
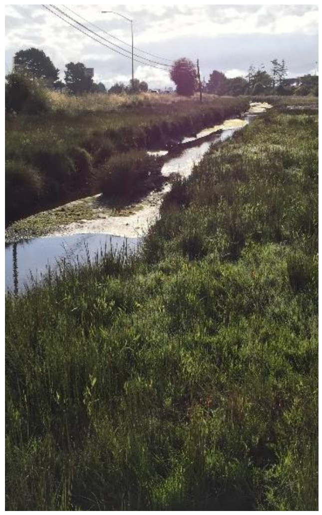
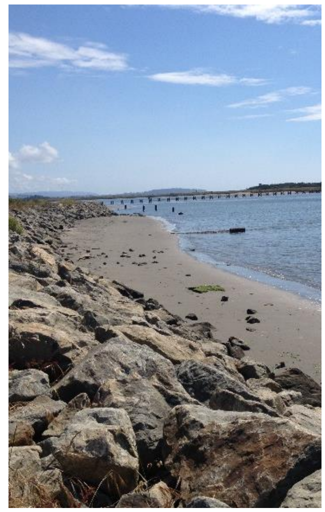


The Eureka Area Watersheds Storm Water Resource Plan

GHD | 718 3rd Street Eureka, California

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List of Acronyms

- BLM: Bureau of Land Management
- BMP: Best Management Practices
- Caltrans: California Department of Transportation
- CSD: Community Service District
- DWR: Department of Water Resources
- EAWSWRP: Eureka Area Watershed Storm Water Resource Plan
- HBI: Humboldt Bay initiative
- HBMWD: Humboldt Bay Municipal Water District
- HCSD: Humboldt Community Services District
- LID: Low Impact Development
- MS4: municipal separate storm sewer systems
- NCRP: North Coast Resource Partnership
- NCSC: North Coast Stormwater Coalition
- NPDES: National Pollutant Discharge Elimination System
- NCIRWMP: North Coast Integrated Regional Water Management Plan
- NCRWQCB: North Coast Regional Water Quality Control Board
- PCBs: Polychlorinated Biphenyls
- SWRCB: State Water Resources Control Board
- SWRP: Storm Water Resource Plan
- TAC: Technical Advisory Committee
- TMDL: Total Maximum Daily Load
- US EPA: United States Environmental Protection Agency
- USGS: United States Geological Survey
- WDR: Waste Discharge Requirement
- WWTP: Waste Water Treatment Plant

1. Introduction

Traditional approaches to storm water management have focused on rapid conveyance to surface waters without providing treatment of runoff. These traditional approaches have limited the capacity of storm water to be thought of as a resource and has resulted in detrimental impacts to downstream surface water bodies including hydromodification, destabilization, erosion, and pollution. In recent years, storm water management approaches have shifted to focus around mimicking natural hydrology and watershed processes by incorporating low impact development (LID) and green infrastructure. These design approaches typically provide treatment and infiltration, or temporary storage, of rainfall close to where it occurs.

A storm water resource plan (SWRP) is a planning document that aims to protect the beneficial uses of waters that receive storm water and dry weather runoff. Unlike many planning documents, an SWRP is a watershed-based document that facilitates collaboration among state, regional, and local agencies, and nongovernmental organizations and other stakeholders. The Eureka Area Watersheds SWRP (EAWSWRP) covers the watersheds that drain to Humboldt Bay from the east and the hydrologically-connected areas (Appendix B, Figure A1).

This project is a regional collaboration between Humboldt County, the City of Eureka, and the Humboldt Community Services District (HCSD) in addressing the region's water resources and setting regional priorities for improving storm water systems.

This SWRP includes a prioritized list of projects to address storm water, dry weather runoff capture, and sea level rise adaptation for the project watershed and component sub-watersheds. The SWRP meets the requirements of the California Water Code section 79747 and the Stormwater Resource Plan Guidelines. The SWRP provides a tool to inform future capital improvement plans and watershed management plans.

1.1 Background and Purpose

A SWRP is a required as a condition of receiving funds for storm water and dry weather runoff capture projects (Water Code section 10563 (c)(1)). This requirement applies to Proposition 1, which authorized $200 million in grants for multi-benefit storm water management projects. The impetus of an SWRP is to prioritize projects that address the water quality impacts from storm water discharges while providing multiple benefits such as public education and ecological enhancement within a local watershed. Additionally, the Plan provides a framework that extends beyond jurisdictional boundaries and facilitates watershed-based management.

To develop the EAWSWRP, a technical advisory committee (TAC) was formed. Members from several agencies that operate within the project watershed were included (Table 1-1).

Table 1-1. EAWSWRP Technical Advisory Committee members.

Affiliation	Name	Role/ Responsibility
City of Eureka	Kelly Allen	City Project Manager - Day to Day contact- Oversee consultant work
City of Eureka	Jesse Willor	Deputy Director of Public Works - Engineering - SWRP Reviewer
County of Humboldt	Todd Becker	County Point of Contact/ Lead on Implementation - Day to day contact
County of Humboldt	Hank Seeman	Deputy Director - Environmental Services - SWRP Reviewer & Liaison with Elk River Watershed Group
Humboldt CSD	Tim Latham	Superintendent - SWRP Reviewer
Humboldt CSD	Mickey Hulstrom	Community Services Manager - SWRP Reviewer
Humboldt CSD	David Hull	General Manager HCSD - SWRP Reviewer
North Coast Regional Water Quality Control Board	Brendan Thompson	General Guidance – SWRP Reviewer

1.2 Goals and Management Objectives

The TAC developed a set of goals and objectives that collectively contribute to the formation of the SWRP. The draft goals and management objectives are included below.

SWRP Goals

- Characterize watershed processes, surface water quality, storm drainage systems, and land use characteristics of the Eureka Area watersheds
- Provide historical context and analysis of Eureka Area watersheds through previous regional planning efforts, analysis of drainage issues, analysis of water quality and compliance, and existing TMDL implementation plans
- Provide a quantitative and transferable methodology for the identification and prioritization of stormwater and dry weather runoff capture projects for multiple benefits
- Outline specific stormwater and dry weather runoff capture projects within the SWRP area
- Leverage stakeholder expertise and knowledge through past planning documents, community engagement efforts, and continued communication and data sharing among stakeholder groups
- Develop framework for future stormwater resource planning and program implementation through adaptive management

SWRP Management Objectives

Increase Regional Coordination

- Improve data management, sharing, and access for stakeholders and public
- Improve understanding of connections between the City/ County and County/ HCSD infrastructure

Support MS4 Permit Compliance

- Enhance City, County, and developer standards for LID implementation, consistent with the Humboldt County LID Stormwater Manual
- Support community education and involvement in storm water programs

Improve Water Quality

- Reduce runoff from impervious areas
- Reduce/ control sediment runoff in upper forested watersheds
- Increase natural stormwater treatment
- Support TMDL implementation

Flood Management

- Reduce localized flooding
- Reduce peak stormwater flows

Protect and Enhance Natural Resources & Community Benefits

- Re-establish riparian habitat, natural drainages and treatment where feasible as part of stormwater management
- Return drainages to a more natural condition
- Increase greenspaces
- Continue community involvement in stormwater planning

1.3 Elements of the SWRP

This document is divided into several sections that encompass overarching categories of an SWRP. The main sections and a brief description is provided here.

Section 2 Description of Watersheds Addressed by the EAWSWRP: An overview the water resources, existing planning efforts, and watershed characteristics is provided in this section. This section discusses the pertinent background information within the project watershed.

Section 3 Water Quality Compliance: This section presents the water quality issues within the project watershed. Existing plans, permits and waste discharge permits are presented in this section.

Section 4 Organization, Coordination and Collaboration: Organizations that contributed to the development of this Plan are discussed in this section. Stakeholder and public outreach and involvement, and consistency with previous planning is also presented.

Section 5 Quantitative Methods for Identification and Prioritization of Projects: The methods for identifying and prioritizing projects to be included in this Plan is outlined in this section.

Section 6 Plan Implementation Strategy and Scheduling of Projects: The resources, schedule, and strategy for the implementation of this Plan is presented in this section. This section also presents how this Plan will be maintained as a living document.

2. Description of Watersheds Addressed by the EAWSWRP

The project watershed boundary lies within Humboldt County and encompass the City of Eureka and unincorporated areas of Humboldt County including Myrtletown, Fields Landing, Cutten, Ridgewood, Brainard, and Indianola (Appendix B, Figure A1). The upper portion of the watershed is generally less populated compared to the lower portion of the project watershed. The hillslope areas of the upper region are primarily occupied by timber production and harvesting activities, while the lower portions are typically more urbanized. Surface waters within the project watershed drain to Humboldt Bay, which is the largest estuary in California north of San Francisco. Humboldt Bay offers typical coastal values of an estuarine embayment as well as a major shipping center and an extensive commercial oyster industry (Dyett and Bhatia 2002).

2.1 Previous Planning and Data Collection Efforts

To utilize previous planning and watershed characterization efforts, an extensive literature and data review was conducted. Relevant and available reports, water quality studies and data, water quantity data, and GIS data known to exist were identified and reviewed. A summary of the documents and datasets collected is provided in Appendix C. A brief summary of relevant, existing plans and studies within the project watershed is provided in the following sections.

2.1.1 Regional Plans

The relevant regional plans addressed below are the North Coast Integrated Regional Water Management Plan (NCRP 2014) and the North Coast Water Quality Control Plan (NCRWQCB 2011). The project watershed is one of many watersheds addressed in these two plans. A brief summary of each plan is provided in the following sections.

2.1.1.1 North Coast Integrated Regional Water Management Plan

The North Coast Integrated Regional Water Management Plan (NCIRWMP) is planning document that discusses major water-related issues and objectives within the North Coast region. The plan provides a centralized and collaborative framework for addressing local, regional, and statewide water resource priorities (NCRP 2014). The NCIRWMP was developed by the North Coast Resource Partnership (NCRP). The NCRP is comprised of the seven North Coast counties and tribes within the NCRWQCB watershed boundary. The NCIRWMP is supported by over 100 agencies, special districts, Tribal organizations, non-governmental organizations, watershed groups, and other stakeholders. The overarching goals of the NCIRWMP are beneficial uses of water, salmonid enhancement, energy independence, climate adaptation/mitigation, economic vitality, local autonomy, intraregional cooperation, and adaptive management. The plan outlines a project application, review and selection process. Details for selected projects are available on the NCRP website (NCRP 2013). This SWRP will be incorporated into the NCIRWMP Planning document as discussed further under Section 6.2.2.

2.1.1.2 Water Quality Control Plan for the North Coast Region

The North Coast Regional Water Quality Control Plan (Basin Plan) is a comprehensive document that describes the existing and potential beneficial uses of the waters within the region. The plan serves a regulatory tool for the Regional Water Board and other agencies in their permitting and resource management activities. It is also utilized as an educational and reference document for stakeholders and members of the public. The Action Plan outlined in the Basin Plan for Humboldt Bay includes: (1) discharger surveillance and monitoring, (2) review and assessment of land use activities, and (3) continued coordination with other state and local agencies with various responsibilities with regards to Humboldt Bay (NCRWQCB 2011).

2.1.2 Local Planning Documents

Of the plans and studies that have been conducted within the project watershed, the most relevant documents are summarized below. Information from other studies within the project watershed area is provided in the Data Gap Summary, which can be found in Appendix C.

2.1.2.1 City of Eureka Phase II NPDES Storm Water Management Plan

The City of Eureka's Storm Water Management Plan was developed to comply with the Federal Storm Water Phase II Final Rule, which requires operators of small municipal separate storm sewer systems (MS4s) to obtain coverage under a National Pollutant Discharge Elimination System (NPDES) permit.

The plan provides a description of the area's watershed, storm sewer system, priority pollutants, and target audiences. Individuals and departments accountable for the various implementation responsibilities are identified. As required by the Phase II rule, the SWMP includes six minimum control measures: (1) public education and outreach, (2) public involvement/participation, (3) illicit discharge detection and elimination, (4) construction site runoff control, (5) post construction storm water management, and (6) pollution prevention/good housekeeping practices for municipal operations (W&K 2005).

2.1.2.2 Eureka Storm Drain Master Plan

The Eureka Storm Drain Master Plan was developed for the City to map and evaluate the storm sewer system. Key elements of the plan include: design criteria to be used for sizing drainage improvements, identified problem areas and recommendations, a method for project prioritization, and potential methods for funding projects (W&K 1996). Although the plan was developed in 1996, City staff continue to use the document to identify storm sewer system improvements.

2.1.3 TMDLs

A Total Maximum Daily Load (TMDL) is a planning and management tool used to assess and protect water quality in a given watershed. A TMDL is generally required for water bodies that are placed on the list of impaired waters, as defined by Section 303(d) of the federal Clean Water Act. Section 303(d) requires that states develop a list of water bodies that do not meet water quality standards once technological feasibility is considered. In California, once a water body is placed on the 303(d) list, there are five steps to develop a TMDL (SWRCB 2017):

1. Involve stakeholders
2. Assess the water body
3. Define the total load and develop allocations
4. Develop an implementation plan
5. Amend the Basin Plan

Within the project watershed, a total of five water body segments are on the 303(d) Impaired Water Bodies List (Appendix B, Figure A3). Further discussion of the impaired water bodies and TMDL status is provided in 3.1.2.1.

2.1.4 Data Gap Analysis

The initial data gap analysis conducted for this SWRP indicated that previous efforts have resulted in a large set of studies and datasets that are useful for the development of this document. Although data from previous efforts will be utilized, data collection in portions of the watershed will be needed. A memorandum summarizing the data gap analysis is included in Appendix C.

2.1.5 Data Collection

Data collection efforts included are summarized in Appendix H and Appendix I.

2.2 Watershed and Subwatersheds

The project area watershed covered by this SWRP is located within the Eureka Plain Hydrological Unit and covers approximately 80,500 acres. The subwatershed areas (Appendix B, Figure A4) are CalWater-defined watersheds and include the following:

- Cloney Gulch
- Fay Slough
- Little Freshwater Creek
- Martin Slough
- Ryan Slough
- Upper Freshwater Creek
- W. Side Eureka
- Pine Hill
- Fields Landing
- Lower S. Fork Elk River
- Upper S. Fork Elk River
- Lower N. Fork Elk River
- Upper N. Fork Elk River
- Lower Elk River

These subwatersheds were selected as the focus of the SWRP for several reasons. The small size of the subwatersheds, which ranges from approximately 230 to 9,435 acres, lends itself to quantitative analysis of storm water and dry weather runoff patterns while the large project watershed boundaries allow for comprehensive and integrated storm water management with a multi-benefit approach. The watershed downstream channels all flow through the most urbanized and highly populated regions within the Eureka Area. The storm water and wastewater infrastructure between the City and the County/HCSD is connected, and the project watershed area allows the entities to coordinate planning at a higher level than they have historically. The collaboration across local and regional governments, utilities, and stakeholders facilitates a cooperative approach to assessing storm water management needs. Neighboring watersheds do not have the same urban characteristics as the proposed watersheds in the SWRP and are therefore not covered by this SWRP.

2.3 Surface Water Resources

Water bodies within the project watershed (Appendix B, Figure A5) support a variety of beneficial uses including municipal and domestic supply; agricultural supply; industrial service supply; groundwater recharge; freshwater replenishment; navigation; water contact recreation; non-contact water recreation; commercial and sport fishing; cold freshwater habitat; wildlife habitat; rare, threatened, or endangered species; marine habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; estuarine habitat; aquaculture and Native American culture (NCRWQCB 2011). Surface waters are discussed further below, broken out by the two major drainages and other small creeks that drain to Humboldt Bay. The water quality concerns that pose risks to these water bodies is also included in this section.

2.3.1 Elk River and Freshwater Creek

The two main surface waters, Elk River and Freshwater Creek are listed as 303(d) impaired waters due to sedimentation and siltation (SWRCB 2015a). Although watershed boundaries vary by study, the typical sub-watersheds included in the Elk River and Freshwater Creek watersheds are provided in Table 2-1. An Adopted Action Plan for the Upper Elk River Sediment TMDL has been developed (NCRWQCB 2016) and a sediment source assessment was completed for the Freshwater Creek TMDL area (PWA 2006). Historical, and to a lesser extent, ongoing timber harvesting practices and road construction have contributed to increased levels of sediment and silt in streams, as well as non-point source runoff (County of Humboldt 2017, PWA 2006). Other sedimentation, particularly for the Freshwater Creek sub-watersheds is a result of the fine-grained nature of the underlying geologic units (WPN 2003). Large amounts of natural sediment are typical of wet and tectonically active areas underlain by weak rocks (HWISRP 2002).

Table 2-1. Grouped CalWater Subwatersheds

Watershed	CalWater Subwatershed(s)
Elk River	Upper N. Fork Elk River, Upper S. Fork Elk River, Lower N. Fork elk River, Lower S. Fork Elk River, Lower Elk River, and Martin Slough
Freshwater Creek	Upper Freshwater Creek, Little Freshwater Creek, Cloney Gulch, Fay Slough, and Ryan Slough

2.3.2 Humboldt Bay

In addition to sediment and silt, other water quality issues in Humboldt Bay include dioxins (EviroNet and ENVIRON 2003) and fecal coliform (Humboldt Bay Shellfish TAC 2003). The presence of these constituents has previously led to the shellfish harvesting closure, which ultimately led to the formation of a shellfish Technical Advisory Committee (County of Humboldt 2017). Polychlorinated biphyenyls (PCBs) also contribute to water quality issues within Humboldt Bay.

Varying levels of dioxins detected in the Humboldt Bay are suspected to have persisted in soil on the sites of former lumber mills, rail yards, and other industrial sites, as well as in bay sediments near contaminated upland sites and creek mouths (SHN 2015). Dioxin equivalent results studies assessed by the SWRCB and the Regional Water Board demonstrated that 25 out of 70 fish or shellfish tissue samples exceeded the 0.3 ng/kg Office of Environmental Health Hazard Assessment screening value (NCRWQCB 2010). Dioxin toxic equivalents are used as a measurement for dioxin contamination of waterbodies. Dioxin is listed as a pollutant that impairs Humboldt Bay and renders it an Impaired Water Body under Section 303(d) of the CWA. Dioxins are extremely toxic, very long-lasting compounds that can cause reproductive damage and cancer. These compounds bind to sediments, slowly moving through the Bay on tides. Dioxins in Humboldt Bay bioaccumulate in fish and shellfish, becoming more concentrated as they move up the food chain, potentially harming humans and wildlife alike (Humboldt Baykeeper 2016).

Fecal coliform testing in and around Humboldt Bay suggested that Fay and Ryan's Slough, and eight of sixteen sampling locations in Eureka experience elevated fecal coliform concentrations during dry weather, and Fay Slough and Elk River, and four other locations within Eureka appear to have a constant source of fecal coliform during wet weather (Humboldt Bay Shellfish TAC 2003). Martin Slough and Lower Elk River, which both drain to Humboldt Bay are listed on the 303(d) List for fecal indicator bacteria (SWRCB 2015b). Nonpoint sources that may contribute to an increase in fecal matter presence include activities by domestic livestock, wildlife, migratory fowl, septic systems, horticultural runoff, urban runoff, marina and boating activities, Cal-Trans and railroad maintenance related activities rainfall related releases (Humboldt Bay Shellfish TAC 2003).

Humboldt Bay was included in the EPA's 303(d) List of impaired waters in 2002 for PCBs. The source of PCBs in the Bay is unknown (SWRCB 2015b). There are no known natural sources of PCBs. PCBs have historically been used as coolants, lubricants, capacitors, and other electrical equipment (ASTDR 2011). Although the manufacture of PCBs was stopped in the U.S. in 1997, the compound does not readily break down, and persist in the environment for long periods of time (ATSDR 2011 and HBHRCD 2006). A 'low' priority designation was assigned for developing a TMDL for PCBs in the Bay.

2.3.3 Priority Pollutants

The priority pollutants within the project watershed were determined based on statewide priority pollutants, pollutants that affect 303(d) listed water bodies, and common pollutants of concern. (Table 2-2). Pollutants were categorized into primary and secondary pollutants. Primary pollutants are those driven by a regulatory framework while secondary pollutants are those that are considered common pollutants of concern in certain areas.

Table 2-2. Pollutants of Concern within the Project Watershed

Pollutant	Primary Pollutant	Location(s)	Source(s)
Sediment	X	Elk River, Freshwater, City of Eureka	NCRWQCB 2016, PWA 2006, W&K 2005
Nutrients		City of Eureka	W&K 2005
Trash	X	Countywide	SWRCB 2017b
Indicator bacteria	X	Lower mainstem Elk River, Martin Slough, Humboldt Bay	SWRCB 2017a, NCRWQCB 2011
Dioxin toxic equivalents	X	Humboldt Bay	SWRCB 2015b
Polychlorinated Biphenyls	X	Humboldt Bay	SWRCB 2015b
Pesticides		City of Eureka	W&K 2005
Hydrocarbons		City of Eureka	W&K 2005

2.4 Groundwater Resources

Groundwater levels in the Humboldt Bay region are typically relatively high due to coastal influences and a wet climate. In unconfined portions of the alluvium, groundwater occurs at depths less than ten feet (DWR 2004). Groundwater levels are therefore likely to affect surface water and storm water and dry weather runoff infiltration. The Eureka Plain groundwater basin is defined as part of the California Coastal Basin Aquifer and is the only groundwater basin identified in the project watershed boundaries (Appendix B, Figure A6).

The basin is approximately 37,400 acres (CA DWR 2004). It is composed of Quaternary alluvium and deposits of the Hookton Formation underlain by non-marine Wildcat series deposits (CA DWR 2004). Pliocene Hookton formation, which underlies approximately 70 percent of the basin, is the primary water-bearing formation. Holocene dune sand, which occurs along the coast, and alluvial deposits located southeast of Arcata Bay and along the Elk River also provide water storage (CA DWR 2004). Precipitation and seepage from surface waters are the primary source of recharge, with some lateral groundwater movement from adjacent formations (CA DWR 2004). The groundwater within the Eureka Plain basin is characterized as calcium-magnesium type water with TDS concentrations ranging from 97 to 460 mg/L (CA DWR 2004). Other localized impairments to groundwater as drinking water include high boron, iron, manganese, and phosphorus (CA DWR 2004). Saltwater intrusion also poses a threat to groundwater quality within the basin (Humboldt County, 2017). The only public agency that withdraws water from the Eureka Plain basin is HCSD as further discussed below.

2.5 Water Supply

In general, the watershed is located in an area with an abundance of water supplies. However, understanding how water is supplied is necessary for an integrated storm water management approach.

2.5.1 HBMWD, the City of Eureka, and HCSD

Water supply in the project watershed is provided primarily by HMBWD for the urban areas and private wells in rural areas. HBMWD extracts water via Ranney Collectors from the aquifer beneath Mad River, approximately 9 miles north of the project watershed. The system produces an average of approximately 10 million gallons per day (11,000 AFY) (HMBWD 2016). HMBWD operates the regional water system and provides service at a wholesale level to seven local municipalities, including Eureka and HCSD which are located in the project watershed.

In addition to HBMWD, the City of Eureka maintains water rights to Mad River water equivalent to 6,499 AFY (5.8 MGD). Under the agreement between the HBMWD and the City of Eureka, the deliveries from HBMWD to the City of Eureka are considered to be deliveries of the City's water, emanating from its own water rights not those of HBMWD.

As of 2007, HCSD purchased approximately one third of its potable water from HBMWD, one third from its own wells at the base of Humboldt Hill and Spruce Point area, and one third from the City of Eureka, which also originates from HBMWD (W&K 2007, Freshwater Environmental Services 2011). HCSD owns and maintains three deep (400 foot plus) wells located at the base of Humboldt Hill in the Eureka Plain Groundwater Basin (Freshwater Environmental Services 2016). In 2010, a total of approximately 591 million gallons of water were distributed by HCSD (Freshwater Environmental Services 2011).

2.5.2 Private Water Systems

The remaining residents are served by private water systems including wells, springs and other surface water sources (W&K 2007). Private wells, particularly within the Elk River and Freshwater Valleys, experience poor drinking water quality and have requested public water through HCSD (W&K 2008). According to the USGS, groundwater quality within the Eureka Plain is acceptable for most uses; however, dissolved iron concentrations may exceed the US EPA's secondary drinking water standard of 300 ug/L, and the ionic and bacterial levels make the groundwater unsuitable for domestic or municipal use (County of Humboldt 2017).

2.6 Wastewater Services

Wastewater is handled in one of two ways within the project watershed: conveyance to and treatment at the Elk River Wastewater Treatment Plant, or via on-site septic systems.

2.6.1 The Elk River Wastewater Treatment Plant

For the majority of urban areas, wastewater is conveyed to the Elk River Wastewater Treatment Plant (WWTP), run by the City of Eureka (W&K 2008). Areas located within the City and HCSD are shown in Figure A7 (Appendix B). A total of approximately 45,000 people are served by the WWTP (City of Eureka 2017b). In winter months, high levels of inflow and infiltration (I&I) cause the WWTP and portions of both HCSD's and Eureka's collection systems to reach near capacity (W&K 2008).

2.6.2 On-site Wastewater Systems

Most rural areas within the county have on-site septic systems. A septic system is a biological method of household sewage treatment that can be very effective when it has been carefully designed and installed and then is properly used and maintained. Septic systems are designed to provide partial treatment of the sewage, with disposal to the soil in such a manner that the sewage stays under the ground and is further treated by soil organisms so that contaminants do not reach groundwater or streams. While these systems can work effectively, high groundwater levels can significantly reduce their performance. Once in the groundwater, pollutants can travel up to 100 times the distance in unsaturated soils before achieving the same level of treatment. It is therefore necessary to identify existing and potential future on-site septic system locations to appropriately implement LID features in the rural areas.

2.7 Land Use

The quality of storm water and dry weather runoff through a watershed is predicated on the land use practices within the drainage area. The project watershed is comprised of mixed land uses (Appendix B, Figure A8), which can be described in three general sections based on relative elevation. The headwaters and upper portion of the watershed are primarily comprised of privately-owned second and third growth redwood forest. The majority of the middle watershed is low density rural residential and agriculture. The lower watershed is primarily within the City of Eureka limits, which is mixed land use that is predominately residential and commercial parcels with public parks and privately owned fields. Light industrial land use exists along the Bay.

2.8 Native Habitats

Humboldt County offers a variety of outdoor recreational opportunities due to its abundance of parks and open space. For the county, more than twenty percent of the 2.3 million acres are protected open space, forests, and recreation areas (Dyett and Bhatia Urban and Regional Planners 2002). The rural, upland areas are characterized by coniferous forest dominated by coastal redwood. Other tree species in the project watershed include Douglas fir, grand fir, western hemlock, Sitka spruce, tanoak, and Pacific madrone, and red alder (Coastal Conservancy 2013, WPN 2003). Understory herbaceous species include the western swordfern, evergreen huckleberry, and red huckleberry (Coastal Conservancy 2013, WPN 2003). The lower portion of the watershed encompasses tidelands and marshes, which are integral to many species of waterfowl and shore birds, both for feeding and nesting. Cultivated lands within the project watershed also provide supplemental food for many birds, including small pheasant populations. The tidal areas provide habitat for invertebrates and nursery areas for forage fish, game fish, and crustaceans (SWRCB 2015c).

The project watershed provides habitat to a variety of wildlife species, including species that are a candidate for listing or listed as threatened under the Endangered Species Act. Marbled murrelet and the northern spotted owl, both federally listed species, and the Pacific fisher, a candidate for listing, can be found in the Elk River watersheds (BLM 2016). Freshwater streams within the watershed boundaries support production of federally-listed, anadromous salmonids including steelhead and cutthroat trout, and coho and Chinook salmon (BLM 2016, County of Humboldt 2017, WPN 2003). There are six designated wildlife areas in the project watershed as shown in Figure A9 (Appendix B) and described in more detail below.

2.8.1 Elk River Wildlife Area

Designated as a wildlife area by the Fish and Game Commission in 1991, the Elk River Wildlife Area is a 104-acre area that consists of coastal salt marsh and riparian wetlands. The area provides habitat for mammals including gray fox, coyote, mink, weasel and river otter (CDFW 2017). In addition to wildlife viewing opportunities, visitors can birdwatch, fish, and hunt when permitted during open seasons (California Conservation Connection 2013).

2.8.2 Elk River Wildlife Sanctuary

The Elk River Wildlife Sanctuary is located within the City of Eureka and is home to a variety of birds, sea mammals, and coast plant species including two endangered plant species: beach layia and Humboldt Bay wallflower (RCAA 2001). The sanctuary offers hiking along the California Coastal Trail, paddling along the Elk River estuary and Humboldt Bay shoreline, and bird and wildlife opportunities (RCAA 2001).

2.8.3 Headwaters Forest Reserve

A portion of BLM's Headwaters Forest Reserve is located in the Elk River watershed. The nearly 7,500 acres was established in 1999 to "conserve and study the land, fish, wildlife, and forests" (BLM 2016). The Headwaters Research Center partners with local schools such as East High School in Fortuna and Humboldt State University to conduct research on salamanders, northern spotted owls, and forest regeneration (BLM 2016). The BLM also partners with local organizations to decommission and restore former logging roads (BLM 2016). Other partnerships that assist in the management of the Reserve include CDFW; Pacific Coast Fish, Wildlife and Wetlands Restoration Association; California Conservation Corp; California State Parks; Eureka Court and Community School; Americorps Watershed Stewards Project; Americorps Youth Serve; Save the Redwoods League; and Redwood Parks Association (BLM 2016).

2.8.4 Humboldt Bay National Wildlife Refuge

The Humboldt Bay National Wildlife Refuge includes nearly 4,000 acres of mudflats, estuarine eelgrass meadows, saltmarsh, brackish marsh, seasonally flooded freshwater wetlands, riparian wetlands, streams, coastal dunes, and riparian forest (US FWS 2017). These areas provide habitat for more than 316 species of birds, 220 species of native plants, 40 species of mammals, and approximately 100 species of fish and marine invertebrates (US FWS 2017).

2.8.5 Fay Slough Wildlife Area

The Fay Slough Wildlife Area encompasses approximately 484 acres of restored coastal and seasonal wetlands. The eastern and southern edges of the area are home to red alders and willows. The area provides habitat to resident and migratory songbrids, egrets, herons, and various raptors. Reptiles and amphibians such as the northern red-legged frogs, pacific chorus frogs, northwest salamanders and newts also inhabit the area (CDFW 2017).

2.8.6 McKay Community Forest

The McKay Community Forest is located southeast of Eureka near Myrtletown, Cutten, and Ridgewood Heights within the watershed of Ryan Creek, a tributary of Humboldt Bay. Humboldt County acquired 1,000 acres of forestland from Green Diamond in 2014, and expects to acquire an additional 190 acres in 2018. The McKay Community Forest will be managed for multiple purposes including public access and recreation, timber harvest, and watershed and resource conservation.

2.8.7 Local Parks

While not officially designated as natural or open space in Figure A9 of Appendix B, native habitats are also located in around local parks. These include: Cooper Gulch, Sequoia Park, Freshwater Park, and Halverson Park. These parks provide green space, aquatic resources in streams, riparian areas, and wetlands.

2.9 Watershed Processes

The following sections outline the natural watershed processes that occur within the project watershed and the activities that have disrupted the natural processes within the project watershed.

2.9.1 Hydrologic Setting

The area within the project watershed boundary is unique compared to many regions in California. Unlike many areas in California, the area within the project watershed boundary has an abundance of surface water resources with average annual rainfall ranging from 40 to 80 inches. In addition to a high average annual rainfall, the project watershed is located within the Coastal Plains Heavy Fog Belt reference evapotranspiration zone, which has the lowest evaporation rates in the state (CIMIS 1999).

The project watershed includes areas of coastal climate and those of mountainous terrain. To illustrate the spatial variation in hydrologic conditions, average annual precipitation for two locations in the project watershed, as shown in Figure 2-1, were obtained from the Performance Reporting Information System (PRISM) Climate Group. The spatial variation across the watershed is also demonstrated by the 30-year normals for average annual precipitation (Appendix B, Figure A10).

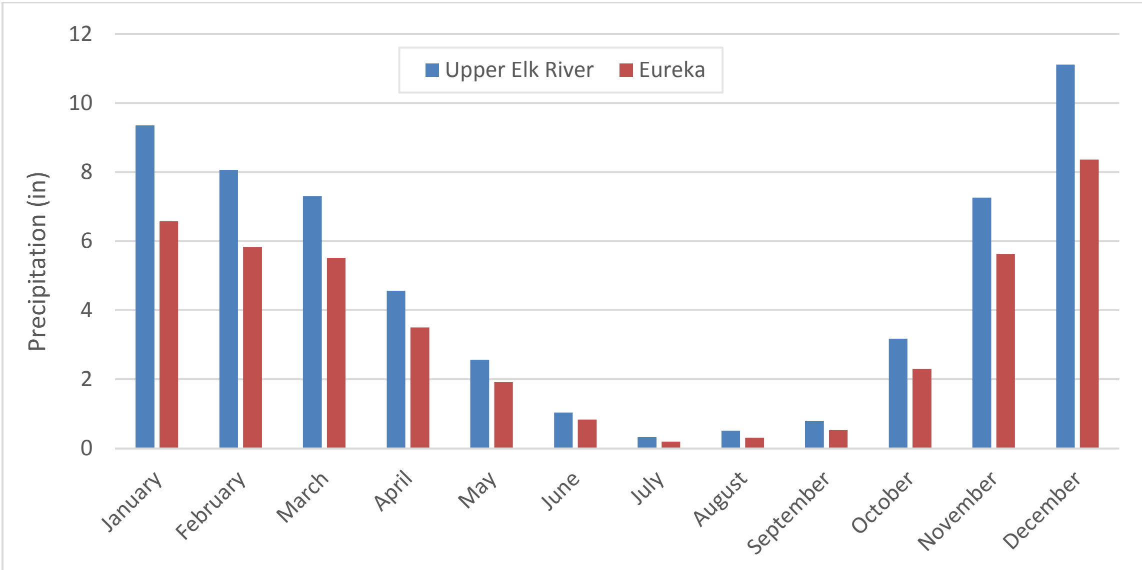

Figure 2-1. Average Monthly Precipitation for Indicated Locations (PRISM 2017)

2.9.2 Natural Processes

The project watershed can be divided into two regions defined by hydrologic behavior: rural areas and urban areas. The rural areas are located primarily in the upper portion of the project watershed, where the physical characteristics of the watershed (e.g., soil type and vegetation cover) dictate hydrology. The urban areas are located primarily in the lower portion of the project watershed, where stormwater flow is controlled primarily by artificial drainage networks and impervious surfaces. Precipitation in the upper portion of the project watershed either flows to a nearby surface water body or infiltrates into the ground. In the lower portion of the project watershed, water flows primarily via artificial drainage networks. In many areas, stormwater runoff cannot infiltrate into the subsurface due to high groundwater levels.

2.9.3 Interruptions to Natural Processes

Although a majority of the rural areas remain relatively undeveloped, natural hydrologic processes of the watershed have been altered due to extensive timber and road building activities. The most markedly changed process within these sub-watersheds is sedimentation, which has been artificially accelerated due to extensive timber and road building activities. These activities, combined with high flow events in the mid to late 1990s, resulted in major deposition on the banks and across the floodplain, reducing the stream flow capacity and raising water surface elevations (TetraTech 2015). Increased sedimentation is evidenced by the reduction in channel conveyance capacity in the upper mainstem Elk River, which is estimated to have been reduced by a factor of 65 since 1965 (Coastal Conservancy 2013); and more frequent flooding and domestic water supply degradation in the area (Coastal Conservancy 2013, Dyett and Bhatia Urban and Regional Planners 2002, WPN 2003).

In the lower portion of the watershed, urban development and human activities that encroach upon the floodplains have affected the distribution and timing of drainage (W&K 2007). Structures and fill placement within the area reduce the flood-carrying capacity of floodplains, increase flood heights and velocities, and increase flood hazards in surrounding areas (FEMA 2015). The drainage systems within the City of Eureka have also been altered by increased impervious areas and constriction of natural water ways. Although flooding is unlikely to be prevented, proper storm water management strategies can aid in attenuating flooding within the project area.

2.9.4 Climate Change

Climate change in California is predicted to lead to increases in temperature, storm intensity, wildfires, and droughts. In the project watershed area, sea level rise (SLR) is the primary climate change factor most likely to impact storm water management. Humboldt Bay's vulnerability is unique because of the combined effects of sea level rise and large tectonic vertical motions associated with the Cascadia subduction zone (NHE 2015). Results from a hydrodynamic model of Humboldt Bay (NHE 2015) is shown in Appendix B, Figure A11. The tectonic activity in the region results in the highest local sea level rise rate in California (Patton et al. 2014).

2.10 Summary of EAWSWRP Watersheds

The following is a list of key findings included in Section 2 Description of Watersheds Addressed by the EAWSWRP:

- The majority of surface waters in the project watershed are listed on the 303(d) Impaired Water Bodies List. Five distinct water bodies are included: Humboldt Bay, Lower Elk River and Martin Slough, Upper Elk River, Upper Little South Fork Elk River, and Freshwater Creek.
- Regulatory-driven pollutants, or primary pollutants, in the project watershed include sediment, trash, indicator bacteria, dioxin toxic equivalents and polychlorinated biphenyls. Common pollutants of concern, or secondary pollutants, in the project watershed include nutrients, pesticides, and hydrocarbons.
- The project watershed boundaries were determined on a watershed-scale that allows for comprehensive and integrated storm water management with a multi-benefit approach. The boundaries facilitate collaborative management amongst entities at a level higher than they have historically.
- Storm water management in the project watershed is unique compared to other areas in California due to a combination of the following: elevated groundwater levels, an abundance of surface water resources, high average annual rainfall, and low evapotranspiration rates.
- The effects of SLR will likely impact storm water management in the project watershed.

3. Water Quality Compliance

This section identifies storm water related activities that generate or contribute to the pollution to the watershed, or that impair the effective beneficial use of surface waters. In addition this section identifies linkages with Total Maximum Daily Load (TMDL) implementation plans, applicable NPDES permits, and Waste Discharge Requirements (WDRs). As discussed in Section 2.3, the two main surface waters within the project watershed, Elk River and Freshwater Creek, flow into Humboldt Bay. Water quality compliance for all three water bodies is included herein.

3.1.1 Contributors to Storm Water Pollution

The following sections identify the activities, both past and present that generate or contribute to pollution of storm water, or that impair the effective beneficial use of surface water. The pollutants evaluated in the following sections were identified as one of the following: (1) a state-wide priority, (2) a pollutant that impairs a water body under Section 303(d) of the Clean Water Act (CWA), or (3) a pollutant of concern according to the City of Eureka or County of Humboldt, as presented in Table 2-2.

3.1.1.1 Sediment

Freshwater Creek and Elk River are both listed as impaired waters under Section 303(d) of the CWA due to sedimentation and siltation. Sediment in Elk River and Freshwater Creek is attributed to both natural and anthropogenic sources. Natural sources include tectonics, geology, soil characteristics, geomorphology, climate, and vegetation. Anthropogenic sources that contribute the sediment and siltation include pre-Forest Practices Act logging, ranching, farming, roads, residential development, removal of riparian vegetation, stream bank modification/destabilization, and timberlands. Sediment is also identified as a pollutant of concern by the City (W&K 2005). Within the City, sediment collects on street and other paved surfaces, and is generated from new construction.

3.1.1.2 Indicator Bacteria

Indicator bacteria is listed as pollutant that impairs the Lower mainstem Elk River and Martin Slough under Section 303(d) of the CWA. Although the exact pollutant source is unknown, agricultural, rural residential, and urban areas are all known to contribute to significant bacterial concentrations in storm water runoff (NCWQRCB 2011). More specifically, sources of bacteria include pet waste and leaky septic or sewer systems.

3.1.1.3 Trash

Trash in surface waters accumulates from intentional and accidental improperly discarded waste, thrown or deposited on land and in water bodies (SWRCB 2015e). The primary sources of trash in water bodies are littering by the public, inadequate waste handling or illegal dumping via storm drain systems, and direct disposal of trash into water bodies from vessels involved in commercial, military, fishing or recreational activities (SWRCB 2015e). Conveyance via storm water is the main transport pathway of trash to receiving water bodies (SWRCB 2015e).

3.1.1.4 Dioxin Toxic Equivalents

Activities attributed to generating dioxin toxic equivalents include industrial activities, including historic lumber mills, and above ground waste storage tank leaks (SHN 2015 and SWRCB 2015b). Hotspots remain from lumber mills that used the wood preservative pentachlorophenol ("penta") from the 1950s through the 1980s, when it was banned except for use on power poles. Unknown sources are also identified as contributing to dioxin toxic equivalents in the Bay (NCRWQCB 2010).

3.1.1.5 PCBs

Polychlorinated Biphenyls (PCBs) are listed as a pollutant that impairs the Humboldt Bay and renders it an Impaired Water Body under Section 303(d) of the CWA. Although the exact sources of PCBs in Humboldt Bay are not known (SWRCB 2015b), PCBs are often released into the environment through spills, leaks from electrical and other equipment, and improper disposal and storage. Although PCB production is prohibited, its stable nature allows the chemicals to persist in the environment.

3.1.1.6 Pesticides

Pesticides are listed as a pollutant of concern for the City of Eureka and are considered a state-wide priority pollutant (W&K 2005). Activities that generate pesticide runoff include residential and commercial use.

3.1.1.7 Nutrients

Nutrients accumulate in storm water runoff throughout the City and are identified as a pollutant of concern in the City's Storm Water Management Plan (W&K 2005). Sources of excess nutrients include fertilizers, pet waste, sanitary sewer overflows, improper restaurant practices, and excessive organic debris (W&K 2005).

3.1.1.8 Hydrocarbons

Hydrocarbons were listed as a pollutant of concern in the City's Storm Water Management Plan (W&K 2005). Parking lots, streets, automotive facilities, and illicit discharges are identified as the primary sources of hydrocarbon contamination (W&K 2005).

3.1.2 Compliance with TMDL Implementation Plans and Discharge Permits

This SWRP supports, is consistent with, and assists in, compliance with TMDLs, applicable NPDES permits and WDRs. This SWRP serves as an educational tool to inform the public and stakeholders about the watershed-wide water quality issues that persist in the project area, and how federal, state, and local regulatory frameworks aim to address these water quality issues. In addition, the EAWSWRP supports the NPDES MS4 Phase II Permit by (1) identifying BMPs that aim to achieve pollutant reduction to the maximum extent practicable from entering receiving water conveyed through MS4 areas and (2) prioritizing LID, trash capture/reduction, and sediment reduction BMPs.

In the project identification and development phase of EAWSWRP, the Humboldt County LID Manual was referenced to incorporate LID elements wherever feasible and practical. For areas in which priority pollutants are of concern, projects that promote these priorities receive additional points in the project prioritization scoring outlined in Section 5.3.1.

3.1.2.1 TMDL Implementation Plans

Section 303(d) of the CWA requires that states develop a list of impaired water bodies that do not meet water quality standards. TMDL Implementation Plans are required for any water body on the 303(d) list. A summary of the 2012 California 303(d) List for water bodies located within the project watershed is provided in Table 3-1.

Table 3-1. Summary of 303(d) list of Impaired Water Bodies Located within the Project Watershed (SWRCB 2015b)

Water Body	Estimated Size Affected	Units	303 (d) Listed Pollutant	Expected TMDL Completion Date
Lower Elk River and Martin Slough	25	mi	Indicator bacteria	2025
Lower Elk River and Martin Slough	25	mi	Sedimentation/siltation	2014
Upper Elk River	93	mi	Sedimentation/siltation	2014
Upper Little South Fork Elk River	2	mi	Sedimentation/siltation	2014
Freshwater Creek	114	mi	Sedimentation/siltation	2017
Humboldt Bay	16,075	ac	Dioxin Toxic Equivalents	2025
Humboldt Bay	16,075	ac	PCBs	2025

Of the water bodies listed, only the Upper Elk River has a completed implementation plan. The Upper Elk River TMDL implementation Plan was formally adopted by the Regional Water Board in May 2016 and is currently being approved by the EPA. The plan demonstrates that the impacted reach of the Elk River currently has a sediment loading capacity of zero, which is equivalent to a zero sediment loading allocation and should be maintained until the reach's physical assimilative capacity has expanded (Tetra Tech 2015). The three key components of the first phase of the Upper Elk River TMDL Implementation Plan are (1) development and enforcement, or waiver, of WDRs, (2) completion of an Elk River Recovery Assessment, and (3) development of a Watershed Stewardship Program (NCRWQCB 2016). Together, these three components provide regulatory and non-regulatory mechanisms to provide source control, remediation, and assessment of the TMDL.

To date, Freshwater Creek is the only other impaired water body for which a TMDL implementation plan is currently underway. A sediment source assessment was conducted in 2006 (PWA 2006); the status of the implementation plan is unknown. This SWRP will be updated as needed to incorporate actions/projects from TMDL implementation plans as they are developed.

3.1.2.2 Waste Discharge Requirements and NPDES Permits

The Federal Storm Water Phase II Rule requires operators of small municipal separate storm sewer systems (MS4s) to obtain a National Pollutant Discharge Elimination System (NPDES) storm water permit. The Phase II Rule is the follow-up to the EPA Phase I NPDES Program, promulgated in 1990 as part of the Clean Water Act. The North Coast Regional Water Quality Control Board (NCRWQCB) is the regulatory agency having Phase II NPDES permit oversight authority for the City and County. The State Water Resources Control Board (SWRCB) issued a WDR General Permit in 2003, which was re-adopted with new requirements in 2013 (Order No. 2013-0001-DWQ). In 2015, Trash Amendments, which apply to all Phase I and II permittees under the NPDES MS4 permits, became effective. The City of Eureka selected Track 1 and County of Humboldt selected Track 2. MS4s that select Track 1 must install, operate and maintain full capture systems in storm drains that capture runoff from one or more of the priority land uses. For Track 2, MS4s must implement a plan with any combination of treatment controls, institutional controls and /or multi-benefit projects within jurisdiction that result in the same performance results of Track 1.

In addition to the General Permit, applicable WDRs and NPDES Permits within the project watershed include:

- Order No. R1-2016-0004: Waste Discharge Requirements for Nonpoint Source Discharges and Other Controllable Water Quality Factors Related to Timber Harvesting and Associated Activities Conducted by Humboldt Redwood Company, LLC in the Upper Elk River Watershed, Humboldt County
- Order No. R1-2013-0005: General Waste Discharge Requirements for Discharges for Timber Operations on Non-Industrial Timber Management Plans (NTMP) in the North Coast Region.
- Order No. R1-2014-0011: Categorical Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvest Activities on Non-Federal Lands in the North Coast Region
- Order No. R1-2016-0001: NPDES NO. CA0024449: Waste Discharge Requirements for the City of Eureka Elk River Wastewater Treatment Plans, Humboldt County
- Order No. 2015-0023: Waiver of Waste Discharge Requirements and General Water Quality Certification for Discharges of Waste Resulting from Cannabis Cultivation and Associated Activities or Operations with Similar Environmental Effects in the North Coast Region

4. Organization, Coordination and Collaboration

Local agencies, nonprofit organizations, and community members collaborated to develop the EAWSWRP.

4.1 Contribution from Local Agencies

This SWRP was developed through a collaborative process between the City of Eureka, the County of Humboldt, and the Humboldt Community Services District (HCSD), with the City of Eureka serving as the lead agency. The continued coordination of these three agencies will be important to the overall success of the SWRP. Annual check-in meetings at one of the North Coast Stormwater Coalition's monthly meetings will help facilitate the ongoing coordination of the SWRP. These agencies are also important to the adaptive management of the SWRP. At the onset of the EAWSWRP process the City of Eureka developed a TAC, which was composed of representatives from the City of Eureka, the County of Humboldt, the HCSD, and the NCRWQCB, as presented in Section 1. The TAC met five times between May 2017 and August 2018 throughout the development of the SWRP and reviewed components of the SWRP on an ongoing basis. The TAC received presentations at these meetings on various aspects of EAWSWRP development; including an overview of the screening and prioritization process and criteria and the resulting storm water capture project opportunities. The TAC reviewed the list of prioritized projects before the public review draft was completed. The project team communicated with the TAC by email and phone in between scheduled meetings as needed. A copy of the TAC agendas and minutes are included in Appendix E.

In the early stages of SWRP development, the project team conducted an extensive literature and data search within the SWRP's watershed boundaries. Following this search, the project team formally requested a list of additional data and materials from TAC members, which included: GIS data, storm water and drainage infrastructure data, sewer infrastructure data, soils and geology data, streamflow data, inflow and infiltration studies, water quality studies, and MS4 Storm Water Permit information. During the initial planning stages the TAC discussed and identified storm water management areas of concern within the SWRP watershed boundary. The project team also requested information about local planned projects from the TAC and other local agencies and organizations through the stakeholder outreach process, which is discussed in further detail in Section 4.2.

The project team released an Administrative Draft of the EAWSWRP to the TAC in May 2018 for review and feedback. Following the review and approval by the TAC, the Administrative Draft was sent to the grant manager at the SWRCB for review and approval. The project team responded to and incorporated the feedback from reviewers and shared the Draft SWRP with stakeholders and the public at a June 2018 workshop and on the EAWSWRP web page. The final EAWSWRP, including a summary of comments and responses from stakeholders and the public, was presented to the TAC on [date to be inserted following meeting]. Following approval by the TAC, the EAWSWRP was submitted to the NCRP for incorporation into the NCIRWMP; this is addressed in further detail in Section 4.3.

4.2 Public Engagement

4.2.1 Stakeholder Outreach, Education and Engagement Plan

As part of the coordination and collaboration efforts of the EAWSWRP a Stakeholder Outreach, Education and Engagement Plan was developed and implemented by the Redwood Community Action Agency (RCAA) (and is included as Appendix D). The Stakeholder Outreach Plan identified the following participant groups in the EAWSWRP development process: TAC members, stakeholders, public, and disadvantaged communities. The project team worked with the TAC to develop a list of stakeholders in the EAWSWRP development process. An effort was made to identify and include stakeholders from a diversity of backgrounds, organizations, and/or areas of the community. The stakeholder list included local agencies, developers, locally regulated commercial and industrial representatives, and nonprofit organizations. The complete stakeholder list can be found in Appendix D. Stakeholder outreach was conducted by email, through the EAWSWRP web page, and through two meetings held in December 2017. Public outreach was conducted through the EAWSWRP web page and TAC member websites, social media pages, the North Coast Stormwater Coalition's (NCSC) public storm water survey, flyer distribution, press releases, and a public workshop in June 2018.

The NCSC's public storm water survey provided an opportunity to learn more about the public understanding of storm water runoff issues and green infrastructure techniques (the term "storm water-friendly" design was used instead of green infrastructure in the public survey). The survey was originally developed by NCSC members with input and assistance from a Humboldt State University natural resources class and was first distributed in 2015 throughout the NCSC member area. The EAWSWRP project team added a question about storm water-friendly design practices on the 2018 survey and added information at the end of the survey about the EAWSWRP process and a link to the web page for more information. The survey was distributed throughout the EAWSWRP project area watershed in both online and print form starting on March 1, 2018 and going through April 30, 2018. The survey is included as Appendix G. The outlet locations for paper copies included: the City of Eureka Engineering Department counter and Spanish and English copies were provided to the English Express class held at the Jefferson Community Center in the economically disadvantaged neighborhood of Westside Eureka. Links to the online survey were placed on websites or social media sites of the following organizations: EcoEureka (City of Eureka site), RCAA, County of Humboldt, HCSD, Sequoia Park Zoo, and Humboldt Waste Management Authority. The online media outlet, Lost Coast Outpost, shared information and a link to the survey on their website. In addition, information about the survey and its location was shared on local radio station KHUM's 'Coastal Currents' weekly show on April 4th, 2018 The storm water survey was a useful tool to provide the general public with information/web link about the EAWSWRP. A total of 501 surveys were completed. The NCSC survey is a tool that can be used in future years to engage a broad section of the public about storm water topics that relate to the EAWSWRP.

The development of a web page for the EAWSWRP was identified in the Stakeholder Plan as an important outreach tool. The dedicated EAWSWRP web page was created on the NCSC's website (northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/). The web page included the following information: need and purpose of a Storm Water Resource Plan (SWRP), EAWSWRP project area map, project timeline, benefits and examples table, draft sections for review

(Watershed Characterization and Water Quality Compliance Sections), and stakeholder and public input opportunities (meeting schedule, project request form, NCSC public survey). The EAWSWRP web page will remain in place to allow the City of Eureka and County of Humboldt to provide updates to the public on this SWRP's implementation and project development.

The Stakeholder Outreach Plan proposed a total of three meetings, two targeted stakeholder meetings (December 2017) and one public meeting (June 2018) to solicit input and potential projects for inclusion in the EAWSWRP.

Stakeholders were notified by email of their inclusion in the EAWSWRP planning process in November 2017 and given a general introduction to the goals of this SWRP. In early December 2017, stakeholders were again notified by email about two upcoming public meetings and presentations about the EAWSWRP and were provided with a link to the EAWSWRP web page, where more information could be found along with a project area map and a storm water project request form for submitting projects to be considered for inclusion in this SWRP.

Information about the EAWSWRP development process was shared by TAC members at various public forums or meeting in an effort to engage stakeholders; this included the NCSC's monthly meetings.

4.2.2 Public Meetings

In order to maximize stakeholders' time and increase attendance, the project team decided to hold the stakeholder outreach meetings/presentations at two of the identified stakeholders' regularly scheduled meetings. The first stakeholder meeting was held during the Humboldt Bay Initiative's (HBI) December 2017 meeting. HBI works toward ecosystem-based management of Humboldt Bay and surrounding watersheds through coordination and collaboration among participants. Participants include representatives from local agencies, nonprofits, academic institutions, consulting firms, as well as interested members of the public. HBI meets on a biannual basis and offers participants an opportunity to learn about new projects, hear updates on existing projects, and increase collaboration. The December 12th, 2017 HBI meeting offered the EAWSWRP project team an opportunity to reach out to many stakeholders, natural resource professionals, and the general public in the Humboldt Bay Watershed about the Plan development process and solicit feedback. The second stakeholder meeting was held during the NCSC's December meeting on December 13, 2017. The NCSC works collaboratively with Northern California city and county governments to reduce storm water pollution and protect local waterways. Coalition members include storm water management staff from the participating cities of Eureka, Arcata, Trinidad, Fortuna, Fort Bragg, and Yreka, the counties of Humboldt and Mendocino, and Humboldt State University, as well as, local, state, and federal agency representatives, non-profit organizations, tribes, consultants, engineers, and interested community members. The NCSC's monthly meetings are open to the public and an agenda is sent out via email to a large list of people a few days prior to the meeting. The EAWSWRP presentation information was included in the December 2017 NCSC meeting agenda. In addition, remote call-in information was available for the NCSC meeting and provided to EAWSWRP stakeholders upon request. Copies of the presentation slides and sign-in/attendance sheets for both of these public meetings can be found in Appendix E and Appendix F.

Upon approval by the TAC for a release date of the public review draft EAWSWRP, the project team scheduled the public meeting for June 26, 2018 from 5:30-6:30pm at the Jefferson Community Center at 1000 B Street in Eureka. A flyer was created to help advertise the meeting, which included a link to the EAWSWRP web page on the NCSC's website (http://northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/). The meeting was promoted in the following ways: 1) posting on websites: City of Eureka, NCSC, HCSD, County of Humboldt; 2) through email list distribution (stakeholder list, NCSC, HBI, City of Eureka); 3) on social media with Facebook posts by the City of Eureka (EcoEureka), NCSC, and RCAA; 4) flyering in public places, with specific attention to flyers being posted at central locations in economically disadvantaged neighborhoods (Jefferson Community Center,,Eureka Natural Foods, Adorni Center, Eureka Co-op, Eureka Public Library in Westside Eureka, USPS Office in Fields Landing, Gills by the Bay Restaurant in King Salmon, Burre Center in Fay Slough); 5) press release distribution to local media outlets: Lost Coast Outpost, Times Standard, and North Coast Journal.

The public meeting in June 2018 provided an opportunity for local stakeholders and members of the general public to learn about the background and need for creating the EAWSWRP and an opportunity to solicit stakeholder and public feedback on the draft SWRP. The meeting included a presentation of the watersheds in the EAWSWRP, evaluations completed, proposed projects, and the benefits for the community and its members. Following the presentation, attendees were invited to participate in a question and answer period where questions and feedback were encouraged. Attendees were provided with paper comment forms as a means of providing feedback or comments. A total of nine people attended the public meeting.

On Friday, June 29, 2018 the public notice of availability of the draft Plan was broadly disseminated to the public, including: all identified local agencies, nonprofit organizations, and other stakeholders, listed in Appendix D, the HBI and NCSC chairs's email lists, the public meeting attendees, and through TAC member websites.. The EAWSWRP web page hosted the public draft of the EAWSWRP, along with a link to a list of prioritized storm water capture opportunities throughout the project area, an email address for providing comments, and an online comment form for providing feedback on the EAWSWRP. The public comment period for the draft Plan was open through the month of July and closed on July 31, 2018.

4.2.3 Disadvantaged and Climate Vulnerable Communities Involvement

The entire project watershed met the criteria of an economically disadvantaged community (DAC), which is defined by the State of California as a community with a median household income (MHI) less than 80 percent of the statewide average (or less than $49,191 based on US Census American Community Survey (ACS) 5-year Data: 2010-2014). The MHI for the entire project watershed area was $46,108.

While the entire watershed is considered a DAC, an evaluation of MHI was conducted at the census block group level to identify the more economically disadvantaged areas in the watershed. During public outreach, a specific effort was made to outreach with flyer distribution for the June public meeting within the more economically disadvantaged neighborhoods in the project area, which included Westside Eureka, Lower Elk River, and Fay Slough. These more economically disadvantaged neighborhoods are also the more climate vulnerable communities in the project area, especially in regard to sea level rise. By including DACs in the development and implementation of the EAWSWRP, storm water runoff-related environmental injustice needs and issues within the project area can be identified and addressed. Figure A12 (Appendix B) shows the locations of the DAC and severely DAC block groups within the project watershed.

4.3 Coordination with Stakeholders

The TAC and project team outreached to potential stakeholders in the development of the EAWSWRP, including local, state and federal agencies, water supply agencies, nonprofit organizations, developers, builders, locally regulated commercial and industrial stakeholders, tribes, and public educational institutions. When developing the initial stakeholder list the TAC considered organizations that work directly with storm water or had the potential in the future to partner on storm water planning and implementation projects. Increasing collaboration around storm water planning in the project area is an important goal of the EAWSWRP development process. The complete list of stakeholders can be found in Appendix D. The stakeholders have been informed throughout the EAWSWRP development process and had an opportunity to review the draft SWRP and provide comments, as described in Section 4.2

5. Quantitative Methods for Identification and Prioritization of Projects

In accordance with Water Code requirements, the EAWSWRP includes a metrics-based evaluation and analysis of multi-beneficial projects that maximize water quality, flood management, environmental, water supply, and other community benefits within the project watershed. Projects were prioritized based on key metrics that contribute to integrated storm water management and address the project watershed's site specific conditions.

Projects included in this SWRP are the result of several sources: projects developed as part of this SWRP, projects identified during outreach, and previously-planned projects. The first step in developing projects for this SWRP was screening for LID BMP opportunities using a spatial multi-criteria analysis (MCA), which is described in Section 5.1. The MCA identified areas in the watershed that are physically suitable for various LID BMP types. The process for the identification of project opportunities, including projects identified during outreach and previously-planned projects is provided in Section 5.2. The analysis conducted to prioritize projects is described in Section 5.3.

5.1 Screening for LID BMP Opportunities using Spatial MCA

A spatial multi-criteria analysis (MCA) was the selected method to identify and prioritize potential locations for LID BMP opportunities. The spatial MCA was implemented using Esri's ArcGIS in conjunction with datasets that capture the physical characteristics of the watershed, described below. Spatial datasets with the following content were used: roads, existing and planned bike routes, sidewalks, parcels, elevation, storm water infrastructure, land use, city boundaries, designated trash priority areas, hydrology flow lines, watershed boundaries, locations of existing stormwater projects, flood hazards, locations of known issues, MS4 boundaries, and designated storm water priority areas. The spatial MCA was conducted assuming that all parcels and road segments in the project watershed were potential locations for project development. The most physically-suitable parcels and road segments were selected by the MCA steps shown in Figure 5-1, each of which is outlined in the following sections. The result of the spatial MCA was a ranked set of parcels and roads that met the required screening criteria (outlined in Section 5.1.2). Note that a ranked set of parcels and roads was developed for each LID BMP type presented in Section 5.1.1.

Figure 5-1. Spatial MCA method summary

5.1.1 Define LID BMPs

The following LID BMPs were included in the screening and identification of project opportunities. These BMPs were identified by the EAWSWRP Technical Advisory Committee (TAC) as meeting the storm water management needs of the project watershed. Several other LID BMPs were considered, but not included in the spatial MCA and are discussed in Section 5.1.1.9.

5.1.1.1 Tree Planter

Tree planters are typically used near impervious surfaces to allow storm water to accumulate and infiltrate. The planters are typically located along a street segment within existing green areas. The installation of these features often require curb modification to divert water from gutters into the tree planter box. A common design of tree planters is provided in Figure 5-2 (NRW 2015).

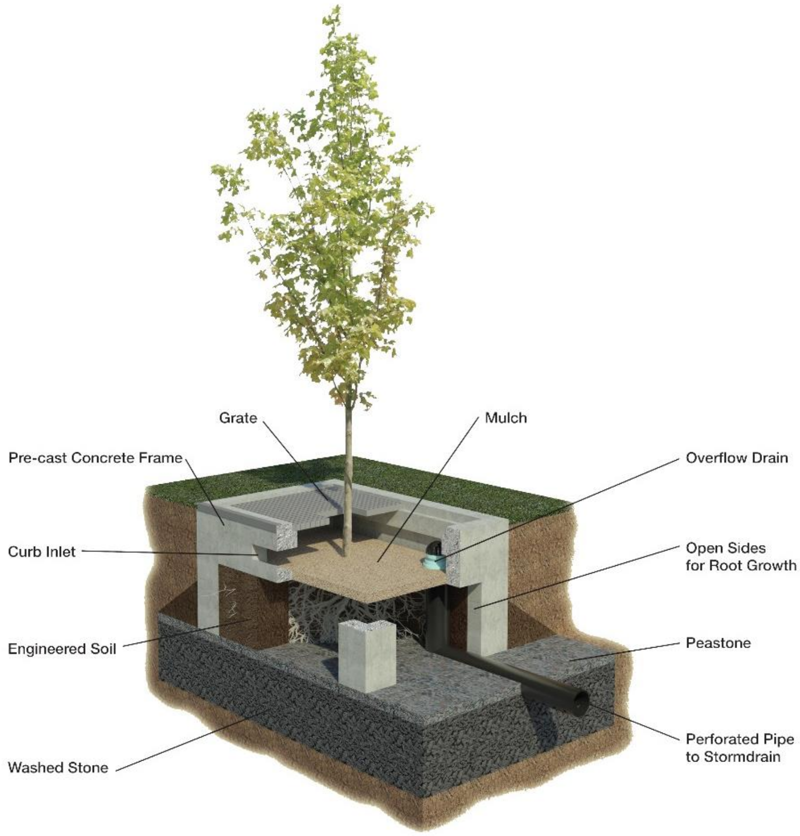

Figure 5-2. Typical Tree Planter Design

5.1.1.2 Bioswale/Vegetated Swale

Bioswales, or vegetated swales, are broad, shallow, trapezoidal or parabolic channels, densely planted with a variety of trees, shrubs, and grasses covering the sides, slopes, and bottom. A bioswale installed in a parking lot is shown in Figure 5-3 (Clemson University 2015). These gently sloped drainages slow the rate at which storm water and dry weather runoff reach a storm water collection system or surface water. Depending on the underlying soil type, bioswales can also facilitate infiltration. Bioswales can be utilized as standalone treatment or in conjunction with other LID features.

Figure 5-3. Bioswale

5.1.1.3 Rain Garden

Rain gardens, or bioretention systems, are used for storm water runoff storage and infiltration. They can be located along street segments or where open space is available. Raingardens incorporate mulch, soil and plants to retain storm water and filter pollutants it may carry. A common design is shown in Figure 5-4 (Durham 2017). Rain garden design may range from simple shallow depressions to more complex designs, but all are structurally engineered to provide interception/capture, infiltration, filtration, storage, and water uptake by vegetation with respect to storm water quantity control. It is common for roof runoff to be diverted into a rain garden, where it can provide water for the vegetation, and infiltration into the soil

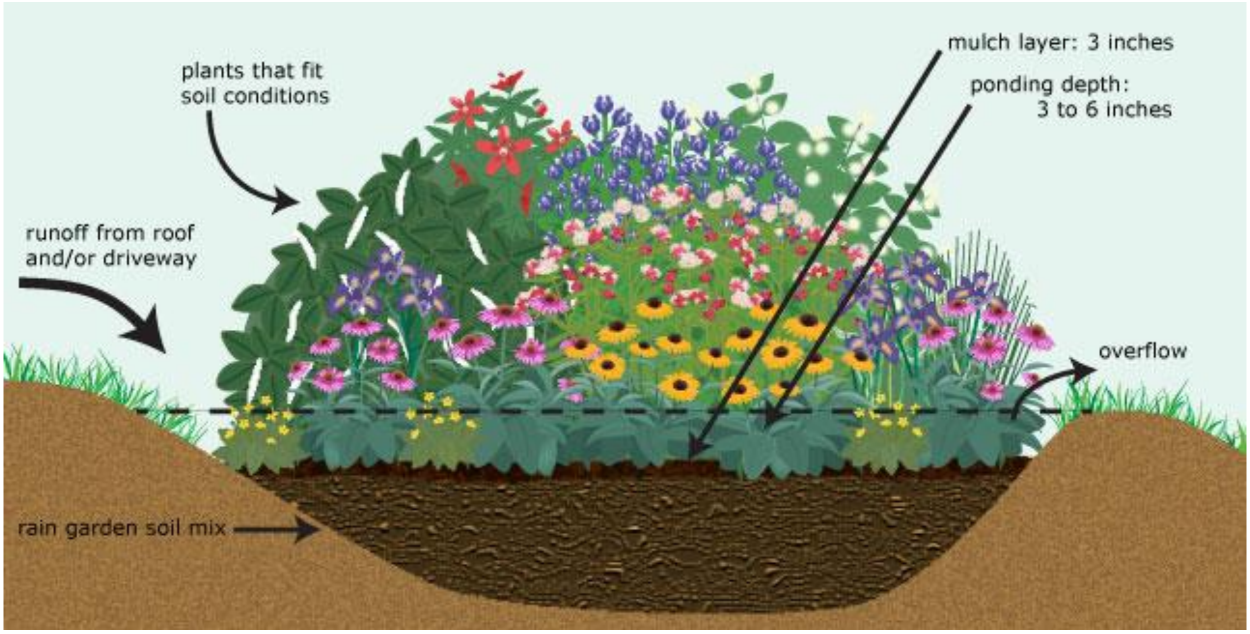

Figure 5-4. Typical Rain Garden Design

5.1.1.4 Permeable Pavers

Permeable pavers are typically concrete or plastic units that interlock together to form a grid in which grass or another permeable media can be placed, as shown in Figure 5-5 (Unilock 2017). Permeable pavers offer local infiltration for surfaces that require a high loading capacity, such as driveways or parking lots. The loading capacity is dependent on a variety of factors including the paver material, spacing between the spacing, and the underlying soil type.

Figure 5-5. Permeable Pavers

5.1.1.5 Infiltrator Pipe

Infiltrator pipes, typically replace existing storm water pipes, but can also be included in a new LID project. The pipe is perforated to allow storm water to infiltrate into the surrounding soils. As shown in Figure 5-6 (Nebraska Extension 2013), gravel is often placed around the pipe to reduce clogging and provide void space to store runoff prior to infiltration. The purpose of infiltrator pipes is to infiltrate storm water that would otherwise be conveyed to surface waters. In addition to the natural filtration that the surrounding soil may provide, infiltrator pipes can provide aquifer recharge.

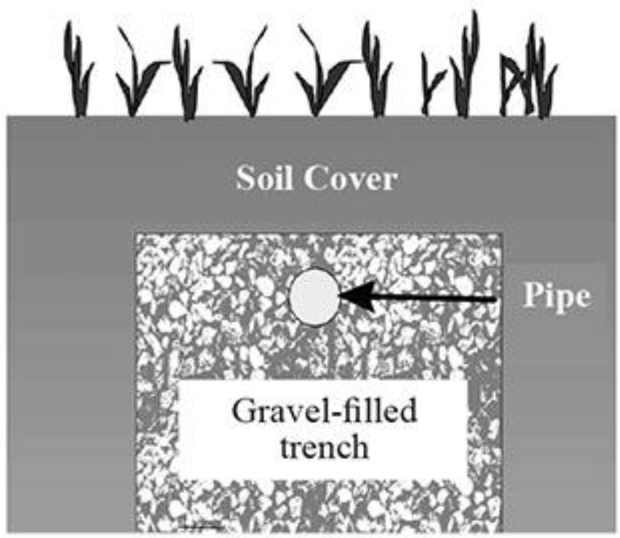

Figure 5-6. Infiltrator Pipe Cross Section

5.1.1.6 Rain Barrels

Rain barrels or cisterns are used to store storm water that can later be used during dry conditions. These features are often connected to gutter downspouts similar to the project shown in Figure 5-7 (City of Lincoln 2018). The captured water is commonly used for lawn and garden watering. The barrels or cisterns can be stored above or underground and can vary greatly in design complexity. Rain barrels are considered a secondary water source and require a backflow device. Rain barrels were not considered applicable to roads. They were also not considered applicable to large undeveloped lots in the upper portions of the watershed.

Figure 5-7. Rain Barrel

5.1.1.7 Trash Capture Devices

In accordance with State Water Board trash capture devices for this SWRP are those that (1) are able to remove particles that are 5 mm or greater and (2) are designed to treat either the peak flow of a one-year, one-hour, storm event, or the same flow as the corresponding storm drain (SWB 2017). Trash capture devices are often retrofitted to existing storm water system features, such as that shown in Figure 5-8 (SFEP 2014). A trash capture device can also be included in one of the LID features by including a screen designed to meet the two aforementioned requirements.

Figure 5-8. Trash Capture Screen

5.1.1.8 Conservation Setback

A conservation setback, or buffer, is an area along a watercourse that is to be protected from development. The purpose of a conservation setback is to protect the natural benefits of shorelines, wetlands, and streams from future disturbance or encroachment. A conservation setback is illustrated in Figure 5-9 (Montana Audobon 2017). Conservation setback projects also provide an opportunity to include in the project stream restoration components.

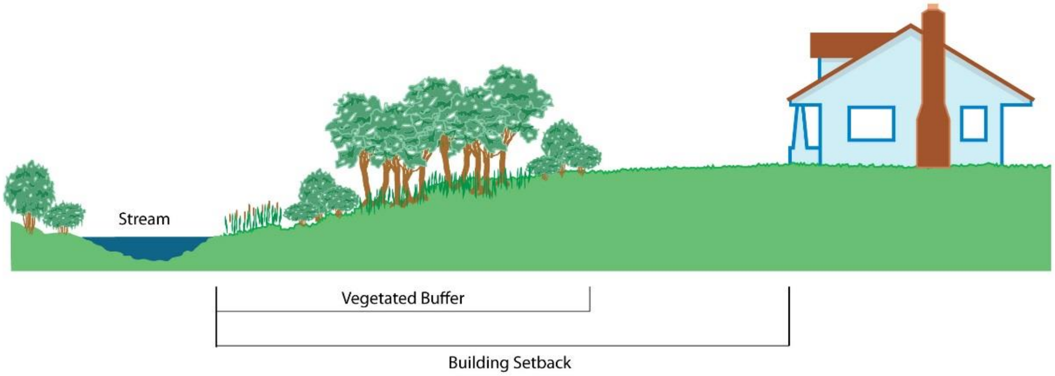

Figure 5-9 Conservation Setback Illustration

5.1.1.9 LID BMPs Omitted from the Spatial MCA

The following LID BMPs were not included in the MCA for identifying project opportunities: (1) green roofs, (2) permeable concrete, (3) soil amendments, and (4) rooftop and impervious area disconnections. These LID BMPs were considered highly-site specific, or not suitable for the project watershed. Although these LID BMPs were not included in the spatial MCA, they may be submitted for inclusion in the EAWSWRP.

Green roofs are vegetated roof covers that can filter, absorb, or detain rainfall. A basic layering structure is shown in Figure 5-10 (Museum of the City Inc. 2017). Green roofs were not included in this MCA for several reasons. Green roof design tends to be more dependent on the local climate, and designs implemented in other areas are not necessarily appropriate for the project watershed, which is located in a cool wet season climate region. A previous study indicated that climates such as the Pacific Northwest are challenging areas for green roof storm water performance (Schroll et al. 2011). In addition, the data that would be required to identify potential locations are not readily available (e.g., accessibility for maintenance, structural capacity, roof pitch).

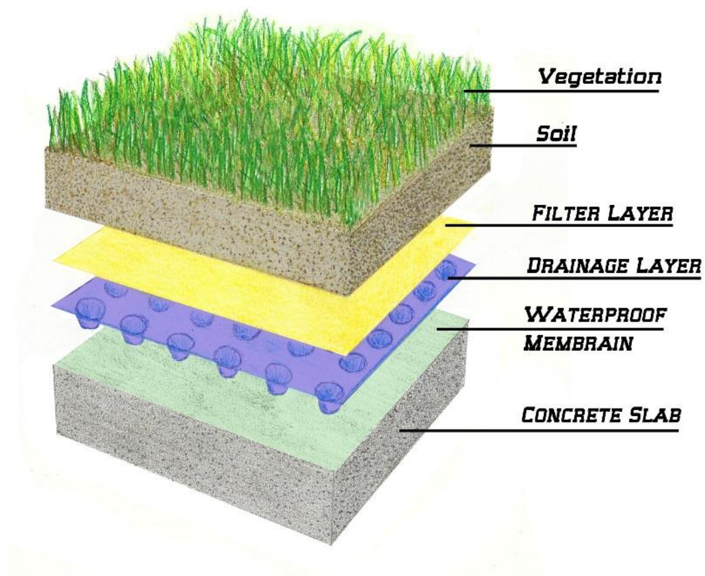

Figure 5-10. Typical Green Roof Design

Similar to permeable pavers, permeable or pervious concrete provides a traffic-loading surface while allowing storm water and dry weather runoff to locally infiltrate. A demonstration of pervious concrete porosity is shown in Figure 5-11 (Pervious Pavement 2011). Permeable concrete was not included in the MCA due to maintenance requirements. Regular cleaning via flushing, jet washing, or vacuum sweeping is required to prevent pore clogging. If regular cleaning is not implemented, it is difficult to unclog pores that have been filled.

Figure 5-11. Pervious Concrete

A soil amendment BMP, or soil quality improvement, consists of either replacing or adding to existing soil amendments such as top soil and mulch, as shown in Figure 5-12 (WDOE 2010). These LID BMPs are often used to increase permeability to improve infiltration. If site restrictions, such as a high groundwater table or septic system, limit the ability to infiltrate runoff, these projects can be designed to improve the soil quality to enhance soil structure, pore space, organic content, and biological activity. This LID BMP was omitted from the MCA because of the site-specific assessment required for design. However, opportunities for soil amendments to be included in conjunction with other LID BMPs were sought after.

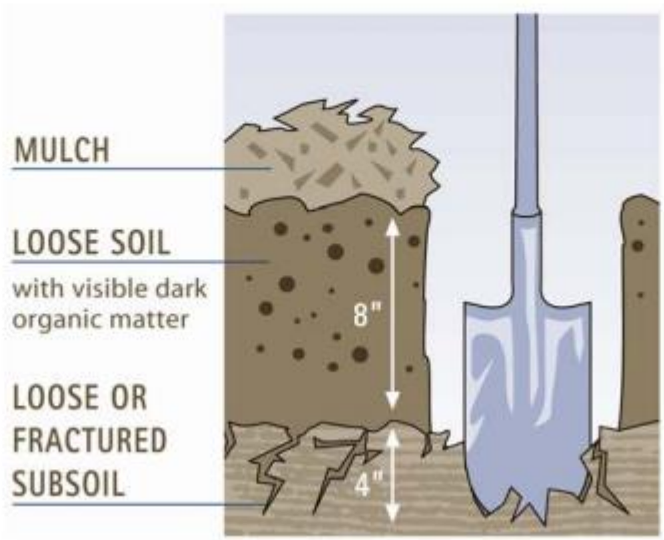

Figure 5-12. Soil Amendment Project

Rooftop or impervious area disconnection typically consists of reducing storm water runoff from impervious surfaces by diverting runoff to pervious areas. An example of this LID BMP is shown in Figure 5-13 (The Urban Farmer Store 2012). Disconnections were not included in this MCA as stand-alone projects because identifying these opportunities is highly site-specific. However, opportunities for disconnections to be included in conjunction with other LID BMPs were considered.

Figure 5-13. Rooftop Disconnection Example

5.1.2 Define Screening Criteria

The criteria used to screen parcels and road segments located in the EAWSWRP watershed for LID BMP opportunities are discussed in this section. Table 5-1 defines the screening criteria and shows which criteria apply to each of the LID BMP types. Each parcel and road segment was screened for each LID BMP. Criteria were applied to both parcels and road segments unless indicated otherwise. The relevance of each screening criteria is discussed in the following sections.

Table 5-1. Summary of LID BMP Screening Criteria

Screening Criterion	Tree Planter	Bioswale/Vegetated Swale	Rain Garden	Permeable Pavers	Infiltrator Pipe	Rain Barrels**	Trash Capture Devices	Conservation setback**
Average Slope < 10%	x	x	x	x	x			
Parcel is publically-owned (parcels only)	x	x	x	x	x	x	x	x
Available Area* (roads only)	x	x	x	x				
Located within Trash Priority Area							x	
Located within 20 feet of existing storm water infrastructure			x		x		x	
Located within 100 feet of a water course								x

*Available area varies based on LID BMP type. Screening criteria for available area by LID BMP type are shown in Section 5.1.2.3.

**These LID BMPs were not considered applicable to road segments

5.1.2.1 Average Slope

The average slope of an area for an LID infiltration feature affects the rate at which storm water capture and infiltration occurs. An average slope of 10% was considered the maximum average slope of a parcel or road for tree planters, bioswale/vegetated swales, rain gardens, permeable pavers, and infiltrator pipes.

5.1.2.2 Public Ownership

To simplify project development and construction processes, only publically-owned parcels were considered for LID BMP opportunities in the MCA. The parcels were first screened by those listed as “Public Land”, ”Schools”, “Non-taxable Entities”, or “Public Utilities”. A second subset of parcels were screened as those whose owner contained the words “Eureka”, “County”, “CSD”, ”School”, ”State”, ”United States”, ”District”, or “City”. These lists were manually sorted into those considered “publically owned” and those not considered “publically owned” and the final parcels were carried through the rest of the MCA process.

5.1.2.3 Available Area

Minimum requirements for available area varied based on the LID BMP type and are shown in Table 5-2. Unless noted otherwise, minimum areas were identified using previous LID design experience. Because spatial datasets showing areas available for project implementation do not exist, the process for determining the available area was different from that of the other screening criteria. The approach for determining area available for roads is provided below. It should be noted space availability was initially considered for parcel screening, but the criterion would not have significantly reduced the number of parcels due to the lack of GIS data for unavailable areas, and the small required minimum area relative to parcel sizes.

Table 5-2. Required Available Area per LID BMP Type

LID BMP Type	Minimum Area (SF)
Tree Planter	9
Bioswale/Vegetated Swale	60
Rain Garden	15
Permeable Pavers	972

*Area determined assuming six 9 ft by 18 ft parking spaces (City of Eureka 2017)

Roads and sidewalks within the project watershed may be wider than is necessary to serve their purpose, and therefore may have available area for storm water improvements, especially when done in conjunction with other roadwork. This space was considered suitable for potential project implementation. To identify segments with sufficient area available, minimum widths for roadways, bike lanes, and sidewalks were used (Table 5-3). The road types were defined in the GIS data provided by the City as a portion of the data collection efforts. For each road segment, each road type was evaluated for its respective minimum width requirements. Both City and County roads in the watershed were assumed to match the minimum width requirements, which were adapted from the City’s General Plan (City of Eureka 1997). The minimum total width for each road type was the sum of applicable features (sidewalks, parking, bicycle lanes, travel lanes, and medians). Sidewalk data was only available within the City of Eureka, and since it was unconfirmed whether or not non-city roads had sidewalks, sidewalk width was excluded from non-city roads. Space for parking was only added to the minimum width for road segments located in areas with a commercial land use designation. Bicycle lanes included both existing and planned routes. The minimum total width for each road segment was compared to the nearest parcel boundary. The space between a road segment's total minimum width and the nearest parcel boundary was considered the available area.

Table 5-3. Minimum Width Requirements (ft) based on Facility Type (adapted from City of Eureka 1997)

Road Type*	Sidewalk (Each Side)	Parking (Each Way)	Bicycle Lane (Each Way)	Travel Way (Each Lane)	Median
Principal Arterial	6	8	5	12	15
Minor Arterial	6	8	5	11	11
Major Collector	6	8	5	12	0
Minor Collector	6	0	5	12	0
Local Road	6	8	5	14	0
Unclassified	6	8	6	11	0

*As defined in the Humboldt County GIS Roads Data

5.1.2.4 Located within Trash Priority Area

Under the Water Board's Trash Amendment, Priority Areas are defined by areas with the following land uses: high-density residential, industrial, commercial, mixed urban, and public transportation stations (SWRCB 2015c). Both the City of Eureka and Humboldt County developed specific Trash Priority Areas for MS4 areas based on a combination of land use and site specific investigations. The spatial layers used in the MCA were the MS4 Trash Priority Areas submitted by the City and County to the SWRCB.

5.1.2.5 Proximity to Existing Storm Water infrastructure

For several LID BMP types, an overflow system would need to be connected to existing storm water infrastructure. For these LID BMP types, twenty feet was considered to be the maximum distance between the edge of a parcel or road, and the nearest storm water feature. Although bioswales and tree planters could be connected to existing storm water infrastructure, these LID BMPs could be constructed independent of storm water infrastructure. Bioswales are typically sloped and are not susceptible to accumulating standing water that may pose a safety risk and therefore do not require an overflow pipe. Similarly, tree planters can be equipped with grates that prevent safety issues that may arise from standing water. The City provided storm water infrastructure locations within the City boundary, and there was field work conducted in Fields Landing and King Salmon to identify locations of some storm water infrastructure features. However, since storm water infrastructure data was not available for the entire watershed area, it was assumed that areas outside the City of Eureka may or may not be within twenty feet of storm water infrastructure. For these instances, rather than receiving a Yes or No for LID BMP suitability, a parcel received a "Maybe". For the ranking criterion discussed in Section 5.1.35.1.2.5, a parcel only received points if three or more LID

BMP types were considered suitable. LID BMP types with a suitability of "Maybe" were not included in the three or more criterion.

5.1.2.6 Proximity to Water Course

To have a conservation setback project, 100 feet was considered the maximum distance between a river or stream and the nearest parcel boundary.

5.1.3 Define Ranking Criteria

The criteria used to evaluate parcels and road segments located in the project watershed are shown in Table 5-4. The weight of each ranking criterion was determined based upon watershed-specific characteristics (e.g. high groundwater table with many areas susceptible to flooding) and input from the TAC. It should be noted that a higher score results in a higher ranking.

Table 5-4. Ranking Criteria

Criteria	Points		Weight
	0	1	
Located within 500 ft of an existing project	No	Yes	3
Located in the 100-year flood plain	Yes	No	1
Located within 500 ft of a known issue	No	Yes	2
Located in a Priority Storm Water Area	No	Yes	3
Land use is open space, parks, or schools*	No	Yes	2
Top-ranked for more than three LID BMP types*	No	Yes	1
Top-ranked for more than two LID BMP types**	No	Yes	1
Located within MS4 Permit Area	No	Yes	2

*This ranking criterion applies only to parcels

*This ranking criterion applies only to road segments

5.1.3.1 Located within 500 ft of an Existing Project

LID BMP opportunities that could be implemented in parallel with an existing planned project were given a higher score because of the increased opportunity for cost-sharing and achieving multiple benefits if projects could be combined.

5.1.3.2 Located in the 100-Year Flood Plain

Fewer points were given to projects located in the 100-year flood plain, which increases their susceptibility to failure during a large storm event.

5.1.3.3 Located within 500 ft of a Known Issue

Higher scores were given to LID BMP opportunities located within 500 ft of a storm water known issue. Known flooding areas were identified by City and County maintenance crew staff.

5.1.3.4 Located in a Priority Storm Water Area

Parcels located in Priority Storm Water Areas, defined in the City and County MS4 permits, were given higher scores.

5.1.3.5 Land Use Type

Land use designations of open space, parks, and schools were considered to increase the opportunity for public outreach, education and involvement.

5.1.3.6 Top-Ranked for More than Two or Three LID BMPs

Higher scores were given to parcels and road segments that were considered top-ranked for more than three LID BMP types, and road segments that were considered top-ranked for more than two LID BMP types. Many of the LID BMP types can be designed in conjunction with other LID BMPs, which increases the opportunity for achieving multiple benefits.

5.1.3.7 Located in MS4 Area

Parcels and road segments located within MS4 permit areas would improve water quality compliance.

5.1.3.8 Located in Complete Street Program Area

The City has selected several roadways for improving safety and fostering vibrant neighborhoods and business districts. These wide roadways lack safe multimodal facilities and provide the opportunity to adapt innovate streetscape and bicycle facility designs to fit the context of a disadvantaged small town. Road segments within the project watershed were given additional points if co-located with one of roadways included in the existing Complete Street Program.

5.1.4 Implement Spatial MCA

All parcels and road segments within 1000 feet of the watershed area were screened for each LID BMP type using the spatial MCA. Esri's ArcGIS was used to complete the Spatial MCA. The output of the analysis was a list of parcels and road segments that met the criteria for each LID BMP type, and an overall score for each parcel and road segment.

5.1.5 Review and Revise

Project suitability for top-ranked parcels, approximately 10% of the publically-owned parcels, were manually inspected using recent aerial imagery. Table 5-5 shows the factors inspected for the various LID BMP types. Note that trash capture devices and stream setback LID BMPs did not require manual inspection because of the specific screening criteria outlined in Section 5.1.2 that was specific to these LID BMPs and did not require additional interpretation.

Table 5-5. Criteria used for manual verification of suitability for indicated LID BMPs.

Criterion Inspected	Tree Planter	Bioswale/Vegetated Swale	Rain Garden	Permeable Pavers	Infiltrator Pipe	Rain Barrels
Potential for converting impervious area	x	x	x	x	x	
Available area	x	x	x	x	x	
Presence of rooftop						x
Presence of greenspace for runoff reuse						x

5.1.6 Summary of Results

The screened and ranked parcels and road segments for the entire project watershed are shown in Figure A13 and Figure A14, respectively (Appendix B). An illustrative example for a smaller area for parcels and road segments is shown in Figure A15 of Appendix B. A list of all ranked parcels is provided as Appendix K. Of the 19,300 parcels in the watershed, 700 are publicly-owned and were included in the ranking. A total of 410 miles of road was evaluated. The total area suitable for the selected LID/BMP types is shown in Table 5-6. A digital database of the MCA results is available on the NCSC website in both an online viewable format and as a GIS geodatabase.

Table 5-6. MCA Roads Results

LID BMP Type	Approximate Area Suitable (acres)
Permeable Pavers	500
Bioswales/Vegetated Swale	515
Tree Planters	515
Rain Garden	325
Infiltration Pipe	325
Trash Capture	75
Conservation Setback	80

It should be noted that two critical site characteristics, soil type and groundwater levels were not included in the MCA. Although important considerations for several of the LID BMPs as both characteristics contribute to the rate and extent of storm water and dry weather runoff infiltration, available data is not contiguous and cannot be interpolated or assumed with sufficient certainty. It is recommended that project development for LID BMPs that facilitate infiltration includes at a minimum, a desktop review of available data and site data be collected if literature is not available. Several resources are provided in Table 5-7. For LID BMP types that require infiltration, areas with groundwater levels at least five feet below the ground surface with a Hydrologic Soil Group of A or B are considered suitable for project development (County of Humboldt 2016).

Table 5-7. Available Resources for Soils and Groundwater Data

Description of Source	Link
DWR Well Completion Reports	https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37
UC Davis Soils Western Humboldt County (1965)	Not available online
SWRCB GeoTracker	https://geotracker.waterboards.ca.gov/
USDA Web Soil Survey	https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
USGS Groundwater Conditions in the Eureka Area (1975)	https://pubs.usgs.gov/wri/1978/0127/report.pdf
UC Davis and NRCS California Soil Properties	https://casoilresource.lawr.ucdavis.edu/ca-soil-properties/

5.2 Identification of Project Opportunities

The following sections outline the identification of projects..

5.2.1 Project Development Tool

Hydraulic and hydrologic models provide a method to evaluate the behavior of storm water runoff both on the ground, and through storm water infrastructure. These models can be adjusted to evaluate different storm events, and the change in storm water flow patterns that may occur if a storm water project is installed.

PCSWMM was selected for the hydraulic and hydrologic modeling for the EAWSWRP. PCSWMM uses a GIS data structure for model construction and data handling, which makes it the ideal choice for the Eureka storm drain study. Additionally, the open-source 1D portion of the model can be used in the future to evaluate the potential quantitative benefits of proposed projects. The overall approach for model construction was to use the City-provided GIS data, and the data collected to develop a trunk-line storm drain system model. Collected flow data was used to confirm the hydraulics of the system was accurately represented. A discussion of the model development, calibration, and results are provided in Appendix I. The configuration of the model allowed for efficient evaluation of multiple LID BMP types for flood reduction and water quality treatment sizing. The model was used in several steps of the project development and prioritization outlined below:

- Located existing areas that may flood during select storm events. Model results included both flooding locations and volumes. These locations were compared to the MCA results and other existing projects to identify multi-benefit project locations.
- Flood reductions were qualitatively estimated based on a visual assessment of model results

- Evaluated potential effects of sea level rise.

In addition to the projects developed as part of the EAWSWRP, planned projects and projects identified during outreach were included in the model where feasible. This allowed for a collective evaluation of all projects in the watershed.

5.2.2 Project Identification

Projects were identified from three primary sources: (1) projects developed before the EAWSWRP, (2) projects identified during outreach, and (3) projects developed as a part of the EAWSWRP.

5.3 Integrated Metrics-Based Benefits Analysis

To prioritize the EAWSWRP projects, an integrated metrics-based benefits analysis was conducted. The metrics used to complete the analysis are discussed in Section 5.3.1, the scoring of the projects in Section 5.3.2, and the prioritized list of projects in Section 5.3.2.

5.3.1 Benefit Metrics

The metrics used to evaluate the benefits of a project are shown in Table 5-8. The benefits were identified using the Water Board's SWRP Guidelines, and amended to account for the specific hydrologic and environmental characteristics of the Eureka Area Watersheds. A summary table with the Eureka Area Watersheds benefits is provided in Appendix J, a minimum of two of these benefits is required to be achieved by any project or program included in this Plan. As discussed in Section 2, the high groundwater table and poorly-drained soils in the lower portion of the watershed limit the areas in which storm water and dry weather runoff can be infiltrated. LID BMP components of projects therefore focus on water quality treatment rather than water quantity benefits, where more conventional storm water management methods are typically required.

The criteria for each benefit's point value were identified taking into consideration that the list of projects will be added to in the future and this metrics-based analysis must be replicable. Table 5-8 details the benefits and the criteria for assigning points. Benefits are scored on a scale of 1 to 3 points. Criteria for the different point values were determined based on other SWRPs, SWRCB literature, and previous projects. The criteria are quantitative where values were identified as reasonably attainable. A point value of zero was assigned for benefits that do not apply to a project. The criteria are considered guidelines and other criteria for determining a benefit's point value will be accepted when justifiable. Each benefit's weight (on a scale of 1 to 5) takes into consideration its contribution to address this SWRP's storm water management objectives and goals discussed in Section 1.2.

Table 5-8. Project Evaluation Metrics

Benefit	Score 1	Score 2	Score 3	Weight
Water Quality				
Increased filtration and/or treatment of runoff	• Increases treatment or filtration of runoff by up to 25% for the contributing drainage area for the 85th percentile of the 24-hr storm event, or • provides treatment for less than 0.25 acres	• Increases filtration and/or treatment of runoff by 25-50% for the contributing drainage area for the 85th percentile of the 24-hr storm event • provides treatment for an area between 0.25 and 0.5 acres	• Increases treatment of filtration of runoff by 50% or more for the contributing drainage area for the 85th percentile of the 24-hr storm event, or • the primary purpose of the project is to provide runoff treatment, and provides treatment for more than 0.5 acres	4
Trash capture	• Provides partial trash removal	N/A	• Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	4
EAWSWRP priority pollutant removal	• Provides minimal secondary priority pollutant removal	• Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hour storm event	• Contributes to compliance with applicable NPDES permits and TMDLs, or • includes treatment techniques known to remove two or more priority pollutants for the contributing drainage area for the 85th percentile of the 24-hour storm event	4
Nonpoint source pollution control	• Implements BMPs that cover less than 5 acres of land	• Implements BMPs that cover between 5 and 10 acres of land	• Implements BMPs that cover more than 10 acres of land	3

Benefit	Score			Weight
	1	2	3	
Conversion of pervious to impervious surface	• Converts between 1000 SF (or 10 parking spaces) from impervious to pervious	• Converts between 1000 SF (or 10 parking spaces) and 1700 SF (or 30 parking spaces) from impervious to pervious	• Converts more than 1700 SF (or 30 parking spaces) from impervious to pervious	2
Water quality monitoring and assessment	• Includes visual inspection of water quality assessments	• Includes regular water quality monitoring	• Includes a water quality monitoring and assessment plan	2
Water Supply				
Water conservation	• Captures and stores storm water that offsets potable water use with storage less than 100 gallons, or • includes drought-tolerant plants, or • incorporates water conservation educational component(s), or • fixes existing water system leaks	• Captures and stores storm water that offsets potable water use with storage capacity between 100 and 1,000 gallons	• Captures and stores storm water that offsets potable water use with storage capacity greater than 1,000 gallons	1
Water supply reliability	N/A	• Provides groundwater recharge from storm water	N/A	1
Conjunctive use	N/A	• Implements conjunctive use program or plan incorporating storm water	N/A	1
Stormwater or dry weather runoff reuse	• Makes use of less than 100 gallons of storm water or dry weather runoff that would otherwise be conveyed directly to a surface water body	• Makes use of between 100 gallons and 500 gallons of storm water or dry weather runoff that would otherwise be conveyed directly to a surface water body	• Makes use of more than 500 gallons of storm water or dry weather runoff that would otherwise be conveyed directly to a surface water body	2

Benefit	Score			Weight
	1	2	3	
Flood Management				
Reduced sanitary sewer overflows	N/A	• Reduces existing sanitary sewer overflow issue within 10 to 20 feet of a storm drain inlet or surface water body	• Eliminates an existing sanitary sewer overflow issue within 10 to 20 feet of a storm drain inlet or surface water body for the 85th percentile of the 24-hr storm event	2
Decreased flood risk by reducing runoff rate and/or volume	• Eliminates flooding for the 1-year, 24-hr storm event, or • includes a project component known to reduce flood risk	• Eliminates flooding for the 10-year, 24-hr storm event	• Eliminates flooding for the 25-year, 24-hr storm event, or • the primary purpose of the project is to reduce flooding that poses a risk to public safety	5
Increased sea level rise resiliency	N/A	N/A	• Includes sea level rise resiliency measures	4
Environmental				
Reduced energy use	N/A	• Reduces energy use	N/A	1
Reduced greenhouse gas emissions	N/A	• Reduces greenhouse gas emissions	N/A	1
Provides carbon sink	N/A	• Provides carbon sink	N/A	1
Re-establishment of the natural hydrograph	N/A	• Provides peak flow attenuation	N/A	2

Benefit	Score			Weight
	1	2	3	
Water temperature improvement	N/A	• Decreases water temperature	N/A	1
Wetland enhancement	• Enhances less than 0.5 acres of wetland	• Enhances between 0.5 and 1 acre of wetland	• Enhances more than 1 acre of wetland	2
Wetland creation	• Creates less than 0.25 acre of wetland	• Creates between 0.25 and 0.5 acres of wetland	• Creates more than 0.5 acres of wetland	3
Riparian enhancement	• Enhances less than 0.5 acres of riparian habitat	• Enhances between 0.5 and 1 acre of riparian habitat	• Enhances more than 1 acre of riparian habitat	2
Riparian creation	• Creates less than 0.25 acre of riparian habitat	• Creates between 0.25 and 0.5 acres of riparian habitat	• Creates more than 0.5 acres of riparian habitat	3
Fish passage improvement	N/A	• Improves fish passage	N/A	4
Urban green space enhancement	• Enhances less than 0.5 acres of urban green space	• Enhances between 0.5 and 1 acre of urban green space	• Enhances more than 1 acre of urban green space	1
Urban green space creation	• Creates less than 0.25 acre of urban green space	• Creates between 0.25 and 0.5 acres of urban green space	• Creates more than 0.5 acres of urban green space	2
Community				
Employment opportunities provided	• Provides employment opportunities	N/A	N/A	2
Disadvantaged community	N/A	N/A	• Provides benefit for disadvantaged community	3
Public education, outreach, and involvement	• Includes public education, outreach or involvement	N/A	N/A	3

Benefit	Score			Weight
	1	2	3	
Public use area enhancement	• Enhances public use area	N/A	N/A	2
Public use area creation	• Creates public use area	N/A	N/A	3

5.3.1 Benefit Metrics Results

Flow rate results from PCSWMM were used to identify opportunities for improved flood management and environmental enhancements where modelling extents allowed. Flood reductions were qualitatively estimated based on a visual assessment of model results. Remaining water quality benefits were measured qualitatively. Community benefits were quantified primarily via communication with project managers, experience from previous projects, and engineering judgement.

5.3.2 Prioritization of Projects

The prioritized projects are shown in Table 5-9. The evaluation for each of the criterion is provided in Appendix M.

Table 5-9. Prioritized Projects

Title	Responsible Organization	Score
West Side Eureka Sub-basin Flood Reduction and Climate Adaptation Program	City of Eureka	71
Henderson Avenue/Mauer Marsh Storm Water Enhancement Project	County of Humboldt	65
Railroad Avenue Drainage Enhancement Project	County of Humboldt	65
Second Street Storm Water Improvement and Adaptation Project	County of Humboldt	63
Fields Landing Drainage Enhancement and Adaptation Project	County of Humboldt	63
King Salmon Drainage Enhancement and Adaptation Project	County of Humboldt	63
Eureka Waterfront Drive Revitalization Project	City of Eureka	62
City of Eureka Red Curb Program	City of Eureka	61
Waterfront Drive Storm Water and Climate Change Adaptation Project	City of Eureka	60
Highland Avenue Area Storm Water Enhancement Project	County of Humboldt	57
Spring Street Storm Drain Realignment	County of Humboldt	55
Humboldt Hill Storm Water Enhancement Program	County of Humboldt	54
C Street Storm Water Enhancement Project	City of Eureka	53
Commercial Street Storm Water Enhancement Project	City of Eureka	53
E Street Drainage Enhancement Project	City of Eureka	51
G Street Drainage Improvement Project	City of Eureka	51
Lewis Avenue Drainage Improvement Project	County of Humboldt	51
McCullens Avenue Storm Water Enhancement Project	County of Humboldt	48
College of the Redwoods Storm Water Improvement Project	County of Humboldt	47
Fields Landing Boatyard Storm Water Improvement Project	County of Humboldt	45
Buhne Street Drainage Enhancement Project	City of Eureka	39
Fifteenth Street Drainage Enhancement Project	City of Eureka	39
Lower Pine Hill and Elk River Road Flood Reduction and Environmental Protection Project	County of Humboldt	38
City and County Outfall Monitoring and Protection Program	City of Eureka	38

Title	Responsible Organization	Score
Harris and Ingly Drainage Improvement Project	County of Humboldt	35
Cooper Gulch Drainage, Environmental, and Community Enhancement Project	City of Eureka	32
Second Slough Enhancement and Adaptation Project	County of Humboldt	32
Duck and O Street Drainage Improvement Project	City of Eureka	26
Zanes Road Flood Reduction Project	City of Eureka	26
Elk River Road at Wrigley Drainage Improvement Project	City of Eureka	26
Berta Road Flood Reduction Project	County of Humboldt	26
Zane Middle School LID Project	City of Eureka	22
Everding South Drainage Improvement Project	City of Eureka	22
H and Madrone Ave Drainage Improvement Project	County of Humboldt	22

6. Plan Implementation Strategy and Scheduling of Projects

6.1 Resources for Plan Implementation

The EAWSWRP includes multiple project types from small LID BMP projects to local drainage basin stormwater enhancement projects up to larger scale stormwater enhancement projects incorporating channel restoration along with water quality improvements, flood improvements, environmental restoration, and community participation. Implementation of this plan and the projects within it will require resources for finalizing project development, local coordination and outreach, and project implementation. The EAWSWRP looked at multiple approaches to meet the resource needs to implement projects. Funding needs are included in the Project Descriptions (Appendix M) for projects that are sufficiently developed to estimate such costs.

6.1.1 Scaling and Coordinating Projects to Maximize available Funding

The first approach that was taken to meet project resources needs was to evaluate several projects types from a programmatic approach. The programmatic projects described in Appendix M were developed to allow project proponents the flexibility to implement LID BMP projects on a small scale as funding allows. The programmatic LID BMP projects were also developed to allow for incorporation into other projects to maximize cost efficiencies and project benefits. For example the Complete Streets LID BMP Programmatic Project included LID BMPs that could be installed one intersection at a time in conjunction with other street improvements made to address pedestrian safety or utility replacement.

6.1.2 Phasing of Local Drainage Basin Projects

The second approach was to acknowledge that like many other communities resources are tight for larger projects, especially if funded by general fund resources. For local drainage basin projects, implementation of improvements can be phased to allow gradual improvement over time.

6.1.3 State and Federal Funding

One of the purposes of the EAWSWRP was to meet state requirement that requires SWRPs in place for an eligible entity to receive State Proposition funds for storm water projects. A focus was made in the development of this plan to evaluate how the existing planned grey infrastructure projects could be re-envisioned to beneficially reuse stormwater and improve water quality. This improves the fundability of existing projects within the multi-benefit criteria framework. Additionally other multi-benefit storm water projects in the project list may be eligible for state funding. Appendix N lists near term and longer term funding opportunities. It is anticipated that Californians in the future will pass new bond measures that could be used in the future to fund projects.

6.2 Implementation

The EAWSWRP currently includes 33 projects and programs (Appendix L) that support the goals of this SWRP. Below are several means to implement the plan.

6.2.1 Incorporation of the SWRP into Existing Plans

The EAWSWRP is a supporting planning document that the City, County, and HCSD can use to support the understanding and need for multi-benefit storm water projects. The high priority projects will be evaluated for incorporation into the Capital Improvement Plans (CIP) for the local agencies.

As the Action Plan for the Elk River TMDL and Freshwater Creek TMDL are developed, priority projects can be incorporated into the implementation plans for each of these TMDLs. How the SWRP will be incorporated into the NCRP NCIRMP is discussed below.

6.2.2 Incorporation of the EAWSWRP into the North Coast Integrated Regional Water Management Plan

As presented in Section 2.1.1.1, the NCRP is a coalition of seven diverse counties, and more than 100 public agencies, Tribes, watershed groups, non-governmental organizations and interested stakeholders. The NCRP oversees the NCIRWMP, which emphasizes the creation of a sustainable environmental and socio-economic framework for the North Coast, by engaging in integrated planning for water infrastructure and natural resources.

The EAWSWRP public draft was provided to the NCRP Technical Peer Review Committee (TPRC) for review to ensure alignment with the NCIRWMP Goals and Objectives and for technical comment. In addition, the public draft will be provided to the NCRP Policy Review Panel (PRP) by email for review and comment as the timing of the completion of the public draft did not allow for presentation at a PRP meeting in April 2018 and there are no summer 2018 PRP meetings. Any comments from the TPRC and PRP will be considered and addressed prior to Plan finalization with a “response to comments” memo. The final EAWSWRP will be presented at a NCRP quarterly meeting to the PRP, tentatively scheduled for October 2018, along with the “response to comments” memo.

SWRP project proponents seeking funding that requires project inclusion into an IRWM Plan will need to follow the NCRP’s “On-going Project Inclusion Process into the NCRP IRWM Plan”, which outlines the steps for including projects on an on-going basis into the NCIRWMP. The steps are as follows: 1) project proponent will provide preliminary project information, 2) project proponent will submit a signed Memorandum of Mutual Understandings (MoMU) if one has not already been submitted, 3) NCRP staff will review the project and follow-up regarding any eligibility concerns, 4) the TPRC will review and accept eligible projects, 5) NCRP staff will publish eligible NCRP projects and project summaries on the website and staff will report to the PRP at a NCRP quarterly meeting, 6) project proponents will be allowed to edit preliminary project information when required in NCRP funding solicitations and calls for proposals, 7) NCRP projects will be reviewed and scored by the TPRC if required by a respective funding solicitation and NCRP priority projects will be selected by the PRP. NCRP’s “On-going Project Inclusion Process” is available on their website.

6.2.3 Entities Responsible for Project Implementation

The entity responsible for project implementation varies by project location and who the oversight entity is for the infrastructure being worked on. The primary responsible entities for the EAWSWRP include the City of Eureka, Humboldt County, and HCSD. In addition, secondary responsible entities that may become involved due to location or land ownership include local school districts, the Humboldt Bay Harbor Recreation and Conservation District, Humboldt Fire District, Humboldt Waste Management Authority, Northwestern Pacific Railroad Co., CalTrans, State Lands Commission, College of the Redwoods, US Department of Fish and Wildlife, and California Department of Fish and Wildlife. There are private entities that may also eventually incorporate projects into the EAWSWRP.

The proposed primary entity responsible for project implementation is included in the project list in Table 5-9. It should be noted that a secondary responsible entity may eventually be the one to implement the project and that other entities located within a project drainage area may assist with implementation through partnerships to support coordination, outreach, and funding.

Once the EAWSWRP is approved by the SWRCB to meet the requirements of the California Water Code section 79747 and the Stormwater Resource Plan Guidelines it will be ready for implementation. Local, state, and federal agencies are then in a position to implement identified projects. Decisions that must be made to implement projects relate to identification of funding, completion of environmental evaluations and documentation under the National Environmental Policy Act, California Environmental Quality Act, and Coastal Act as appropriate, approval of permits as appropriate, approval of final implementation plans and designs, and how to bid the project and oversee construction. The responsibilities for ensuring that these decisions are made and that agencies have the appropriate information to evaluate the project rests with the primary entity responsible for implementing the project.

Coordinated watershed based implementation of the projects will occur through discussions as appropriate at the monthly NCSC meeting, presentation of larger projects at the annual HBI meetings and through incorporation of projects into the NCRP NCIRWMP. Monitoring requirements will be set through the individual projects and their proposed outcomes and tracked as appropriate at the local level for meeting requirements of local regulatory requirements and tracked through statewide monitoring databases and reported to funding agencies as required.

6.2.4 Community Participation Strategy for SWRP Implementation

The community participation strategy that supported development of EAWSWRP can be found in Section 4. The Stakeholder Outreach, Education, and Engagement Plan identified important tools and methods for outreaching to identified stakeholder groups and the general public. These tools and methods will be important in the continuing effort to incorporate community participation during the EAWSWRP implementation process. Community participation will occur during individual project implementation, focusing on the community or neighborhood where the project is located. Community participation will be the responsibility of project proponents. The tools used to outreach to the community will depend on the specific community and the project details, but will most likely include posting of information on websites and direct community outreach.

6.2.5 Procedure to Track Status of the SWRP

6.2.5.1 Monitoring

Monitoring and data collection requirements will be determined based on individual projects and the benefits each project or program proposes to achieve. The Project Application Form available on the EAWSWRP Website requires applicants to specify how project benefits will be measured and what monitoring and data collection efforts will be required to measure the proposed benefits. Surface water or groundwater quality monitoring must be submitted to the appropriate existing statewide monitoring databases, including, but not limited to the State Water Board's California Environmental Data Exchange Network, Surface Water Ambient Monitoring Program (SWAMP), and Groundwater Ambient Monitoring and Assessment Program. The project applicant may provide a link to available data, or upload data collected to the EAWSWRP website. All information will be reviewed and made available to the public by the TAC at the annual EAWSWRP meetings.

A list of current projects and programs is available on the EAWSWRP Website. The list will be updated at the annual EAWSWRP Website meetings to reflect status of existing and addition of new projects. Project applicants are responsible for completing the Project Completion Form, also available on the EAWSWRP website.

6.2.5.2 Data Management

Spatial data for the EAWSWRP will be managed through an ArcGIS geodatabase. This format allows for related data sets to be stored together, metadata to be included about data sources, limitations, and updates, and can be imported into common mapping programs.

Data developed specifically for the EAWSWRP will be made available in two formats. The first is a downloadable geodatabase with the ArcGIS data files. The second will be a GIS storyboard that can be accessed online to allow stakeholders and the public to visually access the data and its underlying attributes.

6.2.6 Timelines for Active or Planned Projects

For a majority of the priority projects included in Appendix L, there is no specific required timeline for implementation. These projects are mostly in the preliminary planning stages and will be implemented as funding becomes available. Project stages and targeted funding programs are provided in Table 6-1. Schedules associated with the programs are provided in Appendix N. Several projects/ programs do have more specific implementation timelines which are discussed below.

Table 6-1. Estimated Project Timelines and Resources

Title	Estimated Timeline for Implementation	Project Stage	Local Resources
Henderson Avenue/Mauer Marsh Storm Water Enhancement Project	> 10 years	Preliminary Planning	None committed
Railroad Avenue Drainage Enhancement Project	> 10 years	Preliminary Planning	None committed
Second Street Storm Water Improvement and Adaptation Project	> 10 years	Preliminary Planning	None committed
Fields Landing Drainage Enhancement and Adaptation Project	> 10 years	Preliminary Planning	None committed
King Salmon Drainage Enhancement and Adaptation Project	> 10 years	Preliminary Planning	None committed
City and County Outfall Monitoring and Protection Program	5-10 years	Preliminary Planning	None committed
Eureka Waterfront Drive Revitalization Project	5-10 years	Preliminary Design	City Build Narrative Study
City of Eureka Red Curb Program	5-20 years	Preliminary Design	City staff time as project phases can be implemented
West Side Eureka Sub-basin Flood Reduction and Climate Adaptation Program	> 10 years	Preliminary Planning	None committed
Waterfront Drive Storm Water and Climate Change Adaptation Project	> 10 years	Preliminary Planning	None committed
Highland Avenue Area Storm Water Enhancement Project	> 10 years	Preliminary Planning	None committed
Spring Street Storm Drain Realignment	> 10 years	Preliminary Planning	None committed
Humboldt Hill Storm Water Enhancement Program	> 10 years	Preliminary Design	County staff time as resources allow
C Street Storm Water Enhancement Project	> 10 years	Preliminary Planning	None committed
Commercial Street Storm Water Enhancement Project	> 10 years	Preliminary Planning	None committed
E Street Drainage Enhancement Project	> 10 years	Preliminary Planning	None committed

Title	Estimated Timeline for Implementation	Project Stage	Local Resources
G Street Drainage Improvement Project	> 10 years	Preliminary Planning	None committed
Lewis Avenue Drainage Improvement Project	> 10 years	Project Initiation	None committed
McCullens Avenue Storm Water Enhancement Project	> 10 years	Preliminary Planning	None committed
College of the Redwoods Storm Water Improvement Project	> 10 years	Preliminary Planning	None committed
Fields Landing Boatyard Storm Water Improvement Project	5-10 years	Preliminary Design	HCSD and Harbor District staff time as resources allow
Buhne Street Drainage Enhancement Project	> 10 years	Preliminary Planning	None committed
Fifteenth Street Drainage Enhancement Project	> 10 years	Preliminary Planning	None committed
Lower Pine Hill and Elk River Road Flood Reduction and Environmental Protection Project	> 10 years	Preliminary Planning	None committed
Harris and Ingly Drainage Improvement Project	> 10 years	Preliminary Planning	None committed
Cooper Gulch Drainage, Environmental, and Community Enhancement Project	5-10 years	Preliminary Design	CDFW planning study
Second Slough Enhancement and Adaptation Project	> 10 years	Planning	CDFW planning study
Duck and O Street Drainage Improvement Project	> 10 years	Preliminary Planning	None committed
Zanes Road Flood Reduction Project	> 10 years	Preliminary Planning	None committed
Elk River Road at Wrigley Drainage Improvement Project	> 10 years	Project Initiation	None committed
Berta Road Flood Reduction Project	> 10 years	Project Initiation	None committed
Zane Middle School LID Project	> 10 years	Project Initiation	None committed
Everding South Drainage Improvement Project	> 10 years	Preliminary Planning	None committed
H and Madrone Ave Drainage Improvement Project	> 10 years	Preliminary Planning	None committed

The Elk River TMDL Action Plan adopted in April 2016 outlines steps and timelines for actions to support the TMDL implementation. Feasible remediation and restoration activities sufficient to achieve water quality standards and return the watershed to a trajectory of recovery were still being developed at the time this SWRP was completed. As specific projects are identified they can be added to the plan. From an overall planning perspective, the TMDL action plan calls for an evaluation of progress in 2021 with the goal of attaining water quality objectives by 2031.

The Freshwater Creek TMDL is still in the development stages. The Regional Board has supported several evaluations of the study area. Once the TMDL is finalized, appropriate multi-benefit projects can be added to the EAWWRP priority project list.

The City and County selected Trash Provisions Track 1 and Track 2 compliance methods, respectively, in September 2017. Preliminary jurisdictional maps showing Priority Land Uses and the corresponding storm drain network were provided to the SWRCB. By December 2018, the City is required to update the Jurisdictional Map to include Proposed Full Capture Systems installations and associated drainage areas and the county is required to submit their Implementation Plan. The Implementation Plan must include results from the Trash Assessment, and updated Jurisdictional Maps. Final compliance for Track 1 and Track 2 is required 10 years after the effective date of the First Implementing Permit, which shall not be later than December 2, 2030.

6.2.7 Strategy and Potential Timeline for Obtaining Necessary Permits

There are several strategies for addressing permitting for priority projects, which are used commonly in project development. The first is to consider environmental impacts and opportunities early in evaluating projects. This results in projects that minimize environmental impacts and are easier to permit. The second strategy is to work with the local permitting agency early on in project development, especially when there are potential impacts that may need mitigation, to understand permitting agency preferences to improve the permitting process. Depending on the complexity of the project, permits can take from one month to many years to be approved. The strategies above will improve the efficiency of the permitting process to minimize the time and costs for permitting for project implementation.

6.3 Adaptive Management – Maintaining a Living Document

This Plan will act as a living document that will be updated to reflect current and ongoing efforts to prioritize multiple benefit projects within the Eureka Area Watersheds. The NCSC website contains a database of parcels and road segments that have been identified as suitable for multi-beneficial project development. This database will serve as an ongoing resource for identifying opportunities that can be developed into projects. Projects developed apart from the database of parcels and road segments can be submitted through the project submittal form on the NCSC website. These projects will be added to this Plan at the EAWSWRP's annual meetings. Also at the annual EAWSWRP meetings, the following items will be discussed and evaluated to determine if updates to the Plan need to be made:

- Modifications to reflect the most current understanding of the watershed
- Updates to existing TMDLs
- Addition of new TMDLs
- Updates to the metrics-based analysis
- Updates to status of ongoing projects
- Identification of completed projects
- Re-evaluation of water quality priorities
- Evaluate effectiveness of management measures and management modifications aimed at improving storm water and dry weather runoff management

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Appendix A Checklist

Storm Water Resource Plan Checklist and Self-Certification

The following should be completed and submitted to the State Water Resources Control Board Division of Financial Assistance in support of a storm water resource plan /functionally equivalent plan. The documents submitted, including this checklist, will be used to determine State Water Board concurrence with the Storm Water Resource Plan Guidelines and statutory water code requirements.

When combining multiple documents to form a functionally equivalent Storm Water Resource Plan, submit a cover letter explaining the approach used to arrive at the functionally equivalent document. The cover letter should explain how the documents work together to address the Storm Water Resource Plan Guidelines.

STORM WATER RESOURCE PLAN GENERAL CONTACT INFORMATION	
Contact Info: **Name** **Phone Number** **Email**	 Kelly Allen 707-268-5253 kallen@ci.eureka.ca.gov
Date Submitted to State Water Resource Control Board:	August 31st, 2018
Regional Water Quality Control Board:	North Coast
Title of attached documents (expand list as needed):	**The EAWSWRP and all attachments are available on the North Coast Stormwater Coalition website: http://northcoaststormwatercoalition.org/**

STORM WATER RESOURCE PLAN INFORMATION	
Storm Water Resource Plan Title:	Eureka Area Watersheds Storm Water Resource Plan
Date Plan Completed/Adopted:	August 31st, 2018
Public Agency Preparer:	City of Eureka
IRWM Submission:	The Eureka Area Watersheds Storm Water Resource Plan was submitted to the North Coast Resource Partnership (NCRP) for inclusion in the NCRP IRWM Plan on August 31st, 2018.
Plan Description:	The Storm Water Resource Plan addressing the greater Eureka Area watersheds.

Checklist Instructions:

For **each element** listed below, review the applicable section in the Storm Water Resource Plan Guidelines and enter ALL of the following information**.** Be sure to provide a clear and thorough justification if a recommended element (non shaded) is not addressed by the Storm Water Resource Plan.

A. Mark the box if the Storm Water Resource Plan meets the provision

B. In the provided space labeled **References**, enter:
1. Title of document(s) that contain the information (or the number of the document listed in the General Information table above);
2. The chapter/section, **and page number(s)** where the information is located within the document(s);
3. The entity(ies) that prepared the document(s) if different from plan preparer;
4. The date the document(s) was prepared, and subsequent updates; and
5. Where each document can be accessed[1] (website address or attached).

STORM WATER RESOURCE PLAN CHECKLIST AND SELF-CERTIFICATION		
Mandatory Required Elements per California Water Code are Shaded and Text is **Bold**		
Y/N	**Plan Element**	**Water Code Section**
WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)		
Y	**1. Plan identifies watershed and subwatershed(s) for storm water resource planning.**	**10565(c) 10562(b)(1) 10565(c)**
References: See Section 2.2 (p. 14).		
Y	2. Plan is developed on a watershed basis, using boundaries as delineated by USGS, CalWater, USGS Hydrologic Unit designations, or an applicable integrated regional water management group, and includes a description and boundary map of each watershed and sub-watershed applicable to the Plan.	
References: See Section 2.2 (p. 14). Figure A4 (Appendix B, p. 83) shows the entire project watershed and sub-watersheds.		

[1] All documents referenced must include a website address. If a document is not accessible to the public electronically, the document must be attached in the form of an electronic file (e.g. pdf or Word 2013) on a compact disk or other electronic transmittal tool.

WATERSHED IDENTIFICATION (GUIDELINES SECTION VI.A)	
Y	3. Plan includes an explanation of why the watershed(s) and sub-watershed(s) are appropriate for storm water management with a multiple-benefit watershed approach;
References: See Section 2.2 (p. 14).	
Y	4. Plan describes the internal boundaries within the watershed (boundaries of municipalities; service areas of individual water, wastewater, and land use agencies, including those not involved in the Plan; groundwater basin boundaries, etc.; preferably provided in a geographic information system shape file);
References: The internal boundaries within the watershed are described in Sections 2.3, (p. 15), 2.4, (p. 17), 2.5 (p. 17), 2.6 (p. 18), and 2.7 (p. 19). Figure A2 (Appendix B, p. 83) shows the boundaries of municipalities. The groundwater basin is shown in Figure A6 (Appendix B, p. 83). Figure A7 (Appendix B, p. 83) shows the areas served by the wastewater treatment in the project watershed.	
Y	5. Plan describes the water quality priorities within the watershed based on, at a minimum, applicable TMDLs and consideration of water body-pollutant combinations listed on the State's Clean Water Act Section 303(d) list of water quality limited segments (a.k.a impaired waters list);
References: Section 2.1.3 (p. 13) discusses the applicable TMDLs. Figure A3 (Appendix B, p. 83) shows the water bodies on the Section 303(d) list. Table 2-2 (p. 17) lists the priority pollutants of concern of the watershed.	
Y	6. Plan describes the general quality and identification of surface and ground water resources within the watershed (preferably provided in a geographic information system shape file);
References: Section 2.3 (p. 15) discusses the surface waters, which are shown in Figure A5 (Appendix B, p. 83). Section 2.4 (p. 17) discusses the groundwater resources. The groundwater basin is shown in Figure A6 (Appendix B, p. 83).	
Y	7. Plan describes the local entity or entities that provide potable water supplies and the estimated volume of potable water provided by the water suppliers;
References: The local entities that provide potable water, and the estimated volume of potable water provided, is discussed in Section 2.5 (p. 17).	
Y	8. Plan includes map(s) showing location of native habitats, creeks, lakes, rivers, parks, and other natural or open space within the sub-watershed boundaries; and
References: A map with surface waters is provided as Figure A5 (Appendix B, p. 83). Native habitats, parks, and other natural or open spaces are shown in Figure A9 (Appendix B, p. 83).	
Y	9. Plan identifies (quantitative, if possible) the natural watershed processes that occur within the sub-watershed and a description of how those natural watershed processes have been disrupted within the sub-watershed (e.g., high levels of imperviousness convert the watershed processes of infiltration and interflow to surface runoff increasing runoff volumes; development commonly covers natural surfaces and often introduces non-native vegetation, preventing the natural supply of sediment from reaching receiving waters).
References: The natural watershed processes within the project watershed are discussed in Section 2.9.2 (p. 22). Interruptions to these processes are discussed in Section 2.9.3 (p. 22).	

WATER QUALITY COMPLIANCE
(GUIDELINES SECTION V)

Y	**10. Plan identifies activities that generate or contribute to the pollution of storm water or dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff.**	**10562(d)(7)**
References: Contributors to the pollution of storm water and dry weather runoff, or that impair the effective beneficial use of storm water or dry weather runoff are discussed in Section 3.1.1 (p. 24).		
Y	**11. Plan describes how it is consistent with and assists in, compliance with total maximum daily load implementation plans and applicable national pollutant discharge elimination system permits.**	**10562(b)(5)**
References: Consistency, assistance, and compliance with TMDLs and NPDES permits, and WDRs are discussed in Section 3.1.2 (p. 25).		
Y	**12. Plan identifies applicable permits and describes how it meets all applicable waste discharge permit requirements.**	**10562(b)(6)**
References: Identification and description of applicable WDRs is discussed in Section 3.1.2.2 (p. 27). How this SWRP meets all applicable waste discharge permit requirements is discussed in Section 3.1.2 (p. 25).		

ORGANIZATION, COORDINATION, COLLABORATION
(GUIDELINES SECTION VI.B)

Y	**13. Local agencies and nongovernmental organizations were consulted in Plan development.**	**10565(a)**
References: Local agencies consulted during the plan development are presented in Section 4.1 (p. 28). Other organizations, including nongovernmental organizations, consulted are discussed in Sections 4.2 (p. 29) and 4.3 (p. 32).		
Y	**14. Community participation was provided for in Plan development.**	**10562(b)(4)**
References: Community participation is described in Section 4.2 (p. 29). The Community Participation Strategy for this Plan's implementation is presented in Section 6.2.4 (p. 60).		
Y	15. Plan includes description of the existing integrated regional water management group(s) implementing an integrated regional water management plan.	
References: The IRWM group is discussed in Sections 2.1.1.1 (p. 12) and 6.2.2 (p. 59).		

ORGANIZATION, COORDINATION, COLLABORATION (GUIDELINES SECTION VI.B)	
Y	16. Plan includes identification of and coordination with agencies and organizations (including, but not limited to public agencies, nonprofit organizations, and privately owned water utilities) that need to participate and implement their own authorities and mandates in order to address the storm water and dry weather runoff management objectives of the Plan for the targeted watershed.
References: Local agencies consulted during the plan development are presented in Section 4.1 (p. 28). Other organizations consulted are discussed in Sections 4.2 (p. 29) and 4.3 (p. 32). The Technical Advisory Committee, and the TAC's Goals and Objectives of this Plan, is presented in Sections 1.1 (p. 8) and 1.2 (p. 9).	
Y	17. Plan includes identification of nonprofit organizations working on storm water and dry weather resource planning or management in the watershed.
References: Appendix D (p. 85) include the list of stakeholders, including nonprofit organizations, that may be working on storm water and dry weather resource planning and management in the watershed.	
Y	18. Plan includes identification and discussion of public engagement efforts and community participation in Plan development.
References: Public engagement efforts and community participation are described in Section 4.2 (p. 29). The Community Participation Strategy for this SWRP's implementation is presented in Section 6.2.4 (p. 60).	
Y	19. Plan includes identification of required decisions that must be made by local, state or federal regulatory agencies for Plan implementation and coordinated watershed-based or regional monitoring and visualization
References: See Sections 6.2.1 (p. 59), 6.2.2 (p. 59), 6.2.3 (p. 60), and 6.2.5 (p. 61).	
Y	20. Plan describes planning and coordination of existing local governmental agencies, including where necessary new or altered governance structures to support collaboration among two or more lead local agencies responsible for plan implementation.
References: Section 6.2.3 (p. 60) discusses the entities, and their responsibilities, for storm water and dry weather capture project implementation in the watershed.	
Y	21. Plan describes the relationship of the Plan to other existing planning documents, ordinances, and programs established by local agencies.
References: Existing plans and documents are discussed in Section 2.1 (p.12). Sections 6.2.1 (p. 59) and 6.2.2 (p.59) outline how this SWRP will be incorporated into existing plans.	
Y	22. (If applicable) Plan explains why individual agency participation in various isolated efforts is appropriate.
References: Not Applicable. The plan was developed by the primary municipal agencies within the project watershed; there were no isolated efforts in plan development tasks.	

QUANTITATIVE METHODS (GUIDELINES SECTION VI.C)	
Y	23. **For all analyses:** Plan includes an integrated metrics-based analysis to demonstrate that the Plan's proposed storm water and dry weather capture projects and programs will satisfy the Plan's identified water management objectives and multiple benefits.
References: The integrated metrics-based analysis is described in Section 5.3.1 (p. 49).	
Y	24. **For water quality project analysis (section VI.C.2.a)** Plan includes an analysis of how each project and program complies with or is consistent with an applicable NPDES permit. The analysis should simulate the proposed watershed-based outcomes using modeling, calculations, pollutant mass balances, water volume balances, and/or other methods of analysis. Describes how each project or program will contribute to the preservation, restoration, or enhancement of watershed processes (as described in Guidelines section VI.C.2.a)
References: The benefit metrics provided in Table 5-8 (p. 50) indicate a project or program's compliance with the NPDES permit. Potential areas for future projects were identified in the Multi-Criteria Analysis (discussed in Section 5.1 (p. 32)). Areas located within the MS4 Area, were prioritized. Discussion of how modeling was used to assess volumes of water treated is provided in Section 5.2.1 (p. 48). A more detailed discussion of the hydraulic model is provided in Appendix I (p. 90). Section 5.3.1 (p. 49) describes the metrics for prioritizing projects and programs. Section 5.3.1 (p. 55) presents the results of the project prioritization process, which summarizes how each project and program contributes to the preservation, restoration, and enhancement of watershed processes.	
Y	25. **For storm water capture and use project analysis (section VI.C.2.b):** Plan includes an analysis of how collectively the projects and programs in the watershed will capture and use the proposed amount of storm water and dry weather runoff.
References: The integrated metric-based analysis, which considers storm water and dry weather runoff capture is discussed in Section 5.3 (p. 49). Storm water and dry weather runoff volume reduction analysis is provided in Section 5.2.1 (p. 48). A discussion of the hydraulic model uses as it relates to storm water capture is provided in Section 5.2.1 (p. 48). A more detailed discussion of the hydraulic model is provided in Appendix I (p. 90).	
Y	26. **For water supply and flood management project analysis (section VI.C.2.c):** Plan includes an analysis of how each project and program will maximize and/or augment water supply.
References: The integrated metric-based analysis, which considers water supply and flood management, is discussed in Section 5.3 (p. 49). Section 2.4 (p. 17) includes a description for the high groundwater in the area, making recharge difficult. Stormwater Reuse to augment water supplies is prioritized as shown in Table 5-8 (p.50).	
Y	27. **For environmental and community benefit analysis (section VI.C.2.d):** Plan includes a narrative of how each project and program will benefit the environment and/or community, with some type of quantitative measurement.
References: The integrated metric-based analysis, which considers environmental and community benefits, is discussed in Section 5.3 (p. 49).	
Y	28. **Data management (section VI.C.3):** Plan describes data collection and management, including: a) mechanisms by which data will be managed and stored; b) how data will be accessed by stakeholders and the public; c) how existing water quality and water quality monitoring will be assessed; d) frequency at which data will be updated; and e) how data gaps will be identified.
References: See Sections 6.2.5 (p. 61) and 6.3 (p. 65).	

IDENTIFICATION AND PRIORITIZATION OF PROJECTS (GUIDELINES SECTION VI.D)		
Y	**29. Plan identifies opportunities to augment local water supply through groundwater recharge or storage for beneficial use of storm water and dry weather runoff.**	**10562(d)(1)**
References: Section 5.1 (p. 32) describes the process for identifying opportunities, which includes opportunities that can augment local water supply through groundwater recharge or storage of beneficial use of storm water and dry weather runoff. Section 5.3 (p. 49) outlines how projects will be prioritized based on their ability to augment local water supply. Project descriptions are included in Appendix L (p. 93) and prioritized in Appendix M (p. 94).		
Y	**30. Plan identifies opportunities for source control for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff.**	**10562(d)(2)**
References: Section 5.1 (p. 32) describes the process for identifying opportunities, which includes opportunities for both pollution and dry weather runoff volume, onsite and local infiltration, and use of storm water and dry weather runoff. Section 5.3 (p. 49) outlines how projects will be prioritized based on their ability to provide source control. Project descriptions are included in Appendix L (p. 93) and prioritized in Appendix M (p. 94).		
Y	**31. Plan identifies projects that reestablish natural water drainage treatment and infiltration systems, or mimic natural system functions to the maximum extent feasible.**	**10562(d)(3)**
References: Section 5.1 (p. 32) describes the process for identifying opportunities, which includes opportunities that reestablish natural water drainage treatment and infiltration systems, or mimic system functions to the maximum extent feasible. Section 5.3 (p. 49) outlines how projects will be prioritized based on their ability to mimic natural drainage patterns. Project descriptions are included in Appendix L (p. 93) and prioritized in Appendix M (p. 94).		
Y	**32. Plan identifies opportunities to develop, restore, or enhance habitat and open space through storm water and dry weather runoff management, including wetlands, riverside habitats, parkways, and parks.**	**10562(d)(4)**
References: Section 5.1 (p. 32) describes the process for identifying opportunities, which includes opportunities that develop, restore, or enhance habitat and open space through storm water and dry weather runoff management. Section 5.3 (p. 49) outlines how projects will be prioritized based on their ability to enhance natural spaces through storm water and dry weather runoff management. Project descriptions are included in Appendix L (p. 93) and prioritized in Appendix M (p. 94).		
Y	**33. Plan identifies opportunities to use existing publicly owned lands and easements, including, but not limited to, parks, public open space, community gardens, farm and agricultural preserves, school sites, and government office buildings and complexes, to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite.**	**10562(d)(5), 10562(b)(8)**
References: Section 5.1 (p. 32) describes the process for identifying opportunities, which includes opportunities that use existing publicly owned lands to capture, clean, store, and use storm water and dry weather runoff either onsite or offsite. Section 5.3 (p. 49) outlines how projects will be prioritized based on their ability to use publicly owned lands for storm water and dry weather runoff management. Project descriptions are included in Appendix L (p. 93) and prioritized in Appendix M (p. 94).		

IDENTIFICATION AND PRIORITIZATION OF PROJECTS
(GUIDELINES SECTION VI.D)

Y	**34. For new development and redevelopments (if applicable): Plan identifies design criteria and best management practices to prevent storm water and dry weather runoff pollution and increase effective storm water and dry weather runoff management for new and upgraded infrastructure and residential, commercial, industrial, and public development.**	**10562(d)(6)**
References: Not applicable because there are no new development or redevelopment projects. However, Section 5.1.1 (p. 33) defines LID BMPs use to prevent storm water and dry weather runoff pollution. Design criteria are identified in Sections 5.1.2 (p. 42) and 5.1.3 (p. 45). These BMPs and design criteria, and the Humboldt LID Manual provide a basis of design for new development and redevelopments.		
Y	**35. Plan uses appropriate quantitative methods for prioritization of projects. (This should be accomplished by using a metrics-based and integrated evaluation and analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and other community benefits within the watershed.)**	**10562(b)(2)**
References: The integrated metrics-based benefits analysis is described in Section 5.3 (p. 49). The metrics are provided in Table 5-8 (p. 50).		
Y	36. *Overall:* Plan prioritizes projects and programs using a metric-driven approach and a geospatial analysis of multiple benefits to maximize water supply, water quality, flood management, environmental, and community benefits within the watershed.	
References: The integrated metrics-based benefits analysis is described in Section 5.3 (p. 49). The geospatial analysis of multiple benefits is presented in Section 5.3 (p. 49).		
Y	37. *Multiple benefits:* Each project in accordance with the Plan contributes to at least two or more **Main Benefits** and the maximum number of **Additional Benefits** as listed in Table 4 of the Guidelines. (Benefits are not counted twice if they apply to more than one category.)	
References: The Main and Additional Benefits were amended to account for the specific hydrologic and environmental characteristics of the Eureka Area Watersheds. Consistent with Storm Water Grant Program funding guidelines, a minimum of two benefits are required to be achieved for each project or program. A discussion of the benefits is presented in Section 5.3.1 (p. 49). A summary table the benefits and example projects is provided in Appendix J (p. 91).		

IMPLEMENTATION STRATEGY AND SCHEDULE
(GUIDELINES SECTION VI.E)

Y	38. Plan identifies resources for Plan implementation, including: 1) projection of additional funding needs and sources for administration and implementation needs; and 2) schedule for arranging and securing Plan implementation financing.	
References: Available funding resources are discussed in Section 6.1 (p. 58). A full list of resources, and the frequency at which each program is administered is included as Appendix N (p. 95). Section 6.2.6 (p. 61) discusses the Timelines for Active or Planned Projects. For sufficiently-developed projects, projected funding needs are including in the Project Descriptions (Appendix L, p. 93).		
Y	**39. Plan projects and programs are identified to ensure the effective implementation of the storm water resource plan pursuant to this part and achieve multiple benefits.**	**10562(d)(8)**
References: The integrated metrics-based benefits analysis described in Section 5.3 (p. 49) ensures multiple benefits are achieved. Implementation measures are provided in Section 6.2 (p. 59).		
Y	**40. The Plan identifies the development of appropriate decision support tools and the data necessary to use the decision support tools.**	**10562(d)(8)**
References: A hydraulic model was used to evaluate storm water capture volumes. A brief summary of the model is provided in Section 5.2.1 (p. 48). A more detailed discussion of the hydraulic model is provided is Appendix I (p. 90). Data management and dissemination is discussed in Section 6.2.5.2 (p. 61). A web-based geodatabase that contains results from the Multiple-Criteria Analysis, which serves as a tool to determine suitable locations for projects and programs, is available online (insert link here after it becomes live).		
Y	41. Plan describes implementation strategy, including: a) Timeline for submitting Plan into existing plans, as applicable; b) Specific actions by which Plan will be implemented; c) All entities responsible for project implementation; d) Description of community participation strategy; e) Procedures to track status of each project; f) Timelines for all active or planned projects; g) Procedures for ongoing review, updates, and adaptive management of the Plan; and h) A strategy and timeline for obtaining necessary federal, state, and local permits.	
References: See Section 6 (p. 58)		
Y	**42. Applicable IRWM plan:** **The Plan will be submitted, upon development, to the applicable integrated regional water management (IRWM) group for incorporation into the IRWM plan.**	**10562(b)(7)**
References: The applicable IRWM and how this SWRP will be incorporated is discussed in Sections 2.1.1.1 (p. 12) and 6.2.2 (p. 59).		

	IMPLEMENTATION STRATEGY AND SCHEDULE (GUIDELINES SECTION VI.E)
Y	43. Plan describes how implementation performance measures will be tracked.
References: See Section 6.2.5 (p. 61).	

	EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VI.F)
	44. Outreach and Scoping: Community participation is provided for in Plan implementation. **10562(b)(4)**
References: See Section 4.2 (p. 29) for a discussion of how community participation was facilitated, including the creation of a web page, social media posts, NCSC Public Storm Water Survey dissemination, public review draft, and public meetings.	
	45. Plan describes public education and public participation opportunities to engage the public when considering major technical and policy issues related to the development and implementation.
References: See Section 4.2.2 (p. 30), which discusses the stakeholder and public meetings/presentations that engaged the public in the development of the SWRP and provided opportunities for understanding technical and policy issues related to the SWRP. Also, the posting of draft sections of the SWRP for review and comment on the web page.	
Y	46. Plan describes mechanisms, processes, and milestones that have been or will be used to facilitate public participation and communication during development and implementation of the Plan.
References: See Section 4.2 (p. 29) for a complete list of public participation and communication methods used during the SWRP development and implementation.	
Y	47. Plan describes mechanisms to engage communities in project design and implementation.
References: See Section 4.2 (p. 29) for mechanisms that were used; including, Section 4.2.1 (p. 29) EAWSWRP project web page description including the online project request form and the stakeholder and public meetings.	
Y	48. Plan identifies specific audiences including local ratepayers, developers, locally regulated commercial and industrial stakeholders, nonprofit organizations, and the general public.
References: See Section 4.2.1 (p. 29) for a discussion of specific audiences identified as stakeholders and Section 4.2.2 (p. 30) for the audiences participating in the two stakeholder meetings. See Appendix D (p. 85) for a list of stakeholders.	

EDUCATION, OUTREACH, PUBLIC PARTICIPATION (GUIDELINES SECTION VI.F)	
Y	49. Plan describes strategies to engage disadvantaged and climate vulnerable communities within the Plan boundaries and ongoing tracking of their involvement in the planning process.
References: See Section 4.2.3 (p. 31) for a discussion of the efforts to engage disadvantaged and climate vulnerable communities in the project area.	
Y	50. Plan describes efforts to identify and address environmental injustice needs and issues within the watershed.
References: See Section 4.2.3 (p. 31) for a discussion of the efforts to identify and address storm water runoff-related environmental injustices in the project area.	
Y	51. Plan includes a schedule for initial public engagement and education.
References: See Section 4.2.1 (p. 29) for an overview of the initial public engagement and 4.2.2 for the dates of the stakeholder and public meetings.	

DECLARATION AND SIGNATURE

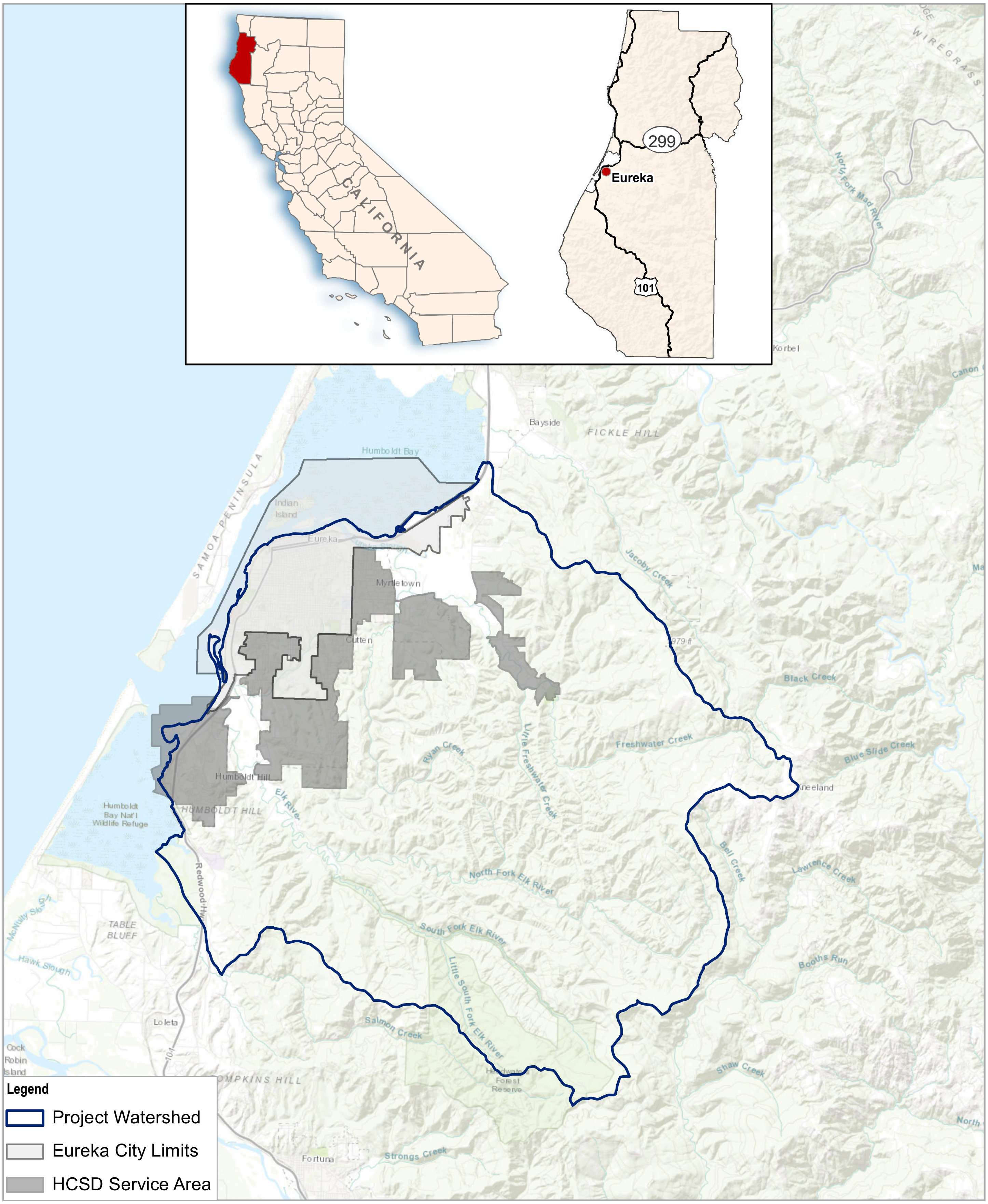
I declare under penalty of perjury that all information provided is true and correct to the best of my knowledge and belief.

	Deputy Director of Public Works City Engineer	8.30.2018
Jesse Willor, P.E.	Title	Date
	EAWSWRP Project Manager (Consultant/City of Eureka)	8-30-2018
Rebecca Crow, P.E.	Title	Date

City of Eureka

Public Agency

Appendix B Maps



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

Project Vicinity

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

FIGURE A1

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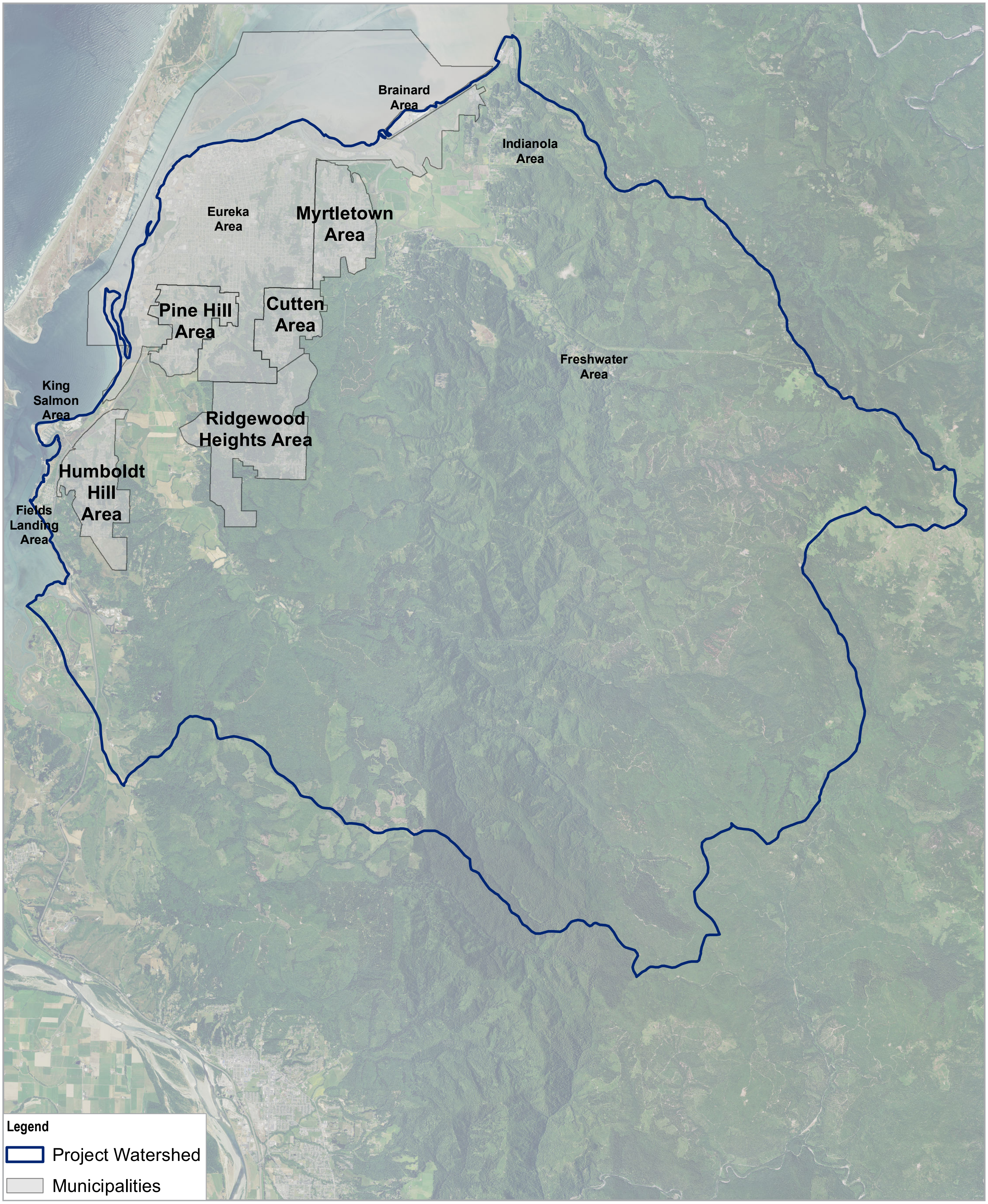
Print date: 25 Jun 2018 - 15:18

Data source: City of Eureka boundary; HCSD boundary; Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA Created by:jclark2



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Map Projection: Lambert Conformal Conic
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Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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GHD

City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

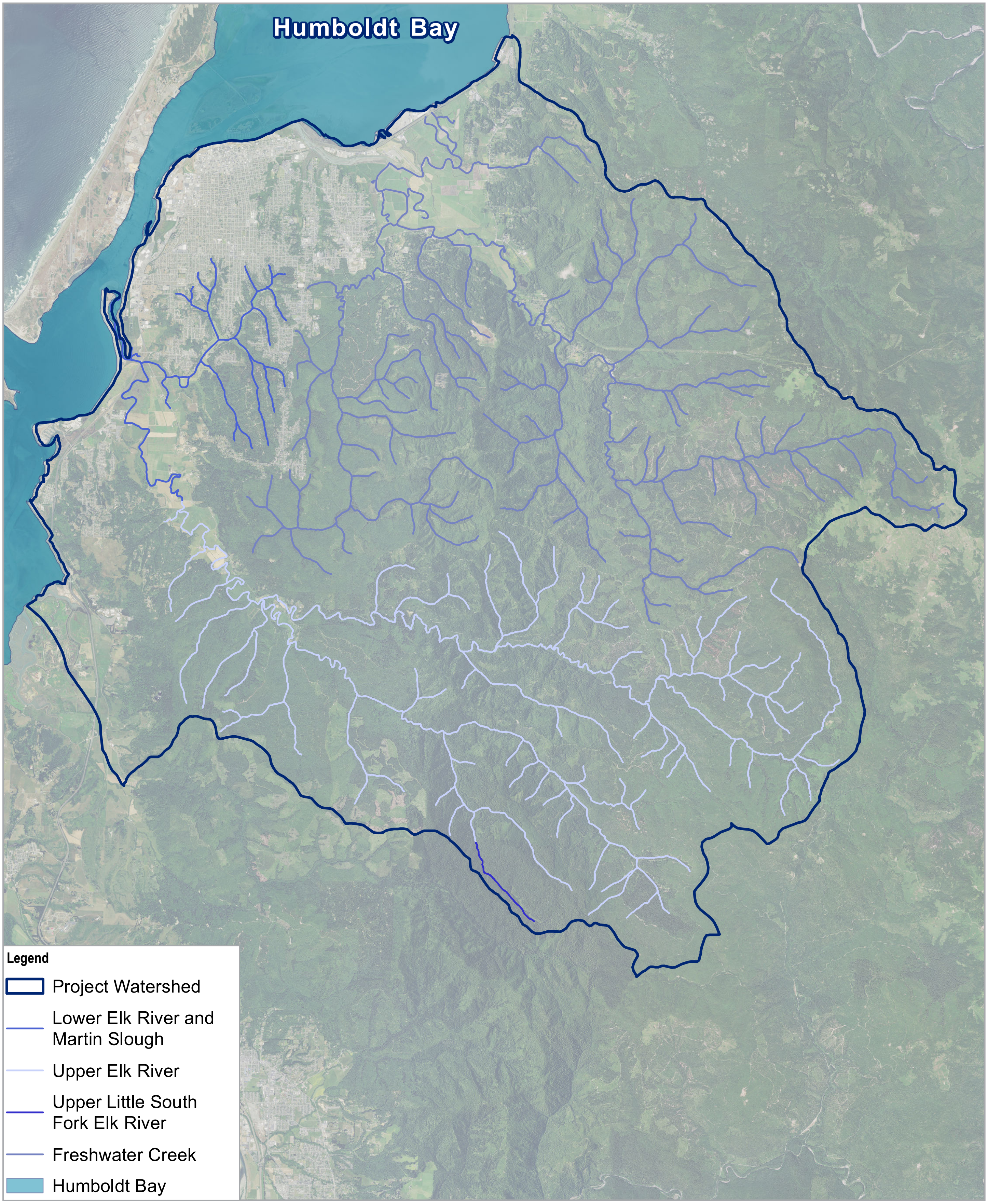
Municipalities within the Project Watershed

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

FIGURE A2

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A2_Municipalities_revA.mxd
Print date: 25 Jun 2018 - 15:05

Data source: Humboldt County, 2016. Eureka City Limits, 2012. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

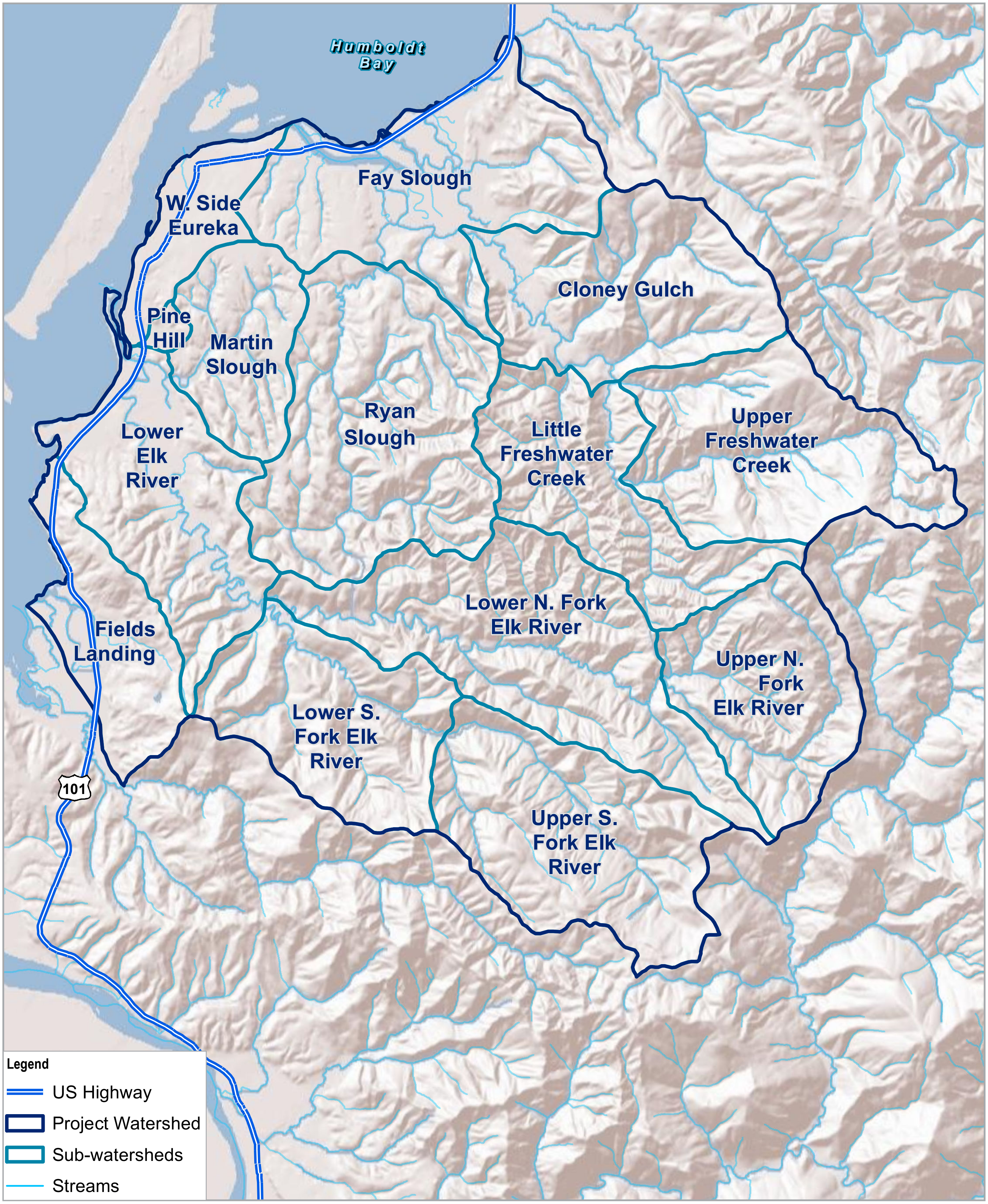
Water Bodies on the 303(d) Impaired Water Bodies List

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A3

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A3_ImpairedWaterBodies_revA.mxd
Print date: 25 Jun 2018 - 15:03

Data source: Clean Water Act Section 303(d), 2012. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

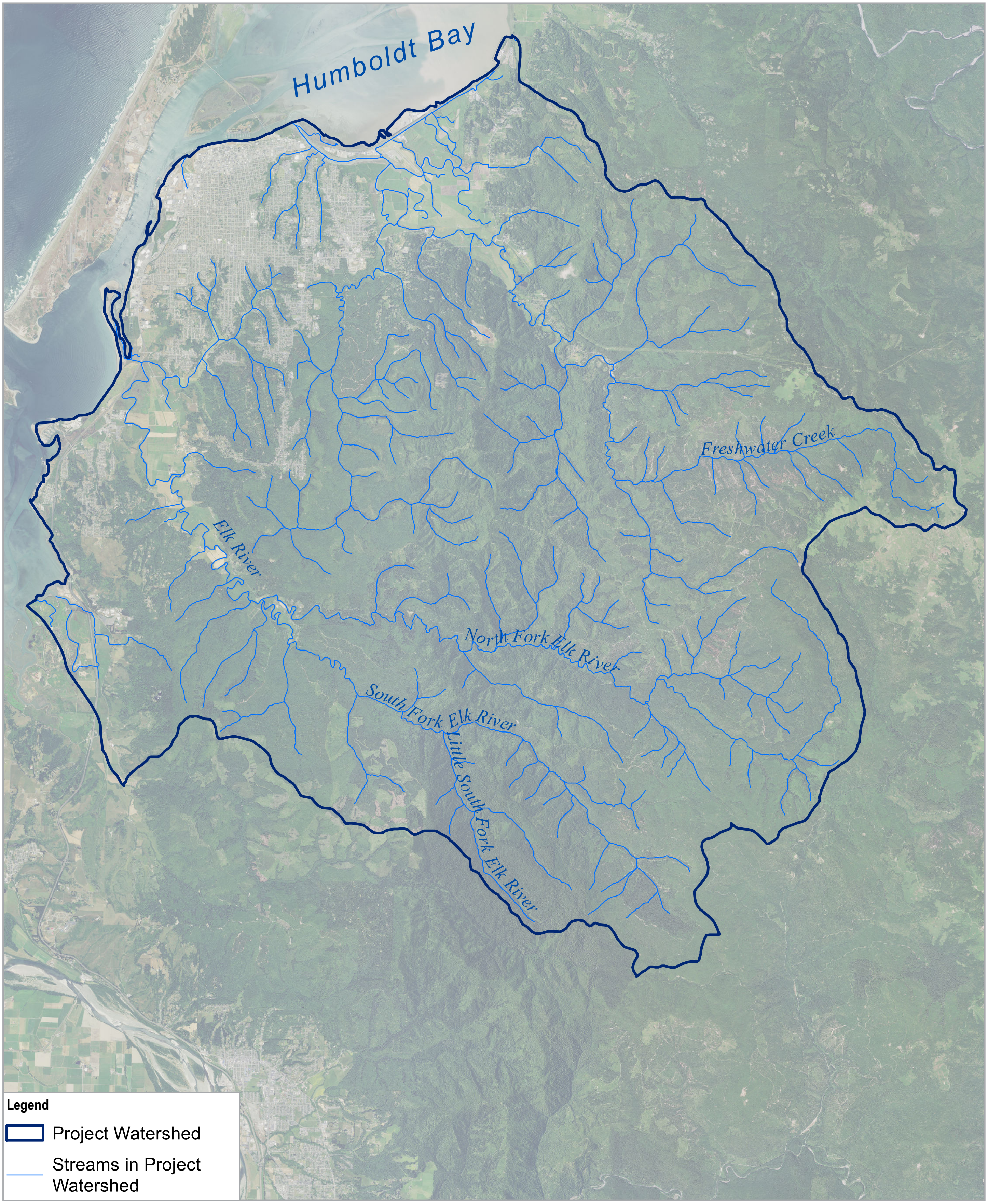
Project No. 11110741
Revision No. -
Date 06/25/2018

Project Watershed and Sub-watersheds

FIGURE A4

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A4_Eureka_Subwatershed_revA.mxd
Print date: 25 Jun 2018 - 15:00

Data source: Calwater: watersheds; Humboldt county GIS: streams; Copyright:© 2014 Esri Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

Surface Waters in the Project Watershed

FIGURE A5

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A5_SurfaceWater_revA.mxd
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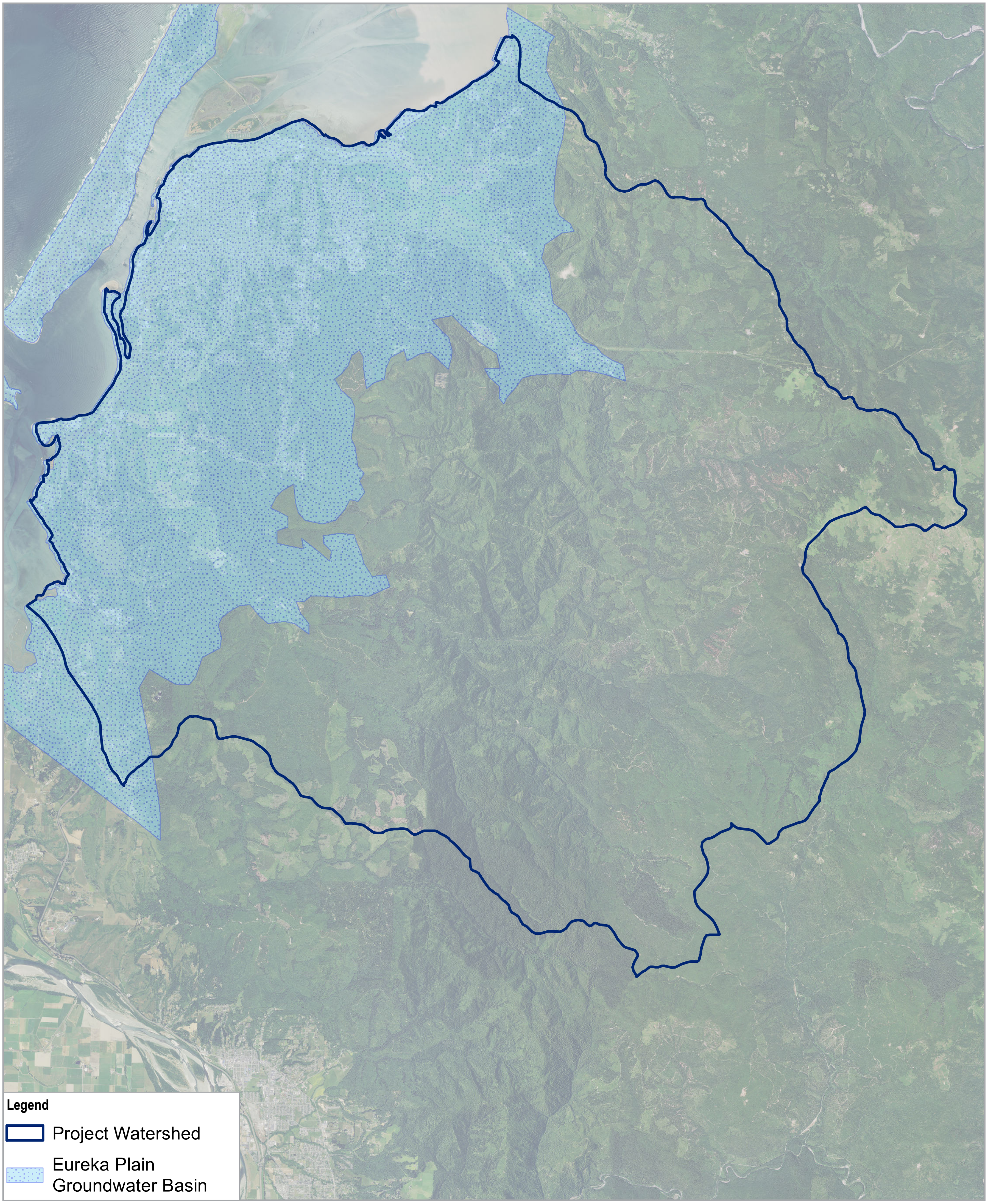
Data source: Humboldt County Streams. NAIP orthoimagery, 2016; Created by:jclark2



Paper Size ANSI A

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

Groundwater Basin in the Project Watershed

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A6

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A6_EkaGroundwaterBasin_revA.mxd
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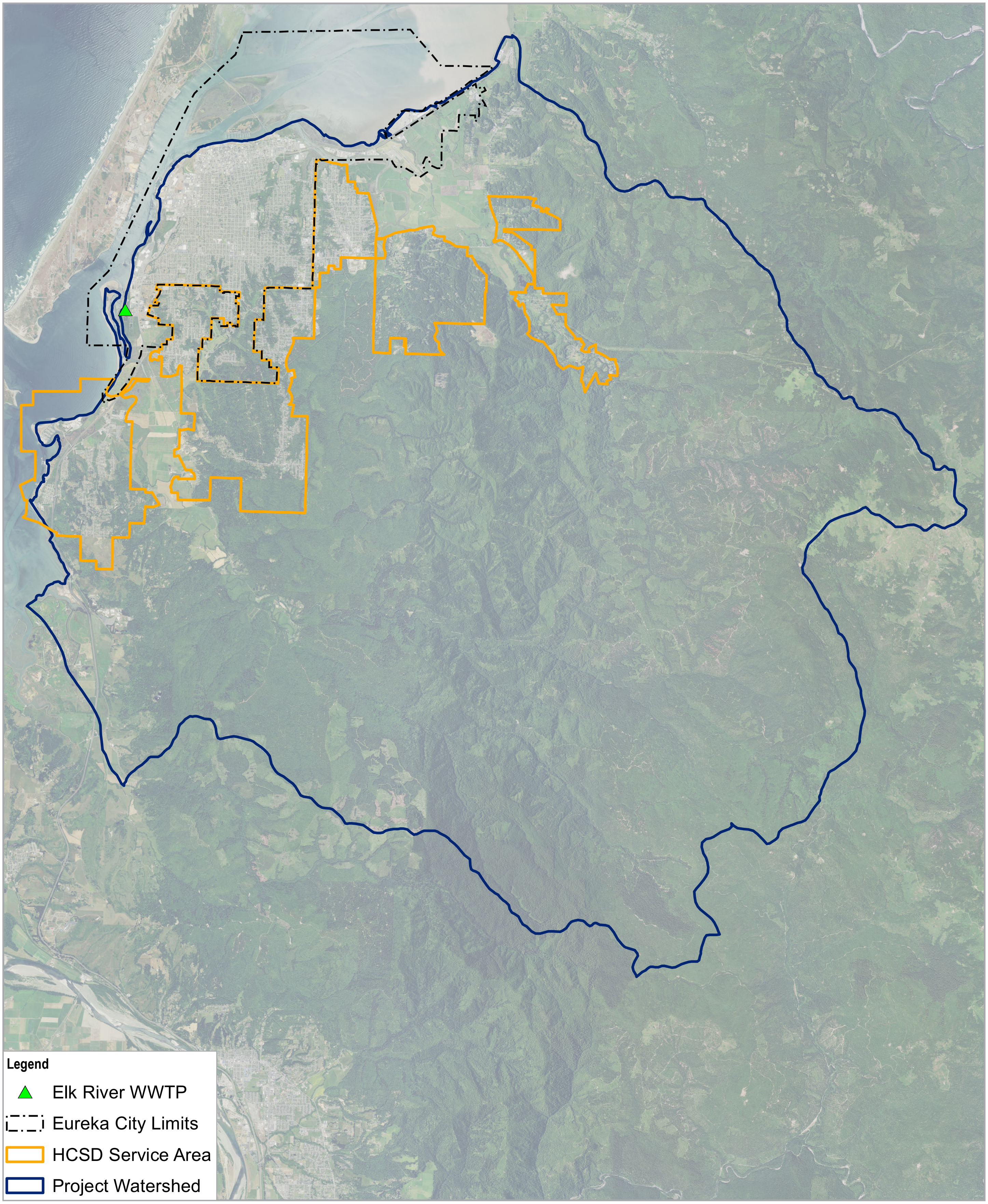
Data source: Department of Water Desources. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

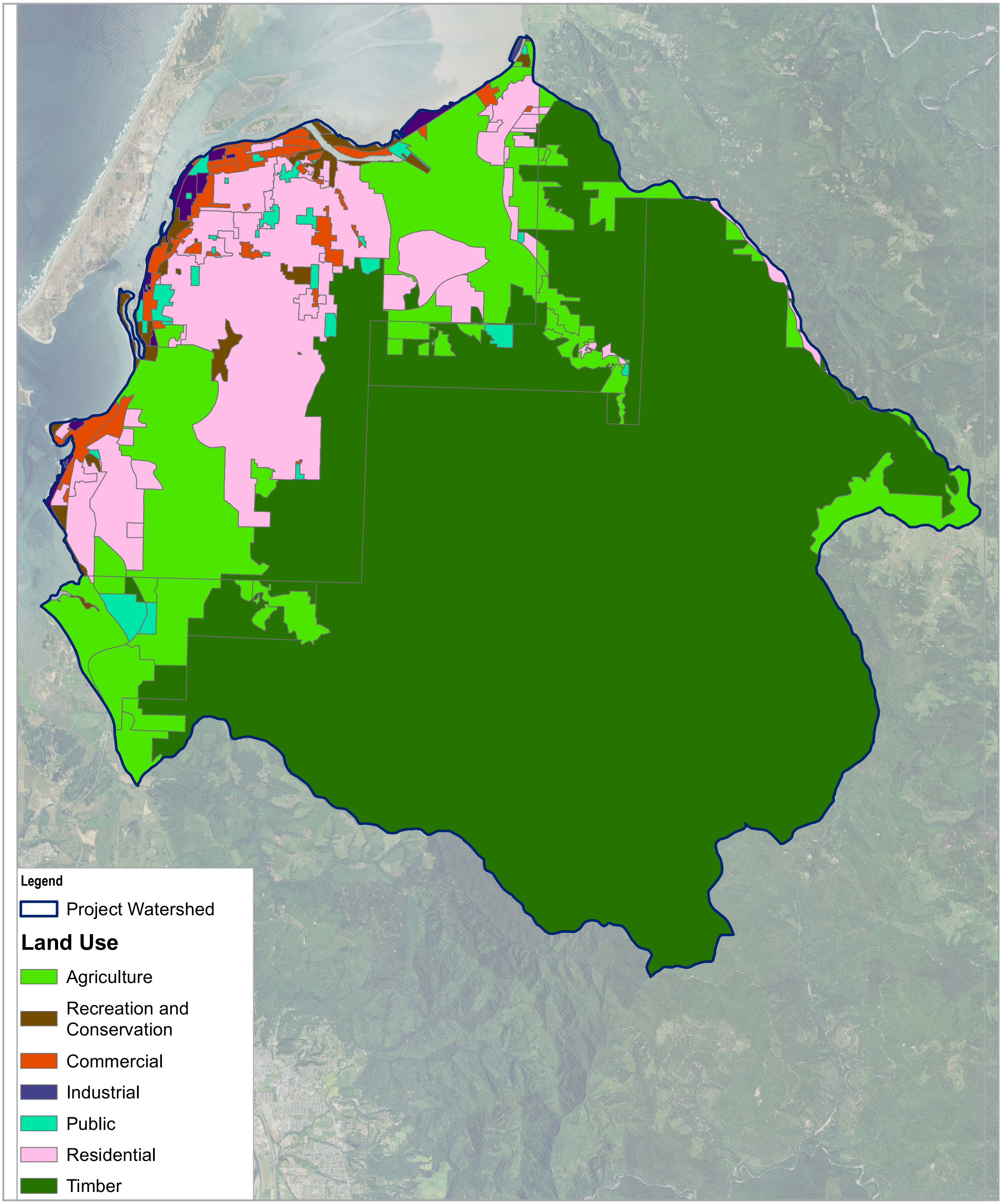
Areas Served by Elk River WWTP in the Project Watershed

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

FIGURE A7

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A7_HumboldtCSD_revA.mxd
Print date: 25 Jun 2018 - 13:26

Data source: Humboldt County CSD boundaries. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

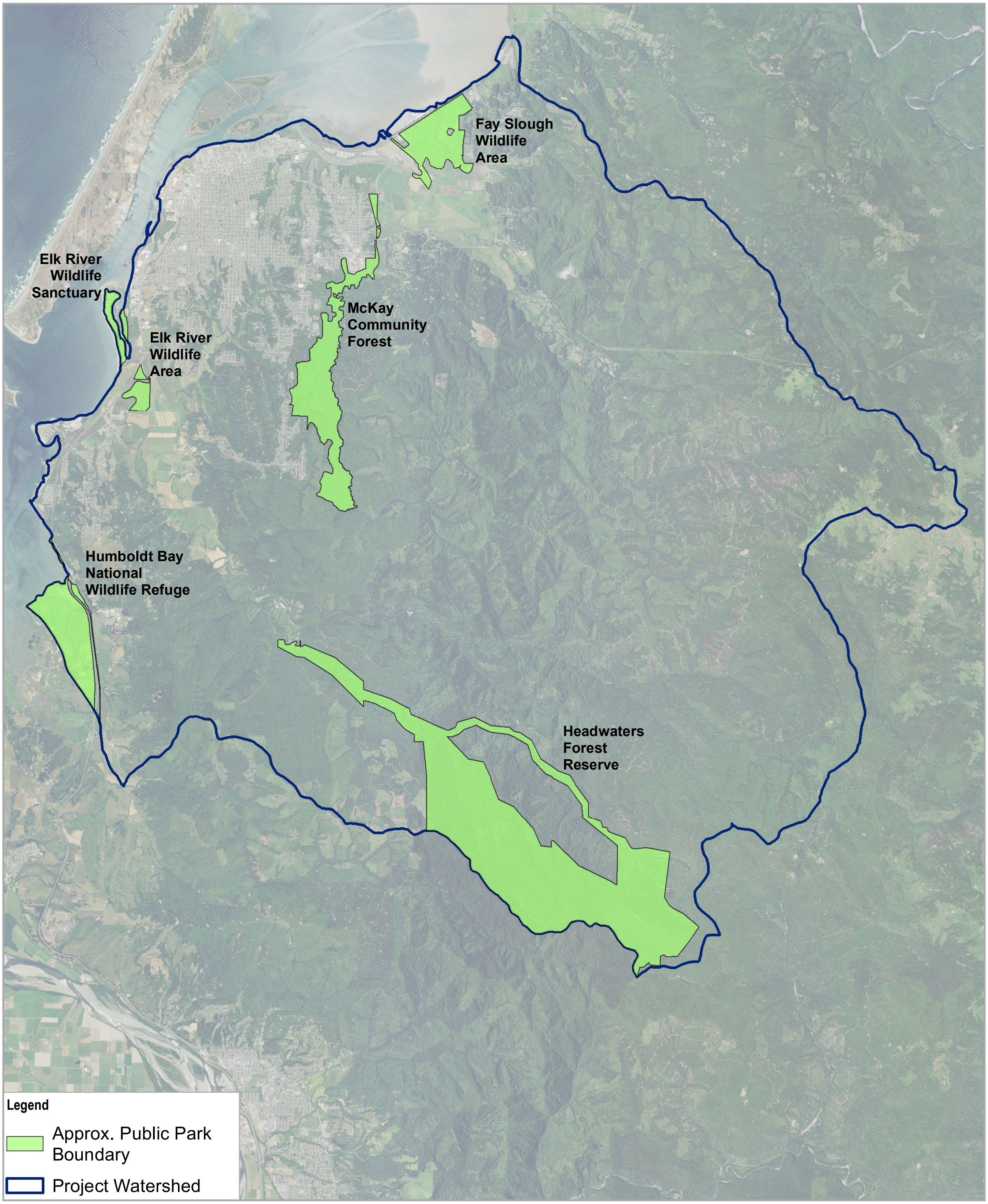
Project No. 11110741
Revision No. -
Date 06/25/2018

Land Uses within the Project Watershed

FIGURE A8

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A8_LandUse_revA.mxd
Print date: 25 Jun 2018 - 13:13

Data source: Humboldt County, 2014; City of Eureka, 2006; NAIP, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

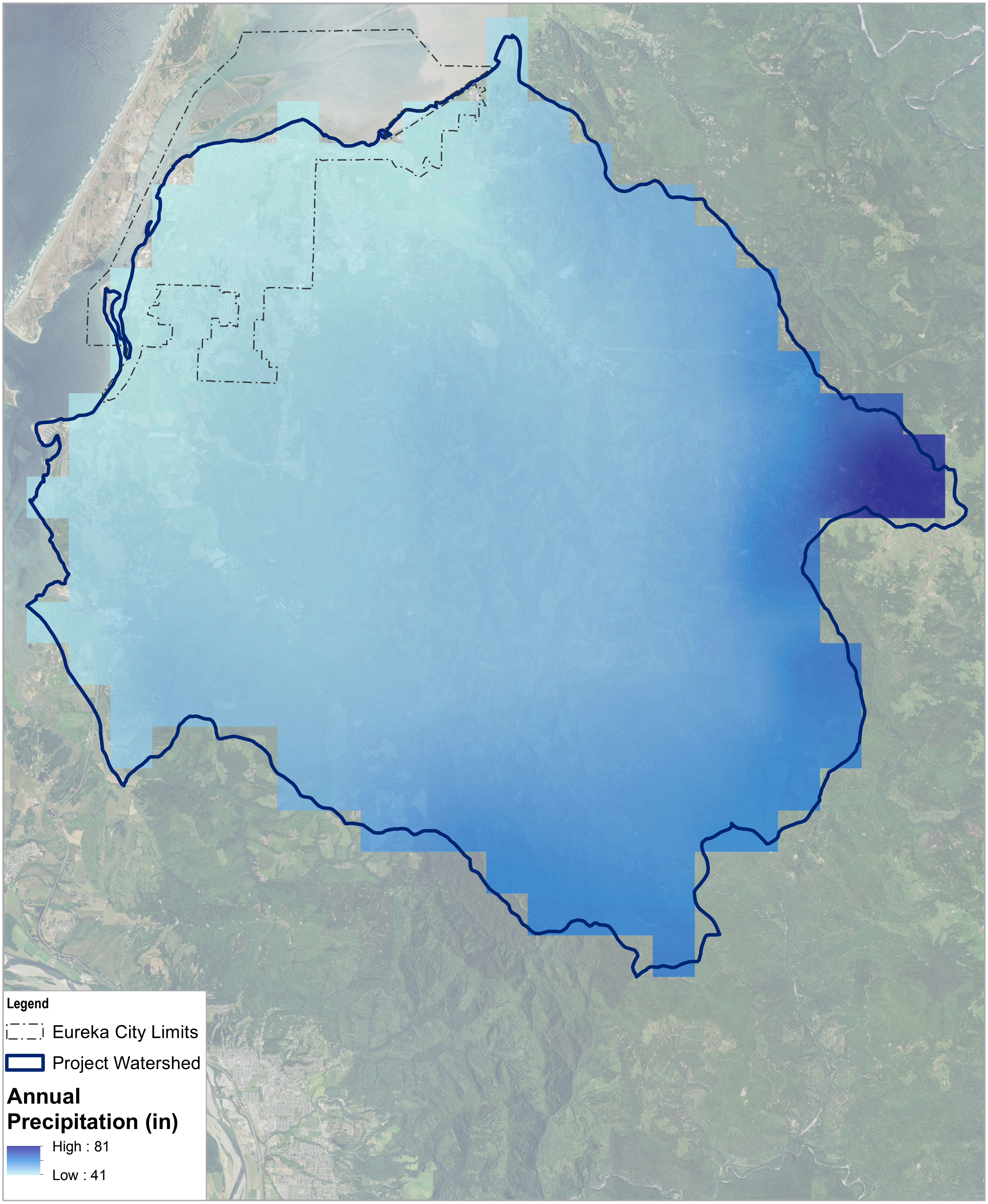
Natural and Open Spaces in the Project Watershed

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A9

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A9_Parks_revA.mxd
Print date: 25 Jun 2018 - 13:22

Data source: Humboldt County Streams. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

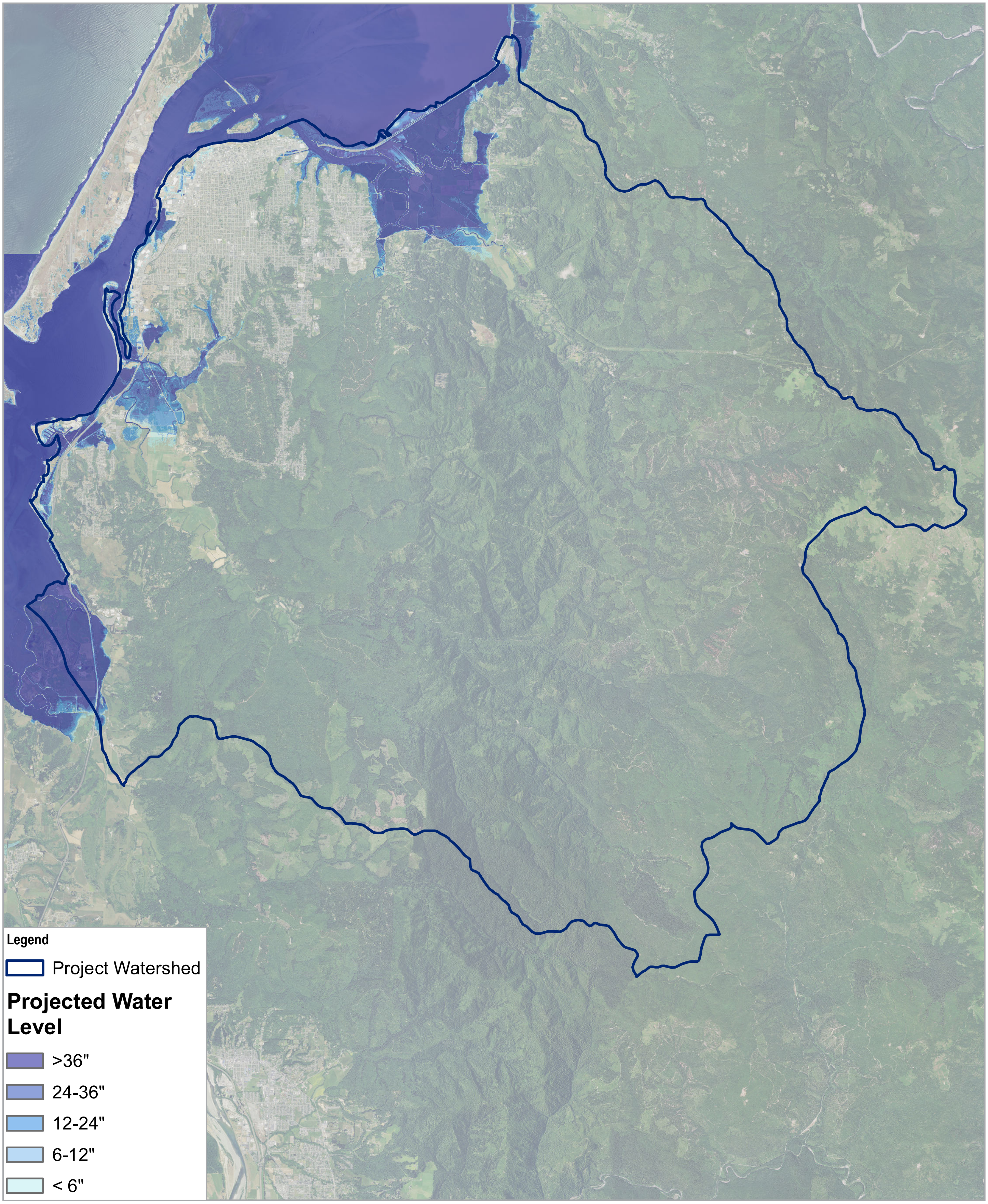
30-Year Normal Average
Annual Precipitation

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A10

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A10_Annual_Precipitation_revA.mxd
Print date: 25 Jun 2018 - 13:18

Data source: PRISM Precipitation; NAIP Orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

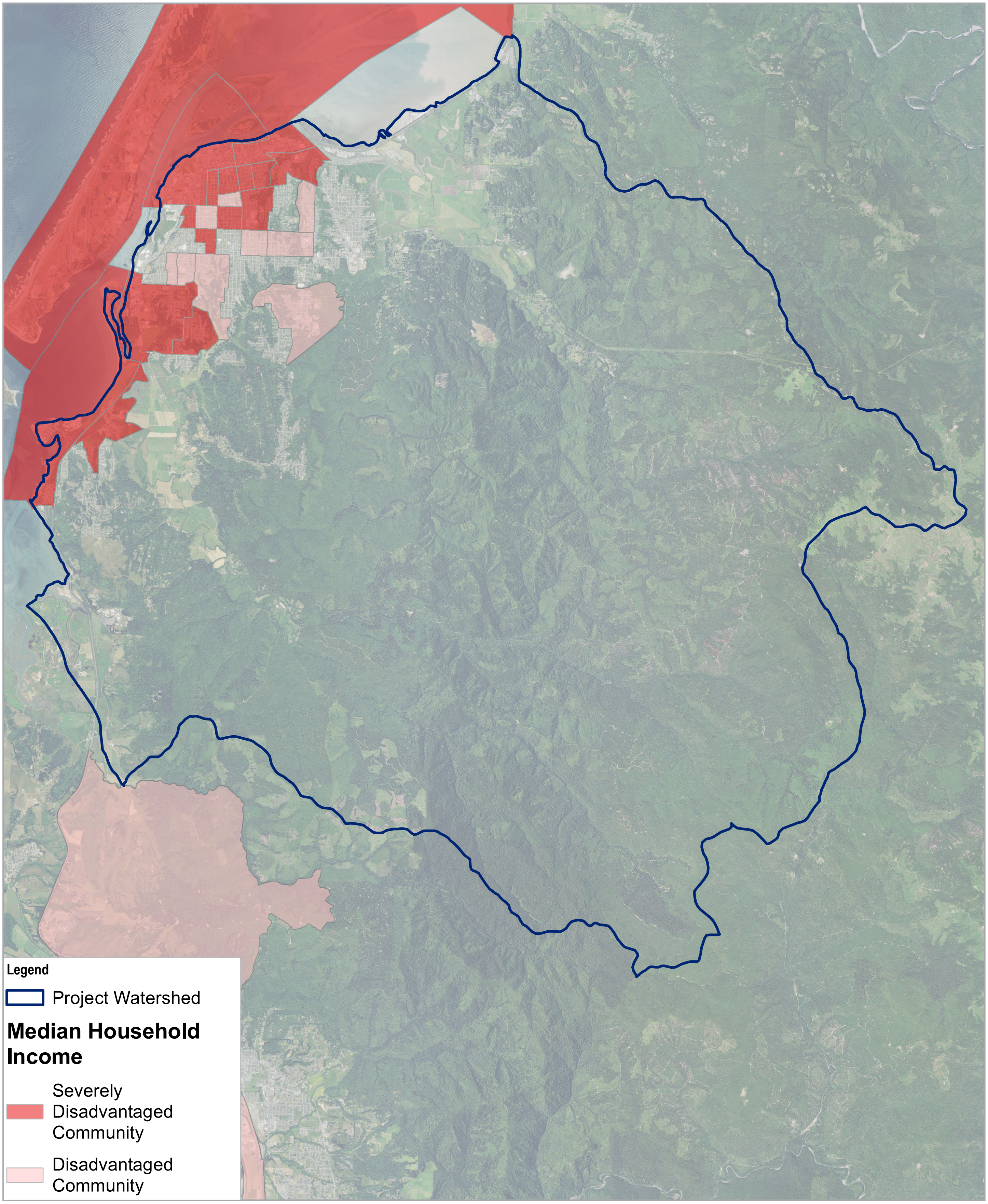
Humboldt Bay Projected Annual High Tide due to Sea Level Rise in Year 2100 (NHE 2015)

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A11

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A11_SLR_revA.mxd
Print date: 25 Jun 2018 - 13:06

Data source: Humboldt Bay DEM, NHE, 2015. NAIP orthoimagery, 2016; Sources: Esri, USGS, NOAA Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

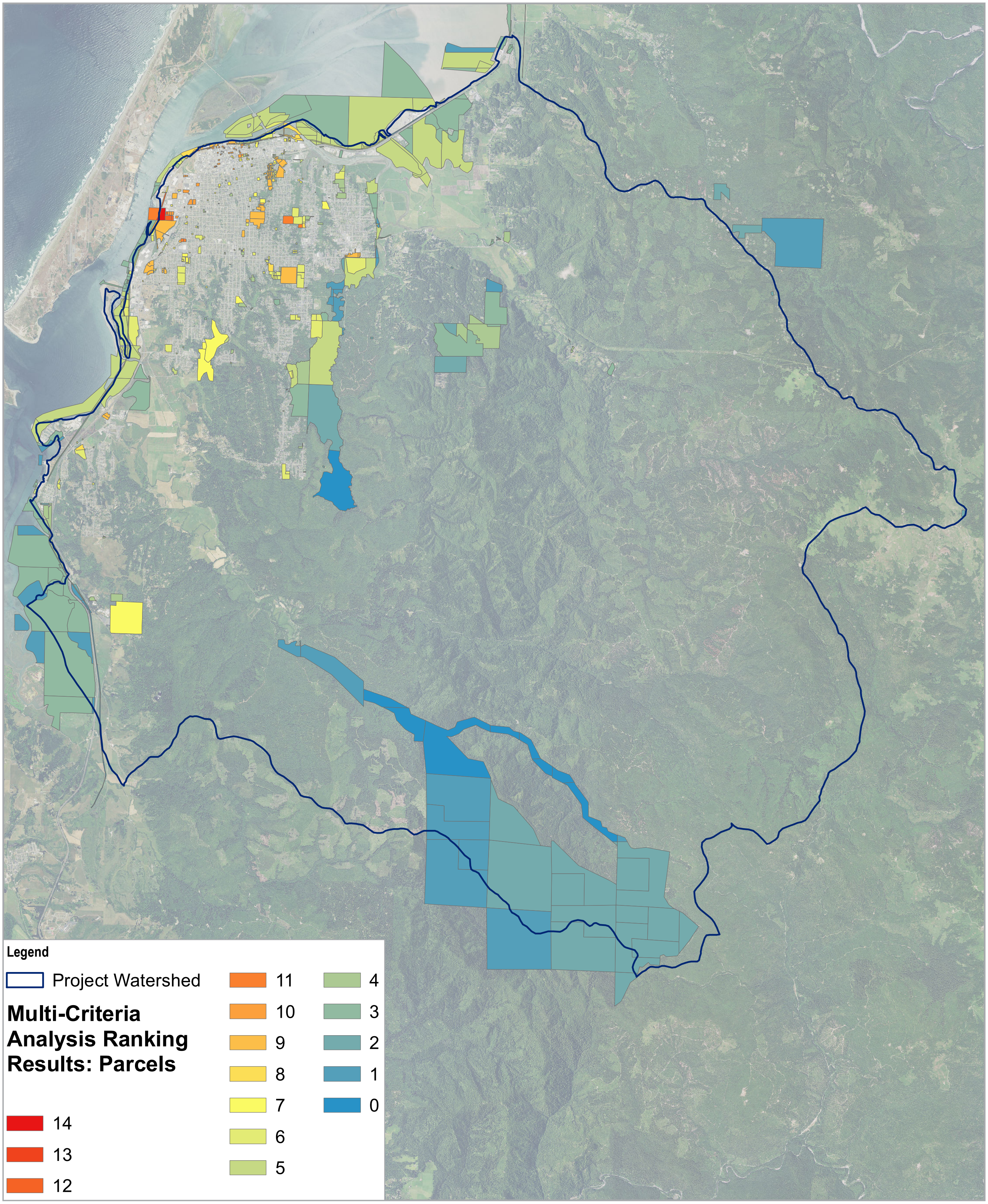
Economically Disadvantaged and Severely Disadvantaged Census Block Groups within the Project Watershed

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

FIGURE A12

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A12_DAC.mxd
Print date: 25 Jun 2018 - 12:59

Data source: US Census, 2010-2014. NAIP orthoimagery, 2016; Created by:jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

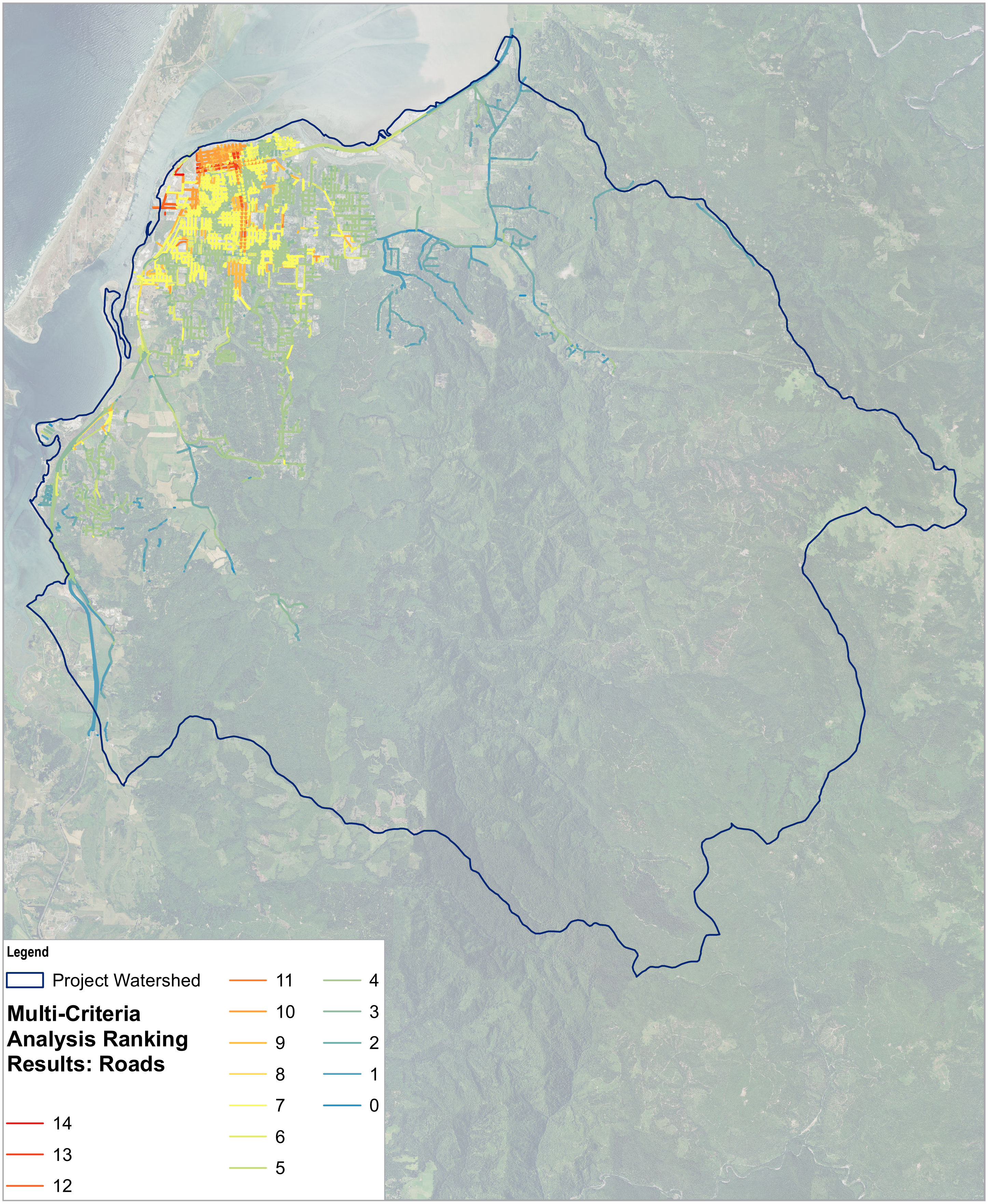
Overview of Multi-Criteria Analysis Parcel Results

Project No. **11110741**
Revision No. **-**
Date **06/25/2018**

FIGURE A13

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A13_MCA_ParcelResults.mxd
Print date: 25 Jun 2018 - 12:56

Data source: GHD model results: Parcel Segments 3/23/2018; NAIP orthoimagery, 2016; . Created by: jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

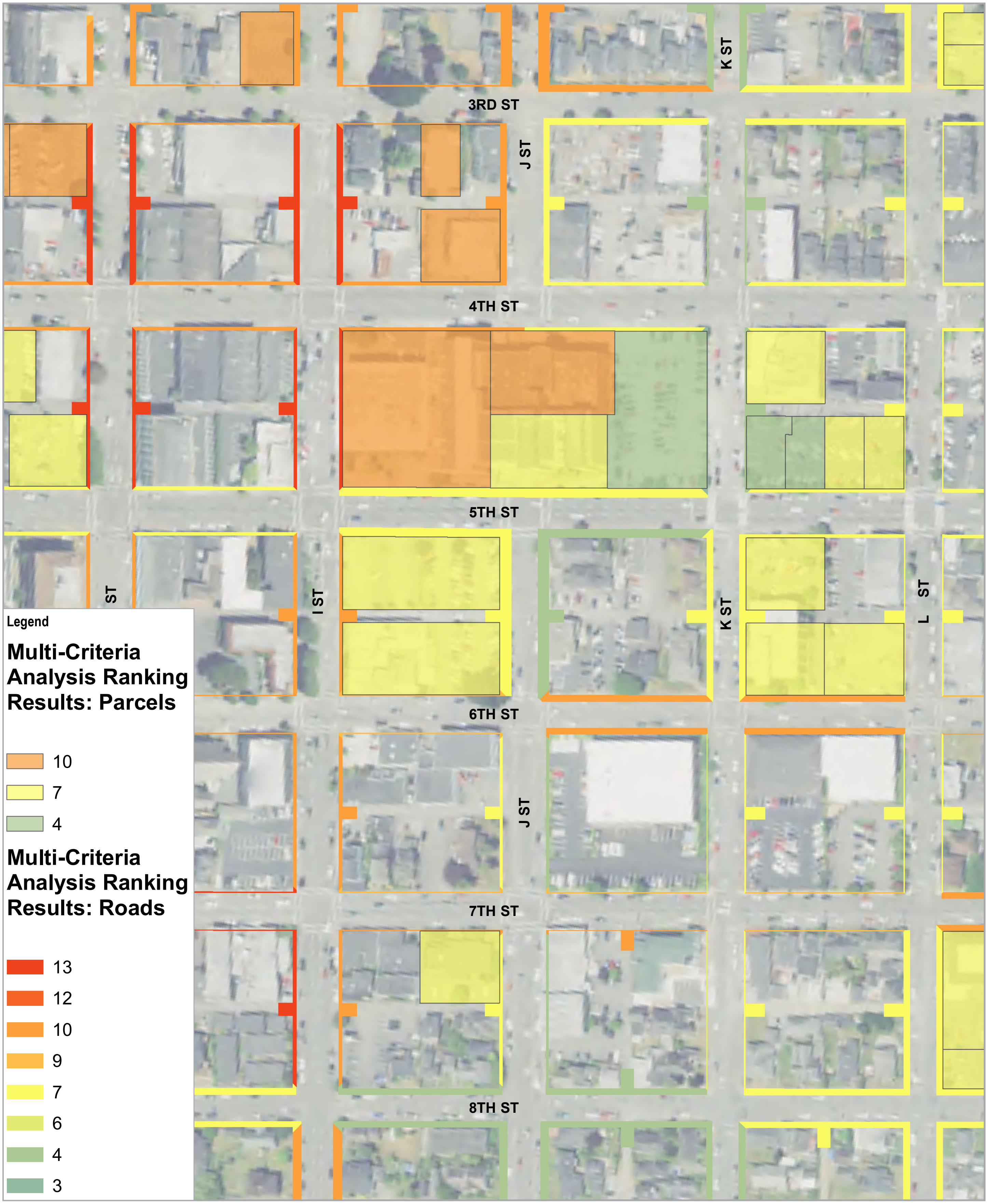
Overview of Multi-Criteria Analysis Road Segments Results

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A14

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\EurekaAreaSWResourcePlan\11110741_A14_MCA_RoadResults.mxd
Print date: 25 Jun 2018 - 12:52

Data source: GHD model results: Road Segments 5/10/2018; NAIP orthoimagery, 2016; . Created by: jclark2



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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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City of Eureka
Eureka Area Watersheds
Storm Water Resource Plan

Illustrative Example of Multi-Criteria Analysis Results

Project No. 11110741
Revision No. -
Date 06/25/2018

FIGURE A15

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Print date: 25 Jun 2018 - 12:43

Data source: GHD model results: Parcels 3/23/2018, Road Segments 5/10/2018; Humboldt County Roads; NAIP orthoimagery, 2016; . Created by: jclark2

Appendix C Data Gap Summary

Memorandum

May 30, 2017

To:	Eureka Area Watersheds Stormwater Technical Advisory Committee	Ref. No.:	1111741
From:	Rebecca Crow, GHD	Tel:	707-443-8326
CC:	Jeremy Svehla, GHD; Amber Shows, GHD; Richela Maeda, GHD		
Subject:	**Data Gap Summary for Eureka Area Watersheds Stormwater Resource Plan Development**		

1. Introduction

This Technical Memorandum summarizes the data collection and review efforts and identifies missing data and material necessary to develop the Eureka Area Watersheds Stormwater Resource Plan (EAWSWRP) that meets the requirements of the California Water code section 79747 and the State Water Resources Control Board Stormwater Resource Plan Guidelines.

The Technical Memorandum includes the following key sections:

- Literature Review Summary
- Data Summary and Gaps
- Recommendations

2. Literature Review Summary

Relevant and available reports, water quality studies and data, and water quantity data known to exist have been identified and are included in an annotated list is provided in Appendix A. Based on the data and material collected, a few key conclusions are summarized below:

- Previous and ongoing studies and efforts to document and assess water quality concerns and remediation plans within the Elk River and Freshwater Creek watersheds likely provide sufficient information to characterize the water quality conditions in these areas. Water quality data within the City of Eureka collected by Humboldt Bay Keeper will be used for characterization within city limits. The combined water quality studies within the project watershed have identified water quality impairments that may benefit from stormwater resource management. Additional water quality is not required, but may be collected to aid in the identification and prioritization of multiple benefit projects and programs.

- Several hydrologic and hydraulic studies (see Appendix A) have been completed within the project watershed boundaries. These studies aim to assess, identify, and provide solutions to water capture and conveyance concerns within the project area. This quantitative information will serve as supporting material to conduct a metrics-based benefit analysis and prioritization of projects.
- Previous efforts to assess and quantify the project area's vulnerability to sea level rise will be used as a part of the metric-based benefit analysis and prioritization of projects. In addition to the potential social impacts within the project area, previous studies quantified the potential spatial extent of inundated areas and projected tide water levels.
- A summary of the available GIS data is provided in the following section. Collection of accurate watershed and stormwater infrastructure data within the project area is critical to developing an accurate understanding of potential opportunities that will ensure the SWRP will achieve its water management objectives.

3. GIS Data Summary and Gaps

Relevant GIS data has been identified and are included in an annotated list is provided in Appendix B. A summary of the available data and data gaps by GIS data type are presented below.

3.1 Watershed GIS Data

The EAWSWRP is a watershed based plan. Watershed data for the area is the basis of much of the understanding of the existing conditions. Most of the watershed data needed for the EAWSWRP exists, including watershed boundaries, political boundaries, elevation models, and some geologic data.

Elevation data exists as LiDAR derived digital elevation models (DEMs) for the study area at one-meter resolution, which can serve as a proxy for rim elevation in the hydraulic modeling. Rim elevations can be obtained alternately through survey or GPS technologies. Additionally, city boundaries, service district boundaries and the MS4 area boundary have been acquired. Watershed boundaries and flowlines have been acquired through CalWater and USGS respectively. Identified outfalls have been provided for the City of Eureka and the County in the MS4 area.

There are no project-wide soils data layers that provide data on soil conductivity. In the absence of soils data, coarser geologic data will be used for analysis.

A GIS based Multiple Criteria Analysis (MCA) will be used to assess and identify potential locations for stormwater capture and use projects. This analysis method quantitatively assesses and evaluates the complex interaction of site availability, site conditions, and environmental conditions and social issues to identify constraints for infrastructure development. The inputs for the MCA can vary, but at a minimum, they should include stormwater infrastructure, opportunities: areas of ideal placement of LID, and constraints: areas not suited for LID. These opportunity/constraints layers would include building footprints, other underground infrastructure, zoning designations, sidewalks, nature strips, existing trees, edge of roadway and easements. Several datasets have been made available, and below is a summary of what additional data would be advantageous to acquire for the MCA.

- Additional Desired Inputs: road easement polygon, impervious areas within the residential areas of Eureka, existing trees points, and soil permeability/conductivity information

3.2 Stormwater GIS Data

Stormwater infrastructure data gaps exist in coverage and in the attributes assigned to structures and pipes. The City of Eureka stormwater infrastructure appears complete in terms of GIS spatial coverage. The City of Eureka's stormwater pipes attributes do not identify the upstream or downstream nodes, nor do they capture the upstream or downstream invert elevations. Additionally, about a third of the storm drain pipes are missing diameter and/or material attributes, and no upstream/downstream nodes or dimension information exists for the culverts or drainage ditch layers. These attributes are necessary for hydraulic modeling and would need to be gathered from field data collection as it is assumed that hard copy maps have already been digitized into the GIS. See Tables 1 and 2, and Figure 1 for data gaps in the City of Eureka's storm drain information.

Table 1 Summary of *Missing* Point Feature Information – City of Eureka

Feature Type	Feature ID	Feature Type	Rim Elevation
DI Points	12 of 775	No Data	No Data
Storm MH	No Data	No Data	111 of 340

Table 2 Summary of *Missing* Conduit Feature Information – City of Eureka

Feature Type	Material Type	Dimension	Up-Stream Node	Down-Stream Node	Up-Stream Depth	Down-Stream Depth
Storm Main	337 of 962	310 of 962	No Data	No Data	No Data	No Data
Drainage Ditch	No Data	No Data	No Data	No Data	No Data	No Data
Culvert	No Data	No Data	No Data	No Data	No Data	No Data

Some Humboldt County MS4 areas are represented in GIS, such as Pine Hill and Myrtletown. Gaps exist within the drainage network. For example, drop inlets and pipes are represented, but most surface drainage such as gutters and ditches are not. Additional spatial coverage gaps exist in the following MS4 areas outside Eureka city limits: Fields Landing, King Salmon, Humboldt Hill, Cutten, Ridgewood Heights. Rural areas similar to Freshwater are not expected to have stormwater infrastructure outside of cross driveway culverts and roadside ditches.

The County data mentions the need to reference improvement plans to clarify or confirm several areas. This may involve adjusting the GIS data to match plan sets or other hardcopy information the County has on file. A summary of missing attributes for the County's GIS data is displayed below in Tables 3 and 4 and Figure 2. The table only reviews missing data in Pine Hill and Myrtle Town there is no GIS data for other County areas of the system. Hard copy maps do exist and will be reviewed as part of the field data collection effort, and digitized into GIS if necessary.

Table 3 Summary of *Missing* Point Feature Information – County of Humboldt

Feature Type	Feature ID			Feature Type			Rim Elevation		
Pine Hill	0	of	151	0	of	151	0	of	151
Myrtletown	0	of	185	0	of	185	0	of	185

Table 4 Summary of *Missing* Conduit Feature Information – County of Humboldt

Feature Type	Material Type			Dimension			Up-Stream Node			Down-Stream Node			Up-Stream Depth			Down-Stream Depth		
Pine Hill Pipe	1	of	114	1	of	114	1	of	114	37	of	114	1	of	114	37	of	114
Pine Hill Surface	1	of	104	No Data			No Data			No Data			No Data			No Data		
Myrtletown Pipe	13	of	222	6	of	222	19	of	222	64	of	222	21	of	222	47	of	222

3.3 Sewer/Stormwater Connectivity GIS Data

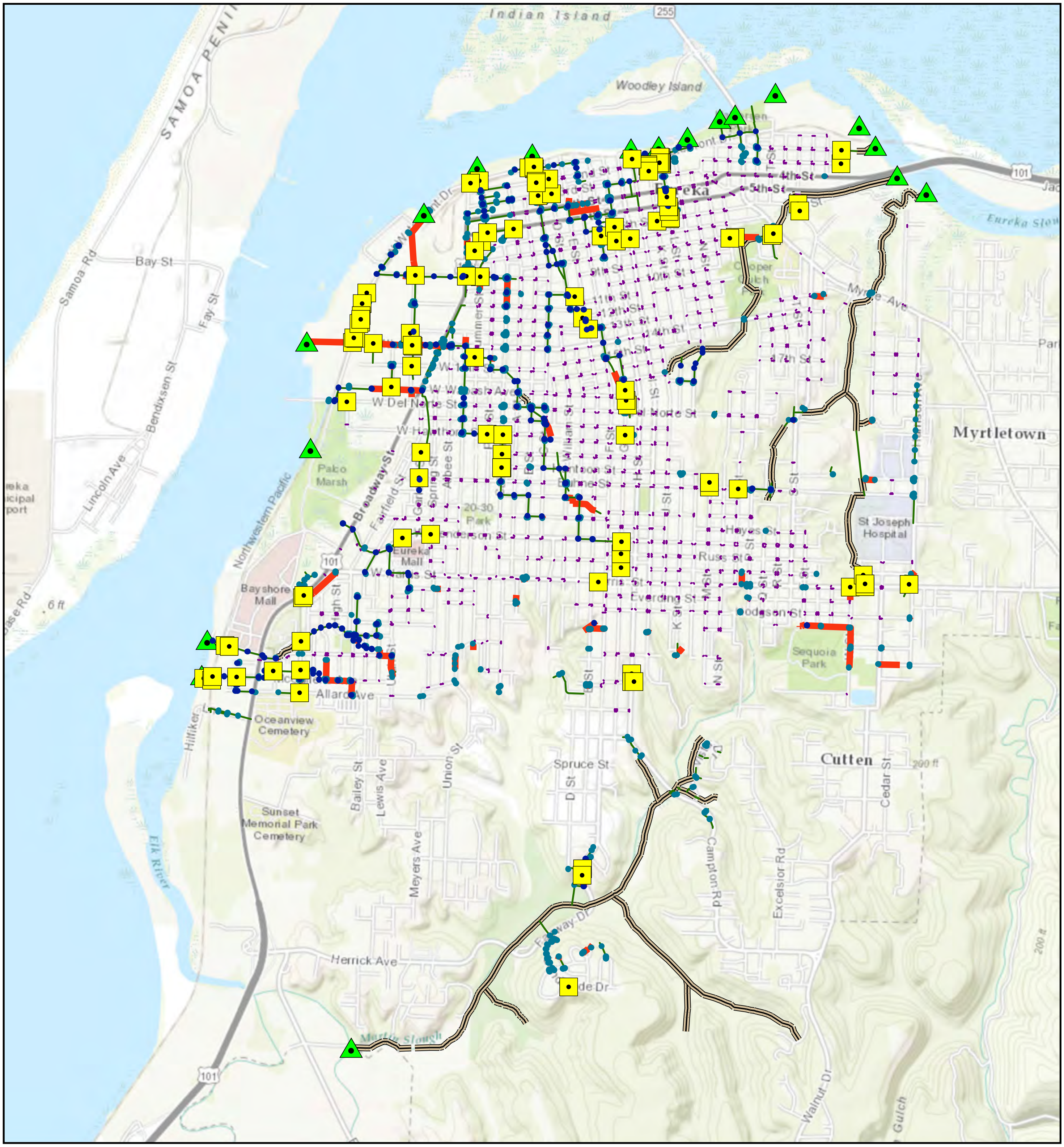
The City of Eureka has their complete sanitary sewer system represented in GIS. They also include sewer mains that are shared between the City and Humboldt Community Services District. The sewer main and manhole infrastructure for the Humboldt Community Services District is available in a GIS that was previously digitized by and provided via the City of Eureka.

4. Recommendations

The literature and data review revealed there is available information to describe and characterize the sub-watersheds within the EAWSWRP. Additional data is needed to develop the analysis tool to identify priority projects within the project watershed boundaries. The data needed is listed below:

- Attributes for the City of Eureka's Stormwater system
    - Pipe size and material
    - Invert elevations and surface elevations where cut depths are available
- County stormwater infrastructure for additional areas of the MS4 not already captured in previous studies, both spatial and attribute information
- Soil type and conductivity layers for project area

The spatial extent of data collection will be determined in coordination with the City, County, and Community Services District based on the final analysis tools selected, areas of known stormwater and flooding problems, and available budget.



- Stormwater Manhole
- Missing Elevation Data - Stormwater Manhole
- Stormwater Outfall
- Drop Inlet and Curb Cut
- Stormwater Main
- Missing Diameter or Material - Stormwater Main
- Stormwater Drainage Ditch
- Stormwater Culvert

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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EUREKA CALIFORNIA

City of Eureka
Stormwater Resource Plan

Data Gap Analysis
City of Eureka Data Gaps

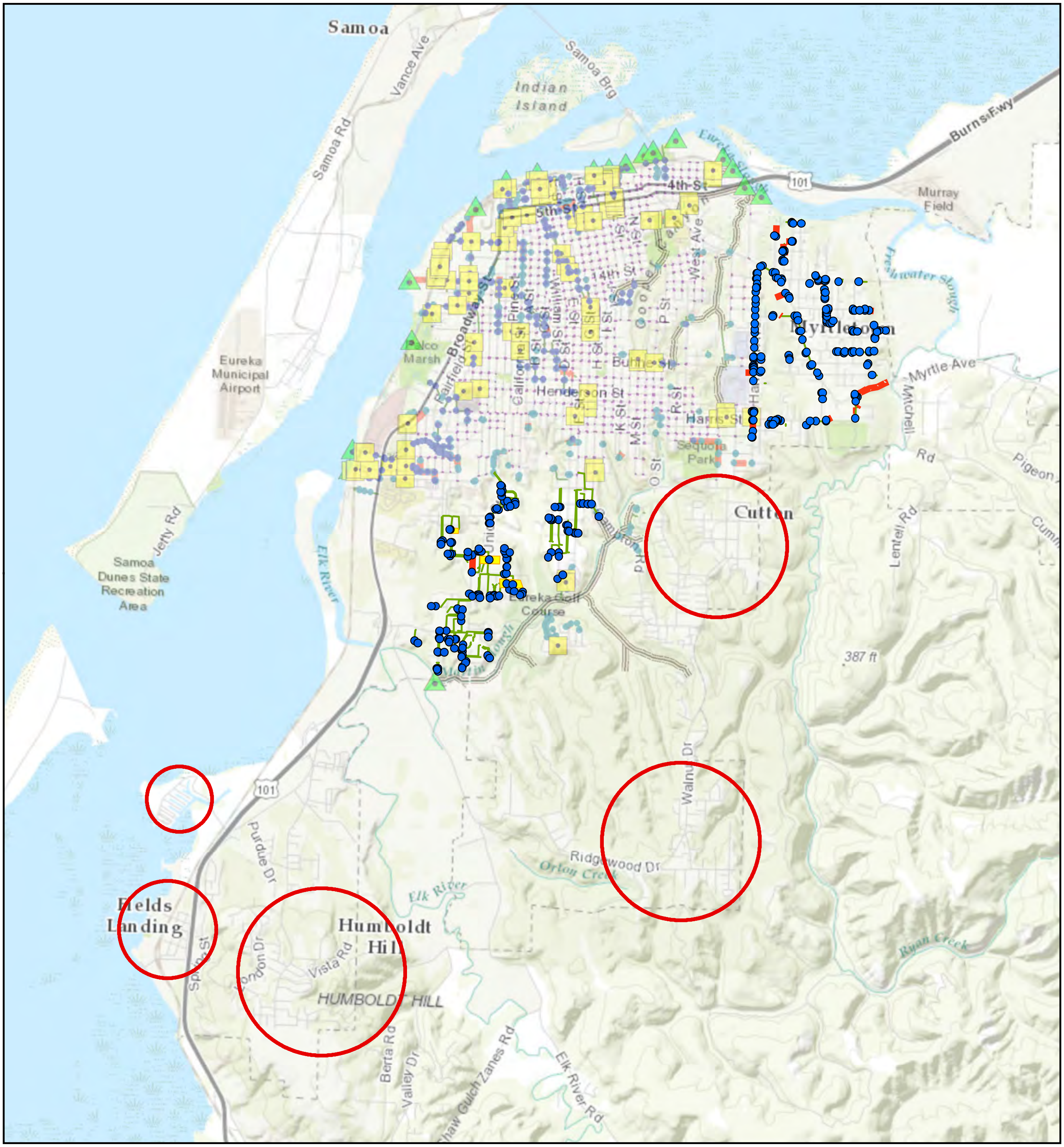
Job Number 11110741
Revision A
Date 12 May 2017

Figure 1

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

G:\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\Task3\F1_DataGapEka.mxd

Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:ashows



- Stormwater Structure
- Stormwater Pipe
- Missing Material or Invert Measurement - Stormwater Pipe
- Areas to be Resolved
- Areas to Collect Stormwater Infrastructure: King Salmon, Fields Landing, Humboldt Hill , Ridgewood Heights, and Cutten

Paper Size ANSI A

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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EUREKA CALIFORNIA

City of Eureka
Stormwater Resource Plan

Job Number 11110741
Revision A
Date 19 May 2017

Data Gap Analysis
County of Humboldt Data Gaps

Figure 2

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

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Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:ashows

Appendix A: Document and Study Annotated List

Document/Dataset Title	Author	Year	Notes on Relevant Content
Eureka Wastewater System Facilities Plan - Hydrologic Model Technical Memorandum	Brown and Caldwell	2008	Includes basic information on the wastewater treatment plant (e.g., peak and average flows and connection information). Maps with sewers, flow monitors, and pump and lift stations within the study area. I&I estimates for 20-year event per unit area, per unit pipe length.
Eureka Wastewater System Facilities Plan - Hydraulic Model Technical Memorandum	Brown and Caldwell	2008	Summary of GIS data used. Used DHI's Mike Urban program.
Evapostranpsiration Rates	California Irrigation Management Infomration System	1999	Monthly evapotranspiration rates based on thirteen zones within the California.
Daily Rainfall for Woodley Island	CDEC	2014	2012-present.
Infiltration and Inflow Flow Data	City of Eureka	2016	Daily flow measurements for various areas within the City. Data spans from 2006 to present.
Stormwater Outfall Water Quality Data	City of Eureka	2016	MBAS, Ammonia, Potassium, Color tests for July 2016.
Elk River Recovery Assessment	Coastal Conservancy	2013	General background information on Elk River, the watershed, and fish species within the watershed.
Evaluation of the Results of Dioxin and Other Chemical Testing of Commercial Oyster Beds in Humboldt Bay, California, From June to October, 2002	EnvironNet and Environ	2003	Dioxin, metals, and semivolatile organic compound testing in commercially grown oysters and mussels from Humboldt Bay. Testing was conducted in June and October of 2002.
FEMA Flood Insurance Study for Humboldt County and Incorporated Areas	FEMA	2015	Investigation of existence and severity of flood hazards in, or revises and updates to previous FISs and FIRMS for Humboldt County.
Martin Slough Enhancement Project Basis of Design Report	GHD	2015	Development and results of HEC-RAS model for project area (Martin Slough and Elk River estuary).

Document/Dataset Title	Author	Year	Notes on Relevant Content
Humboldt Bay Management Plan Draft EIR	Humboldt Bay Harbor, Recreation and Conservation District	2006	Serves as a disclosure document to inform the public with an assessment of potential effects of implementing the Humboldt Bay Management Plan. Some general information on Humboldt Bay hydrology and contributing watersheds.
Humboldt Bay Management Plan Volume I The Plan	Humboldt Bay Harbor, Recreation and Conservation District	2007	Information on waterway maintenance, dredging, general shoreline management information and planning.
Final Comment Report Humboldt Bay and Watershed Fecal Coliform Study	Humboldt Bay Shellfish TAC	2003	Study to investigate tributary coliform loading characteristics and evaluate Department of Health Services closure criteria based upon impacts to the bay waters. The study was designed to (1) evaluate existing shellfish harvesting closure criteria, and (2) to determine the extent of fecal coliform concentrations contributed by Humboldt Bay tributaries, and (3) identify where areas warranting additional investigation.
Humboldt Baykeeper Water Quality Data Eureka	Humboldt Baykeeper	2012	Water quality results for organics, inorganics and nitrates. Spans from 2009 to 2012.
Water and Sewer Design and Construction Standards	Humboldt Community Services District	2016	Design and construction standards for Humboldt County.
Humboldt County General Plan Update Revised DEIR	Humboldt County	2017	Basic information on groundwater, surface water, permitting (other info in typical EIR).
Final Report on Sediment Impairment and Effects on Beneficial Uses of Elk River and Stitz, Bear, Jordan, and Freshwater Creeks	Humboldt Watersheds Independent Scientific Review Panel	2002	Evaluation of sediment impairment in the area, mitigation and remediation options, and summary of data gaps within the watersheds.

Document/Dataset Title	Author	Year	Notes on Relevant Content
Phase II Report: Independent Scientific Review Panel on Sediment Impairment and Effects on Beneficial Uses of the Elk River and Stitz, Bear, Jordan and Freshwater Creeks	Humboldt Watersheds Independent Scientific Review Panel	2003	Evaluate (1) causes and effects of water quality impairment, (2) the rate of recovery, (3) water quality protection measures, and (4) recommendations previously presented in the Dunne Report No. 46
Humboldt County LID Manual	LACO Associates	2016	LID implementation and design guidance within the County.
Humboldt Bay Trails Feasibility Study	Natural Resources Services Division of RCCA	2001	Watershed and water quantity information on Elk River Wildlife Sanctuary.
North Spit Water Levels	NOAA	2017	Hourly data: 1977-present; 6-Minute data: 1996-present
Work Plan to Control Excess Sediment in Sediment-Impaired Watersheds	North Coast Regional Water Quality Control Board	2008	Outlines of the actions and tasks the North Coast RWQCB is currently implementing or intends to implement over the next ten years.
Water Quality Control Plan for the North Coast Region	North Coast Regional Water Quality Control Board	2011	Brief description of the North Coast Region, describes water quality and quantity problems and the potential beneficial uses of surface and ground water within the region.
Humboldt Bay: Sea Level Rise, Hydrodynamic Modeling, and Inundation Vulnerability Mapping	Northern Hydrology and Engineering	2015	Hydrodynamic Modeling within Humboldt Bay. Values for sea level rise in the area.
Freshwater Creek TMDL Sediment Source Assessment Phase I	Pacific Watershed Associates	2006	Identification and documentation of causes and effects of landslides within Freshwater Creek watershed. Extensive sedimentation information.
Slope Stability Modeling and Landslide Hazard in Freshwater Creek and Ryan Slough Humboldt County, Ca	Pacific Watershed Associates	2008	Information on geologic setting in Freshwater Creek and Ryan Slough watersheds.
Daily Precipitation and Temperature Data for Humboldt County Area	PRISM	2017	1981-present.

Document/Dataset Title	Author	Year	Notes on Relevant Content
Salmon Forever's 2013 Annual Report on Suspended Sediment, Peak Flows, and Trends in Elk River, Freshwater Creek, Humboldt county, CA	Salmon Forever	2013	Water quality assessment including peak flows and sediment discharge from Elk River and Freshwater Creek.
Sanitary Sewer Evaluation Survey for the City of Eureka	SHN and CH2M	2017	Evluates conditions of existing sewer colleciton system, identifies areas needing repair and/or replacement, and creates a plan and schedule to rehibilitate the system.
Elk River Wastewater Treatment Plant Improvements	SHN and CH2M	2017	Portion of the WWRIP for City of Eureka. Provides recommendations for the Elk River Wastewater treatment Plant to meet waste discharge permit. Includes influent flow data (quanitity and quality).
Elk River Sediment TMDL Sediment Source Analysis for Upper Elk River	SWRCB	2011	Inventories and describes all sources of sediment discharge that are impacting the beneficial uses of water in the impaired body. Includes sediment loading rates from various sources and summaries of previous studies.
Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (General Permit)	SWRCB	2013	General WDRs for MS4s.
2012 California integrated Report Clean Water Act Sections 303(d) and 305(b)	SWRCB	2015	CWA Section 303(d) and 305(b) requirements and recommended changes to the 2010 Report. Content covers Region 1 (North Coast), Region 6 (Lahontan), and Region 7 (Colorado River).
Draft Action Plan for the Upper Elk River Sediment TMDL	SWRCB	2015	General background information on Elk River, table of TMDL Implementation Actions, sediment source loading rates categorized by source.
Storm Water Resource Plan Guidelines	SWRCB	2015	Guidelines and requirements for a Storm Water Resource Plan.

Document/Dataset Title	Author	Year	Notes on Relevant Content
Upper Elk River: Technical Analysis for Sediment	Tetra Tech, Inc.	2015	General characteristics of Elk River watershed, landslides (significant source of sediment), applicable environmental regulations that affect the watershed, water quality standards (instream and hillslope water quality indicators), impacts from excess sediment, restoration activities, conceptual model of sediment behavior in the Upper Elk River watershed with quantitative estimates of sediment loading, channel filling, and sediment output from the impacted reach, framework for Implementation, monitoring and adaptive management.
Humboldt Bay Shoreline Inventory, Mapping and SLR Vulnerability Assessment	Trinity Associates	2013	Vulnerability assessment for shoreline of Humboldt Bay. Includes general background information for Humboldt Bay shoreline area.
WebSoil Survey	USDA	2017	Majority of study area not covered.
Freshwater Creek Watershed Analysis Cumulative Effects Assessment	Watershed Professionals Network	2003	Addresses individual and synergistic effects of management practices on aquatic resources within eight sub-basins (Upper Freshwater, South Fork Freshwater, Little Freshwater, Graham Gulch, Cloney Gulch, McCready Gulch, School Forest, and Lower Freshwater).
Eureka Storm Drain Master Plan	Winzler & Kelly	1996	Assessment of potential stormwater runoff to private and public property for the 10-, 25-, and 100-year storm events, recommendations to stormwater problems, and prioritized improvements.
City of Eureka Phase II NPDES Storm Water Management Plan	Winzler & Kelly	2005	Stormwater management plan that complies with the Federal Stormwater Phase II Final Rule, which requires operators of MS4s to obtain an NPDES permit. Contains information relating to water quantity and quality concerns, permitting, planning, and management with respect to storm water in Eureka.

Document/Dataset Title	Author	Year	Notes on Relevant Content
Dunn-Robinson-Forster-Gill Subdivision Development – Preliminary Drainage and Hydrologic Assessment	Winzler & Kelly	2006	Drainage study to assess impacts of subdivision located in an unincorporated area of southeastern Eureka, CA known as Ridgewood Heights. Examined existing flow conditions for a 10-year event. Used StormCAD Version 5.5 to determine peak flows and time of concentration.
Draft Water Resources Technical Report for Humboldt County Community Development Division	Winzler & Kelly	2007	Assessment of hydrologic, stormwater, water quality conditions, and major watershed issues. Hydrology and water quality analysis for (1) existing conditions in Humboldt County, including a framework for regulatory requirements, (2) an analysis of future water demands based on the General Plan land use build out (3) potential mitigation measures and reduced impacts utilizing BMPs, (4) cumulative impacts, and (5) a summary of watershed and water resource issues

Appendix B: GIS Dataset Annotated List

GIS Dataset Title	Source	Year	Notes on Relevant Content
Geologic Map of California	USGS	1977	In the absence of soil data, lithology and geologic data will provide information on soil hydraulic conductivity https://mrdata.usgs.gov/geology/state/state.php?state=CA
Coastal LiDAR	California Coastal Conservancy LiDAR	2009-2011	1m LiDAR derived DEM for Humboldt Bay and shoreline
CalWater 2.2.1 watershed boundaries	California State Water Resources Control Board	April 2004	Watershed and subwatershed boundaries
Myrtletown geodatabase	Humboldt County	April 2017	Stormwater infrastructure for the Myrtletown neighborhood
Pinehill geodatabase	Humboldt County	April 2017	Stormwater infrastructure for the Pine Hill neighborhood
Outfall_database geodatabase	Humboldt County	April 2017	Outfall inventory for Myrtletown and Pine Hill
Stormwater geodatabase	City of Eureka	July 2015	Stormwater infrastructure, outfalls and maintenance zones
WASTEWATER geodatabase	City of Eureka	July 2015	Wastewater infrastructure. laterals and monitoring locations
WATER geodatabase	City of Eureka	July 2015	Water infrastructure including fire hydrants and service connections
EUREKA_BASE_DATA geodatabase	City of Eureka	July 2015	Various layers including land use, zoning, street centerlines, alley polygons, city owned parcels and parks for use in hydraulic modeling and in the Multiple Criteria Analysis for LID potential
Elk River and Freshwater Creek LiDAR	Sanborn	March 2005	1m LiDAR derived DEM for Elk River and Freshwater Creek watersheds
National Hydrography Dataset	USGS	updated quarterly	Flow path for rivers, streams and sloughs

GIS Dataset Title	Source	Year	Notes on Relevant Content
HCSD Sewer Dataset	Humboldt Community Services District via City of Eureka	<unknown>	Digitized by City of Eureka, assumed complete sewer system to be used in I&I discussion
Impervious Surface	City of Eureka	<unknown>	Impervious surface polygons, classified by type for all industrial and commercial areas and roughly a quarter of residential areas of Eureka
Building Footprints	City of Eureka	<unknown>	Building footprints for the City of Eureka
Eureka City Limits	City of Eureka	<unknown>	Administrative boundary
County MS4 Area	Humboldt County	<unknown>	Administrative boundary
Humboldt Community Services District Boundary	Humboldt Community Services District	<unknown>	Administrative boundary
Sidewalk Areas	City of Eureka	<unknown>	Area of potential sidewalk development

Appendix D Stakeholder Outreach Engagement Plan

Stakeholder Outreach, Education, and Engagement Plan
For the Eureka Area Watersheds Storm Water Resource Plan

Purpose

The Eureka Area Watersheds Storm Water Resource Plan (EAWSWRP) is a regional storm water planning document that facilitates a watershed-based analysis of storm water issues and opportunities within select watersheds that drain to Humboldt Bay, as shown in Figure 1. A Storm Water Resource Plan (SWRP) is now required as a condition of receiving funds for storm water and dry weather runoff capture projects from any bond approved by voters after January 2014 (Water Code section 10563, subdivision (c)(1)), including Proposition 1.

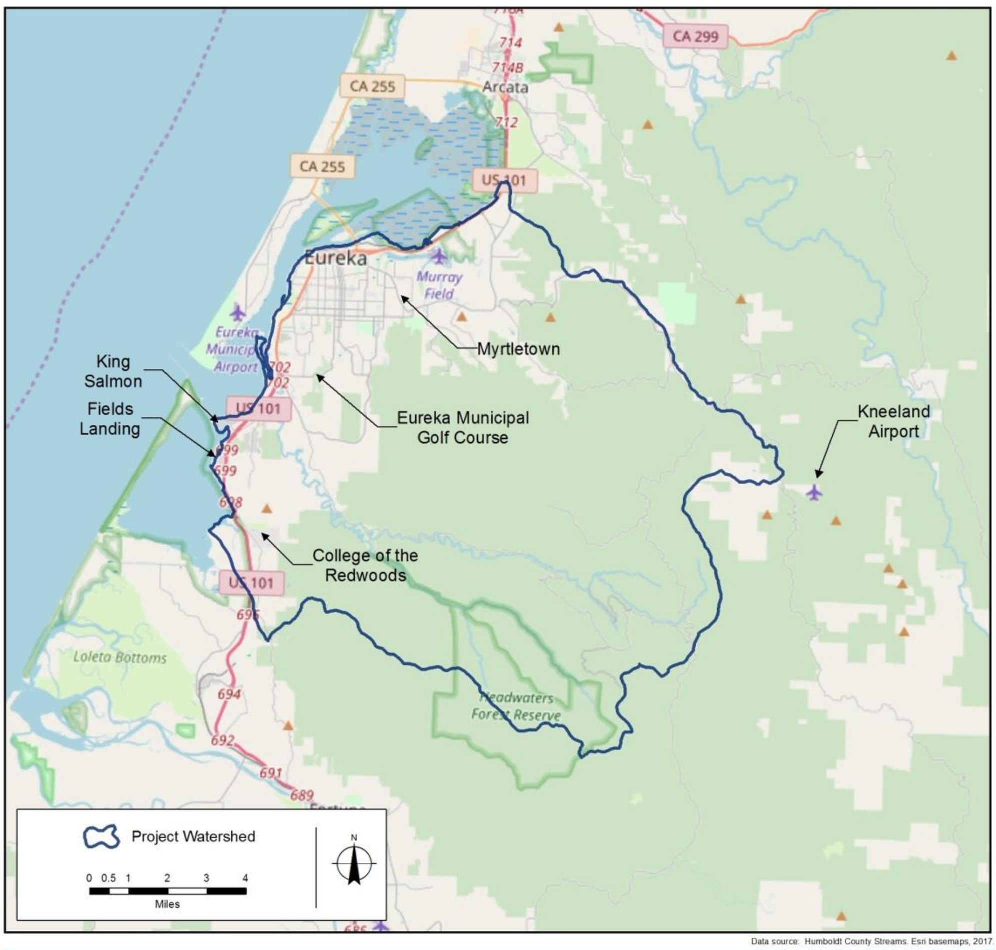

Figure 1. Project Area Map

The EAWSWRP is intended to maximize cooperation and collaboration among state, regional, and local agencies, and nongovernmental organizations during the development and implementation of storm water projects. The State Water Resource Control Board's (SWRCB) SWRP Guidelines (2015) state that "Many local agencies, especially water supply agencies, can directly benefit from projects that use storm water and dry weather runoff as a resource; these beneficiaries have the potential to be important partners and/or serve crucial inter-agency coordination roles. Local municipalities, school districts, universities, conservancies, and other public agencies that have public lands and easements for multiple benefit projects are also potentially valuable partners. Consistent with the requirement to prioritize use of lands or easements in public ownership for storm water and dry weather runoff projects (Water Code, § 10562, subdivision (b)(8)), state, regional, and local government agencies, public and private utilities, and nongovernmental organizations should collaborate to address local, regional, and watershed-wide obstacles by working together to maximize environmental outcomes that result from joint government/organizational efforts.". In addition, the EAWSWRP will provide guidance for identification and prioritization of storm water projects.

Education and outreach to key stakeholders and the public is an important component of the SWRP development process, as outlined in the SWRCB's SWRP Guidelines. Redwood Community Action Agency (RCAA) is collaborating with the City of Eureka and other project partners to facilitate the outreach, education, and engagement in the Eureka Area Watersheds in order to maximize community-based benefits.

Key components of the outreach process:

- Participant Group Identification and Coordination
- Stakeholder Outreach
- Public Outreach
- Disadvantaged Communities Outreach
- Engagement Tools and Outreach Methods

Participant Group Identification and Coordination

Participants in the EAWSWRP development process include the Technical Advisory Committee (TAC), stakeholders, public, and disadvantaged communities in the watershed boundary. The City of Eureka worked with the project team to develop the TAC at the onset of the EAWSWRP Project. The TAC participants are shown in Table 1 and will meet a minimum of four times. RCAA worked with the City of Eureka, TAC, and GHD, Inc. to further identify individuals and organizations to include as stakeholders in the outreach process and when and how to outreach to both stakeholders, the public , and disadvantaged communities. The outreach activities and methods for these groups are discussed in detail in the outreach sections below.

Table 1. Technical Advisory Committee (TAC)

Affiliation	Name	Role/ Responsibility
City of Eureka	Kelly Allen	City Project Manager - Day to Day contact- Oversee consultant work
City of Eureka	Jesse Willor	Deputy Director of Public Works - Engineering - SWRP Reviewer
County of Humboldt	Todd Becker	County Point of Contact/ Lead on Implementation - SWRP Reviewer
County of Humboldt	Hank Seemann	Deputy Director - Environmental Services - SWRP Reviewer
Humboldt CSD	Tim Latham	Superintendent - SWRP Reviewer
Humboldt CSD	Mickey Hulstrom	Community Services Manager - SWRP Reviewer
Humboldt CSD	David Hull	General Manager HCSD - SWRP Reviewer
Water Board	Brendan Thompson	General Guidance - SWRP Reviewer

Stakeholder Outreach

Stakeholder Identification and Contact

RCAA worked with the City of Eureka, GHD, and the TAC to identify potential stakeholders in the EAWSWRP process and create a stakeholder list, which includes organization name and contact person. An effort was made to identify and include stakeholders from a diversity of backgrounds, organizations, and/or areas of the community. The final draft list of stakeholders can be found in Attachment 1. Contacts on the stakeholder list will be notified by email of the EAWSWRP development process and provided with the following information: goals and management objectives of the EAWSWRP, project timeline, details about how they can provide input and be involved in the development of the EAWSWSRP.

Stakeholder Meetings

Two stakeholder meetings will be conducted over the course of the development of the EAWSWRP to share information, gather feedback, and solicit multi-benefit storm water management project ideas and data through an online Project Request Form. In order to maximize stakeholders' time and increase attendance, the project team decided to hold the stakeholder outreach meetings at two of the identified stakeholders' regularly scheduled meetings. One meeting will be held during a regularly scheduled North Coast Stormwater Coalition (NCSC) meeting and a second stakeholder meeting will be held during a Humboldt Bay Initiative (HBI) meeting. The NCSC works collaboratively with Northern California city and county governments to reduce stormwater pollution and protect local waterways. Coalition members include stormwater management staff from the participating cities of Eureka, Arcata, Trinidad, Fortuna, Fort Bragg, and Yreka, the counties of Humboldt and Mendocino, and Humboldt State University, as well as, local, state, and federal agency representatives, non-profit organizations, tribes, consultants, engineers, and interested community members. The HBI works toward ecosystem-based management of Humboldt Bay and surrounding watersheds through coordination and collaboration among participants, who include representatives from local agencies, nonprofits, academic institutions, consulting firms, as well as interested members of the public.

The stakeholders will be notified in advance of the meetings, provided introductory materials, and invited to attend and share the meeting announcement with others within their organizations that might be interested in learning about the EAWSWRP process and providing input. At each of these meetings the following information will be provided:

- EAWSWRP purpose and goals
- EAWSWRP process and schedule
- EAWSWRP Project Request Form
- EAWSWRP web page and materials
- EAWSWRP project contacts

The EAWSWRP Project Request Form will be shared with stakeholders at the meetings and also by email. The Form allows stakeholders to provide specific multi-benefit project recommendations for inclusion in the EAWSWRP. The outcomes from the stakeholder meetings will be included in the prioritizing of projects for the EAWSWRP. Once the initial outreach meetings to stakeholders are held, it is envisioned the stakeholders will be kept informed on the EAWSWRP development by email and will be provided an opportunity to comment on the draft EAWSWRP, including project identification and prioritization. Stakeholders will also be invited to the public meeting where the draft EAWSWRP will be presented to the public.

Key Messages

The key messages to stakeholders will include the following: This is an opportunity to provide your ideas and input in the EAWSWRP, including the submittal of specific multi-benefit storm water projects. Collaboration and participation by a diverse group of stakeholders and the public will lead to an increase in the community-based benefits of the EAWSWRP. Participation is optional and there is no specific commitment level.

Timeline
The EAWSWRP Project Request Form will be available in fall 2017. Stakeholder Meeting No. 1 and Stakeholder Meeting No. 2 will be conducted in late December 2017.

Public Outreach

The public will be invited to participate in the development of the EAWSWRP through the following opportunities:

- Project Website
- Public Stormwater Survey
- Public Meeting (1)

Information about the EAWSWRP process will be shared via multiple media sources, which is discussed under the Engagement Tools and Outreach Material section. The public will be provided with the

EAWSWRP web page, where they will be able to access information and materials about the EAWSWRP and a public stormwater survey developed and distributed by the NCSC. Approximately two to three questions specific to the development of the EAWSWRP will be added to the NCSC's stormwater survey scheduled for spring 2018. This survey is distributed throughout a broad geographic area by the NCSC partners in both online and print form. An introductory sentence about the EAWSWRP and the web link will be included on the bottom of the public stormwater survey.

One public meeting will be conducted during the public review period of the draft EAWSWRP, in late spring/early summer 2018. Members of the public will be able to learn about the goals of the EAWSWRP and provide input on the draft SWRP.

Key Messages

Stormwater is a resource and there are many benefits to minimizing the development impact on hydrology and keeping stormwater on-site rather than diverting it to the storm drain system. Thinking about stormwater management on a watershed scale has many benefits for the environment and human populations. Collaboration and participation in the EAWSWRP process by a diverse group of stakeholders and the public will lead to an increase in the community-based benefits of the EAWSWRP.

Timeline

NCSC Public Stormwater Survey will be distributed in spring 2018, Public Meeting will be held in late spring/early summer 2018.

Disadvantaged Communities Outreach

A disadvantaged community is defined by the State of California as a community with a median household income (MHI) less than 80 percent of the statewide average (or less than $49,191 based on US Census American Community Survey (ACS) 5-year Data: 2010-2014). The project team will identify disadvantaged communities by reviewing ACS 5-year Data: 2010-2014. The entire project watershed area on average was determined to meet the criteria of a disadvantaged community with a population weighted MHI for the watershed of $46,108. While the public outreach process described above applies to everyone within the watershed, a specific effort will be made to outreach within the more economically disadvantaged watersheds in the project area, which include Fay Slough, West Side Eureka, and Lower Elk River. Project information will be distributed to these communities using engagement tools appropriate to the community, e.g. posting fliers at community centers and central locations such as post offices, stores and medical offices.

Engagement Tools and Outreach Methods

RCAA and the project team will share information about the development of the EAWSWRP, along with updates on the progress of the project and post-project announcements through:

- EAWSWRP web page on NCSC website – http://northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/, with links on:
    - City of Eureka website http://www.ci.eureka.ca.gov/depts/pw/stormwater.asp
    - Humboldt County website http://www.humboldtgov.org/1428/Water-Management
    - Humboldt Community Services District website http://humboldtcsd.org/

- Social media
    - NCSC Facebook page – www.facebook.com/NorthCoastStormwaterCoalition
    - City of Eureka EcoEureka Facebook page - https://www.facebook.com/ecoeureka/
    - RCAA Facebook page – https://www.facebook.com/RedwoodCommunityActionAgency
    -
- Flier distribution via email, social media, City and County public works counters, public locations in DAC areas.
- Press releases to local media outlets advertising the public workshop
    - Lost Coast Outpost
    - Times Standard
    - North Coast Journal
- Electronic mail notifications using eawswrp@gmail.com as the main point of contact
- Other forms of outreach may be identified and used during the development of the EAWSWRP

Timeline

EAWSWRP web page will be developed and materials will start being made available in fall 2017. Outreach to stakeholders via email and the web page will be initiated in fall 2017. Outreach to the general public via social media and the web page will begin in early 2018. The engagement and outreach tools will be used concurrently with the activities discussed above to present information and gather input.

Funding has been provided in full or in part through an agreement with the State Water Resources Control Board using funds from Proposition 1. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Attachment 1. Eureka Area Watersheds Storm Water Resource Plan Stakeholder List

Organization	Contact	Email
City of Eureka	Kelly Allen	kallen@ci.eureka.ca.gov
County of Humboldt	Todd Becker	tbecker@co.humboldt.ca.us
Humboldt Community Services District	Mickey Hulstrom	mhulstrom@humboldtcsd.org
North Coast Stormwater Coalition	Todd Becker	tbecker@co.humboldt.ca.us
North Coast Regional Water Quality Control Board	Mona Dougherty	Mona.Dougherty@waterboards.ca.gov
Redwood Community Action Agency	Morguine Sefcik	morguine@nrsrcaa.org
Humboldt Bay Municipal Water District	John Friedenbach	friedenbach@hbmwd.com
Humboldt Baykeeper	Jennifer Kalt	jkalt@humboldtbaykeeper.org
Humboldt Bay Initiative	Joe Tyburczy	jtyburczy@ucsd.edu
CA Department of Fish and Wildlife	Michael Van Hattem	michael.vanhattem@wildlife.ca.gov
CalFire	Kurt McCray	Kurt.McCray@fire.ca.gov
CalTrans	Alex Arevalo	Alex_Arevalo@dot.ca.gov
Humboldt Bay Harbor, Recreation, and Conservation District	Jack Crider	jcrider@humboldtbay.org
Bureau of Land Management	Sam Flanagan	sflanaga@blm.gov
US Fish and Wildlife Service	Kathleen Brubaker	kathleen_brubaker@fws.gov
Humboldt Waste Management Authority	Carlos Chavez	cchavez@hwma.net
Northcoast Regional Land Trust	Dan Ehresman	d.ehresman@ncrlt.org
Northcoast Environmental Center	Larry Glass	larry@yournec.org
Wiyot Tribe	Tim Nelson	tim@wiyot.us
College of the Redwoods	Steven Roper	steven-roper@redwoods.edu
Eureka City Schools	Paul Ziegler	zieglerp@eurekacityschools.org
South Bay Union School District	Gary Storts	gstorts@southbayusd.org
Cutten School District	Sue Ivey	sivey@cuttensd.org
Humboldt County Office of Education	Chris Hartley	chartley@humboldt.k12.ca.us
Humboldt County Resource Conservation District	Jill Demers	hcrcd@yahoo.com
Pacific Gas and Electric	Alison Talbott	A1T5@pge.com
Humboldt Builders' Exchange	Susan Sandoval	officemanager@humbx.com
North Coast Home Builders' Association	Linda Disiere	ljdisiere@gmail.com
Humboldt Association of Realtors	Jessika Chapman Joshua Cook	jessikachapman@mikkimoves joshuacook@mikkimoves.com
Humboldt Bay Sea Level Rise Adaptation Planning	Aldaron Laird	riverplanner@gmail.com
Green Diamond Resource Company	Jeremy Wright	Jwright@greendiamond.com
Humboldt Cannabis Chamber of Commerce	Hollie Hall	hollierhall@gmail.com

Appendix E Stakeholder Meeting Attendance Lists

2017-12-12 Humboldt Bay Initiative General Meeting, Humboldt Bay Aquatic Center, 10am-12pm

Name	Email	Organization/ affiliation (if any)	Please add me to HBI email list. (Mark here only if you're not already on the list.)
1 Clancy DeSmet	clancy.desmet@coastal.ca.gov	CCC	✓
2 Melissa Kraemer	melissa.kraemer@ "	CCC	✓
3 Elizabeth Schatz	eschatz@cityofarcata.org	City of Arcata	✓
4 Jeff Hart	jahnature@me.com		✓
5 Liisa Schmoele	liisa_schmoele@fws.gov	USFWS	
6 Susie Tharratt	susie_tharratt@fws.gov	USFWS	✓
7 Laurel Goldsmith	laurel_goldsmith@fws.gov	USFWS	✓
8 Andre Buchheister	andre.buchheister@humboldt.edu	HSU	
9 Chet Ogan	oganc@sbcglobal.net	Redwood Region Audubon	✓
10 JAY PATTON	quakejay@gmail.com	Cascadia GeoSciences; HSU	
11 Chuck Swanson	cswanson@shn-engr.com	SHN	✓
12			
13			
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2017-12-12 Humboldt Bay Initiative General Meeting, Humboldt Bay Aquatic Center, 10am-12pm

	Name	Email	Organization/ affiliation (if any)	Please add me to HBI email list. (Mark here only if you're not already on the list.)
1	Morguine Sefcik	morguine@nrsrcaa.org	RCAA	
2	Rebecca Crow	rebecca.crow@ghd.com	GHD	✓
3	Richela Maeda	RICHELA.MAEDA@GHD.COM	~~GD~~ GHD	✓
4	Marissa Adams	madams@caltrout.org	Caltrout	
5	Jeff Anderson	Jeff@northernhydrology.com	NHE	✓
6	Jenny Curtis	jacurtis@usgs.gov	USGS	✓
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2017-12-12 Humboldt Bay Initiative General Meeting, Humboldt Bay Aquatic Center, 10am-12pm

Name	Email	Organization/ affiliation (if any)	Please add me to HBI email list. (Mark here only if you're not already on the list.)
1 Andrea Pickart	andrea_pickart@fws.gov	USFWS	
2 Mary Ann Madej	maryann.madej@gmail.com	USGS	✓
3 Rollin Richmond	rollinra@gmail.com	LWVHC	✓
4 Tim Nelson	tim@wiyot.us	Wiyot Tribe	
5 Wes Smith	wes.smith@noaa.gov	OAI/NOAA	
6 Emily Benvie	ebenvie@cityofarcata.org	City of Arcata	
7 Joe Tyburczy	jtyburczy@ucsd.edu	CA Sea Grant	
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North Coast Stormwater Coalition
Meeting Notes
Wednesday, December 13, 2017
Location: Arcata City Hall Council Chambers

Topic	Who Presents
1) Administrative	All

1) Administrative — All
   a) Introductions
      - Todd Becker, County of Humboldt
      - Rebecca Crow, GHD
      - Morguine Sefcik, RCAA
      - Emily Benvie, City of Arcata
      - Travis Clohessy, City of Eureka
      - Becky Price-Hall, City of Trinidad
      - Richela Maeda, GHD
      - Mike Johnson, City of Fortuna
      - Ray Olson, Arcata Wetlands and Creeks Committee
      - Rob Page, Humboldt Cannabis Coalition
   b) Meeting notes
      i) Emily Benvie volunteered for December Meeting
   c) Additions to the Agenda
      i) None
   d) Announcements
      i) Review survey materials on Google Docs and add names as appropriate
2) Discussion Items
   a) Eureka Area Watersheds Storm Water Resources Plan Presentation — GHD
      i) Richela provided presentation
      ii) SWRP is required for eligibility for Prop 1 funds for municipalities of a given size
      iii) TAC developed goals and objectives of Eureka's SWRP
      iv) Stormwater (and related multi-benefit projects) projects within planning area need to be included into SWRP in order to be eligible for Prop 1 funding
      v) Website include SWRP project request form
   b) Trash Provisions — All
      i) Requirements due in 2018
         (1) Implementation predicted to begin in 2020 at the earliest
      ii) Trash Assessments
         (1) Both wet-season and dry-season required
         (2) TAMLE is sufficient
         (3) Assessments are qualitative with grades A-D for 1,000 foot lengths of street
         (4) Full capture equivalency is demonstrated with an "A" score
         (5) Repeat assessments to gauge trash reduction
         (6) Trash that is observed on the street (or within ROW) is the "trash load"
         (7) OWTA is methodology to use – this can be found on NCSC Google Docs
         (8) Priority land use substitutions – lack of clarity regarding approval standards for substituted uses
         (9) NCSC will consider submitting consolidated list of questions to water board in March 2018
   c) Next Meeting — All
      i) Wednesday, February 14, 2018
      ii) Agenda Items
         (1) Survey

CC: NCSC Members

Appendix F Stakeholder Presentation

Eureka Area Watersheds Storm Water Resource Plan

Rebecca Crow | Project Manager
Richela Maeda | Project Engineer

December 2017

Outline

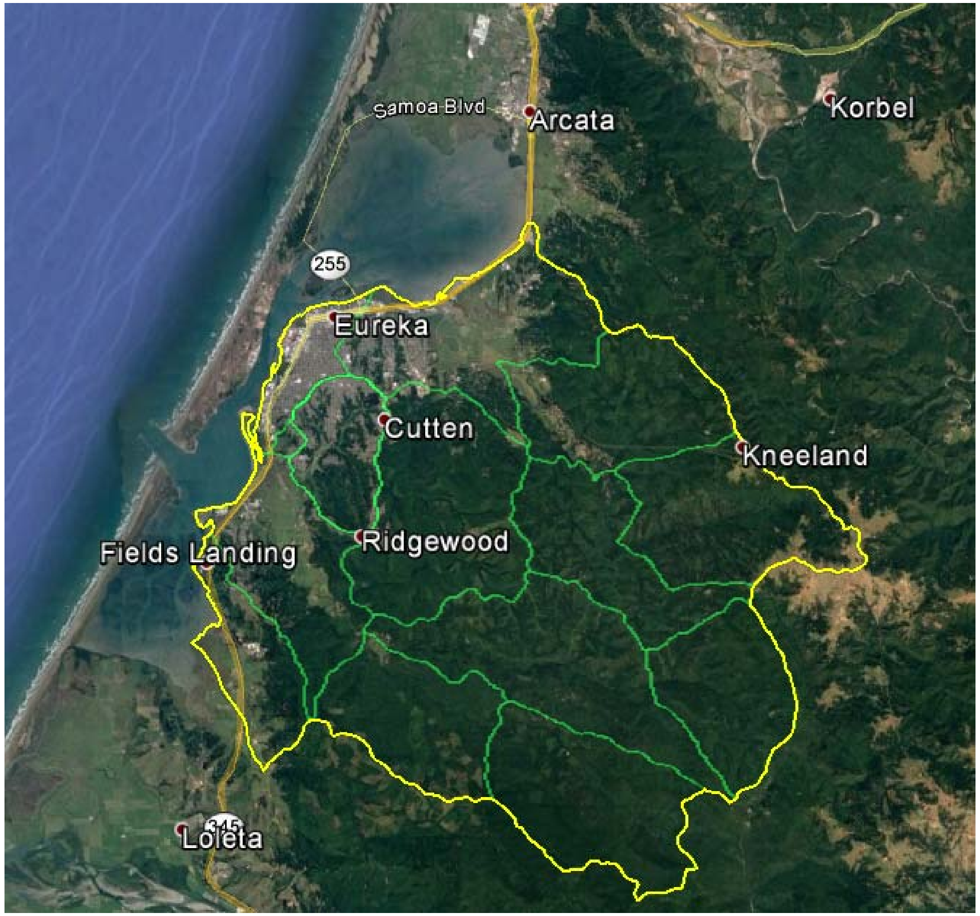
- Background and Purpose
- Goals and Objectives
- Work Completed to Date
- Project Participation
- Next Steps

Background and Purpose

Storm Water Resource Plan (SWRP)

- Planning document
- Watershed-based management
- Provides metrics to prioritize multi-benefit projects SWRP required to obtain Prop 1 Stormwater funds in communities greater than 20,000 people

Background and Purpose



Technical Advisory Committee

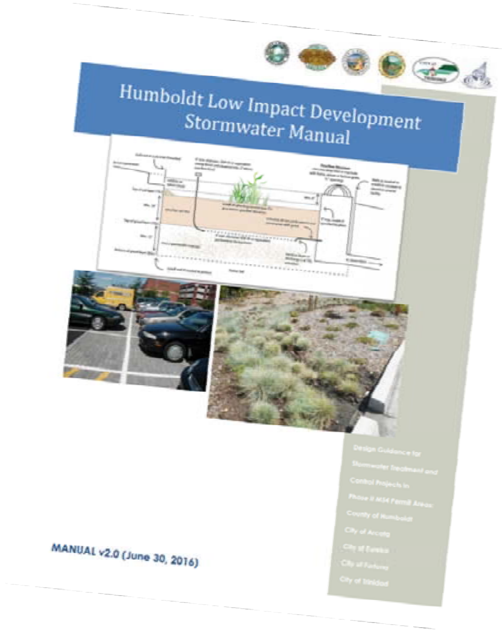
- City of Eureka
- Humboldt County
- Humboldt County Services District (HCSD)
- North Coast Regional Water Quality Control Board

Eureka Area Watersheds
Storm Water Resource Plan Goals

- Characterize watershed processes, surface water quality, storm drainage systems, and land use characteristics
- Provide a quantitative and transferable methodology for the identification and prioritization of storm water projects
- Outline specific storm water projects within the SWRP area
- Leverage stakeholder expertise and knowledge through past planning documents, community engagement efforts, and continued communication and data sharing among stakeholder groups
- Develop framework for future storm water resource planning and program implementation through adaptive management

Eureka Area Watersheds Storm Water Resource Plan Management Objectives

- Increase regional coordination
- Support MS4 Permit compliance
- Improve water quality
- Improve flood management
- Protect and enhance natural resources and community benefits



Work Completed to Date

- Data review and gap analysis
- Literature review
- Watershed characterization
- Water quality compliance approach
- Preliminary data collection
- Developed draft project screening and prioritization method

Stakeholder Participation Opportunities

- Provide your organization's planned projects that are being implemented in the project watershed for inclusion in the EAWSWRP
  - Supports Regional Collaboration
  - Supports potential future Prop 1 funding
- Notification to provide review and comment on the Eureka Area Watersheds Storm Water Resource Plan

EAWSWRP Website – Page on North Coast Storm Water Coalition Website:

http://northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/

EAWSWRP
Project Request Form

Link available on the EAWSWRP Website

Eureka Area Watersheds Storm Water Resource Plan Project Request Form

* Required

Project Information

Title of Proposed Project *

Information:

The development of the EAWSWRP is an opportunity for public and stakeholder input on storm water management in the Project Area Watersheds. There are several ways you can get involved:

- **Submit a Storm Water Project for Inclusion in the EAWSWRP**: Submit a project recommendation, using the Project Request Form, to be considered for inclusion in the EAWSWRP.

project location (latitude and longitude
ct design, and how the project would

fits. Project examples for each benefit can
mples]. Check all boxes that apply to your

of runoff

- [ ] Increases water supply reliability through groundwater management and/or runoff capture and use
- [ ] Facilitates conjunctive use through groundwater management and/or runoff capture and use

Next Steps

- Solicit Regional Planned Project Information:
  Now until February 28, 2018
- Finalize Project Opportunity Screening:
  Complete January 2018
- Hydraulic and Hydrologic Modeling: January 2018 – March 2018
- North Coast Stormwater Coalition Outreach Survey: Spring 2018
- Prioritize Projects: April 2018 - May 2018
- Draft EAWSWRP: June 2018
- Final EAWSWRP: September 2018

Questions

EAWSWRP@gmail.com

http://northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/

www.ghd.com

Appendix G North Coast Stormwater Coalition Storm Water and Water Quality Survey

North Coast Stormwater and Water Quality Survey

The North Coast Stormwater Coalition would like hear your opinion about storm water and water pollution issues in our area. This voluntary survey will take about 5 to 8 minutes and will include questions about daily activities, water quality and natural areas. Local public agencies will use your input to improve their stormwater and pollution prevention programs. Your responses will be completely anonymous.

1. **Please enter your zip-code.**

   ____

2. **Where do you live?**
   Please enter the name of your city or community:

   ____

3. **What is your type of residence?**
   Mark only one oval.

   ◯ House
   ◯ Apartment
   ◯ Mobile Home
   ◯ Other: ______________________________

4. **Please indicate your current housing status:**
   Mark only one oval.

   ◯ Homeowner
   ◯ Renter
   ◯ Other: ______________________________

5. **Which of these water related activities do you frequently pursue:**
   Check all that apply.

   ☐ Fishing/Crabbing
   ☐ Swimming/Wading
   ☐ Surfing
   ☐ Boating
   ☐ Wildlife viewing
   ☐ Hunting
   ☐ Other: ______________________________

6. **Most of the time, when I am done using paints, oils, solvents, thinners and varnishes, I dispose of them**

Check all that apply.

- [ ] In a sink
- [ ] In the yard
- [ ] Down a street drain
- [ ] In the trash
- [ ] At a hazardous waste facility
- [ ] I store it
- [ ] I do not use these products
- [ ] Other: ____________________

7. **Have you implemented any storm water friendly projects on your property?**

Check all that apply

Check all that apply.

- [ ] Installed a rain barrel
- [ ] Removed pavement/concrete and replaced with a permeable/porous surface that allows water to percolate into the soil
- [ ] Redirected roof runoff/downspouts to a landscaped area
- [ ] Installed a rain garden
- [ ] Applied mulch or compost to landscaped areas
- [ ] I've never heard about these options
- [ ] Other: ____________________

8. **Do you have a lawn or garden?**

Mark only one oval.

- ( ) Yes
- ( ) No *Skip to question 12.*

Lawn and Garden

9. **Who usually maintains your lawn/garden?**

Mark only one oval.

- ( ) Myself or my family or roommates
- ( ) Lawn/landscaping service
- ( ) Property owner/manager
- ( ) No one
- ( ) Other: ____________________

10. **Is your lawn or garden treated with any of the following:**
Check all that apply.

- [ ] Fertilizers
- [ ] Pesticides
- [ ] Herbicides
- [ ] Organic fertilizer
- [ ] Manure
- [ ] Compost
- [ ] Nothing
- [ ] I don't know

11. **How do you dispose of your lawn clippings, leaves, or other yard waste?**
Check all that apply.

- [ ] Put into curbside yard waste container or take them to a green waste facility
- [ ] Put into trash/garbage can or take to the landfill
- [ ] Someone else takes care of my yard (professional or non-professional)
- [ ] Blow or sweep into the street or gutter
- [ ] Burn them
- [ ] Re-use them them in the yard (compost, chickens, etc...)
- [ ] Other: ____________________

Pets

12. **Do you or or anyone in your household own an outdoor animal (dog, cat, horse, etc...)**
Mark only one oval.

- ( ) Yes *Skip to question 13.*
- ( ) No *Skip to question 15.*

Pet Questions

13. **Typically, what do you do with your pet's waste in your own yard?**
Check all that apply.

- [ ] I leave it
- [ ] I pick it up and throw it in the trash
- [ ] I put it in a pile or bury it in my yard
- [ ] I do not encounter pet waste in my yard
- [ ] Other: ____________________

14. **When you are walking your dog in public spaces such as on the street or in a park, about how often do you pick up your dog's waste and throw it in the trash?**
If you have no dog or don't ever take your dog into public areas, mark "Not applicable."
Mark only one oval.

- Always
- Often
- Sometimes
- Rarely
- Never
- Not applicable

Motor Vehicle

15.
Do you have/own a motor vehicle?
Mark only one oval.

- Yes *Skip to question 16.*
- No *Skip to question 21.*

Motor Vehicle Questions

16.
If I notice my vehicle leaking fluids, I:
Check all that apply.

- [ ] Place cardboard or some other absorbent material under it.
- [ ] Place a drip pan under it
- [ ] Do nothing
- [ ] Immediately have it repaired
- [ ] Have it repaired, but not immediately
- [ ] I have never noticed my vehicle leaking fluids

17.
I usually park my car:
Mark only one oval.

- In the garage
- On a paved surface
- On an unpaved surface

18. **I wash my car:**

Check all that apply.

- [ ] At a car wash
- [ ] On a paved driveway or surface
- [ ] On a dirt or gravel surface
- [ ] On the lawn
- [ ] I do not wash my car

19. **I change my oil:**

Check all that apply.

- [ ] At an oil change facility
- [ ] In the garage or carport
- [ ] On a paved surface
- [ ] On a lawn
- [ ] On a dirt or gravel surface
- [ ] I do not change my oil

20. **I dispose of my used motor oil:**

Check all that apply.

- [ ] The people who change my oil dispose of it for me
- [ ] At a hazardous material facility such as HWMA, the HWMA mobile, etc...
- [ ] At an auto store
- [ ] In the trash or at the dump
- [ ] Down a drain in the house or garage
- [ ] Down a street drain
- [ ] On some other paved surface
- [ ] On a dirt surface (including burial in the yard)
- [ ] I store it indefinately
- [ ] I do not encounter used motor oil

21. **If I were to witness illegal dumping, such as pouring chemicals down storm drains or into water bodies, or leaving trash in public spaces:**

Check all that apply.

- [ ] I would report it immediately to the City or County
- [ ] I would call the Stormwater Hotline
- [ ] I would do nothing because I don't know who to call
- [ ] Other: ____________________

22. **Do you know how to dispose of household chemicals?**

Mark only one oval.

- Yes
- No
- Don't Know

23. **Are you a cigarette smoker?**

Mark only one oval.

- Yes *Skip to question 24.*
- No *Skip to question 25.*

24. **When I finish my cigarette, I:**

Mark only one oval per row.

	Never	Rarely	Sometimes	Usually	Always
Flick the butt on the ground					
Put it in an ashtray					
Put it into the trash					

25. **Which of the following terms have you heard before:**

Check all that apply.

- stormwater
- urban run-off
- wastewater
- Area of Special Biological Significance (ASBS)
- None of the above

26. **As far as you know, which best describes what happens to the water that goes into our streets and storm drains?**

Mark only one oval.

- It is released untreated into local waterways
- It is treated at a sewage plant, like the household wastewater
- It is cleaned, but to a lesser extent than household wastewater
- It goes someplace else
- I don't know

27. **Which of these statements best describes what you believe a watershed to be:**

Mark only one oval.

- Water like a swamp or marsh
- A specific area whose water drains into the same place
- A named river
- I don't know
- Other: ______________________________

28. **As far as you know, do you live in a watershed?**

Mark only one oval.

- Yes
- No
- I don't know

29. **To the best of your knowledge, is each statement true or false?**

Mark only one oval per row.

	True	False	Don't Know
Hosing or sweeping trash, leaves or dirt into the street is harmful to creeks, streams and other waterways			
Dumping household materials, vehicle fluids and paint into the street is prohibited under California's stormwater regulations			

30. **Do you think you, personally, can have any effect on protecting the water quality in our region?**

Mark only one oval.

- Yes
- No
- I don't know/am not sure

31. **Please indicate your level of concern about the following types of pollution on the North Coast**

Mark only one oval per row.

	Very Concerned	Somewhat Concerned	Not too Concerned	Not at all Concerned	Don't Know
Pollution of local creeks and rivers					
Pollution of the bay and ocean					
Stormwater run-off pollution					
Air pollution or smog					
Litter/Illegal dumping					

32. **What would you say are the primary contributors to run-off pollution in the region?**
Check all that apply.

- [ ] Dog owners
- [ ] Vehicle owners
- [ ] People with gardens
- [ ] Homeless/displaced community
- [ ] College students
- [ ] Illegal cannabis/marijuana cultivators
- [ ] Businesses
- [ ] Local, state and federal government
- [ ] Don't know
- [ ] Other: ______________________

33.
Rate your level of agreement with each of the following statements:
Mark only one oval per row.

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
There isn't enough information provided about how to stop run-off pollution.	◯	◯	◯	◯
It would be worth a few dollars a month in taxes to reduce stormwater pollution in our area.	◯	◯	◯	◯
There are plenty of opportunities to participate in water pollution prevention activities.	◯	◯	◯	◯

34.
Indicate how much you think each of the following types of pollutants might have contributed to stormwater pollution in our area:
Mark only one oval per row.

	A lot	Some	Not too much	Not at all
Paints & solvents	◯	◯	◯	◯
Household chemicals and cleaning products	◯	◯	◯	◯
Outdoor and gardening products such as insect spray, weed killers and fertilizer	◯	◯	◯	◯
Oils and other fluids from vehicles	◯	◯	◯	◯
Lawn clippings, dirt and leaves	◯	◯	◯	◯
Household trash	◯	◯	◯	◯
Animal droppings and pet waste	◯	◯	◯	◯
Chemicals and hazardous waste from local business and industry	◯	◯	◯	◯
Dirty water and detergents from car washing	◯	◯	◯	◯
Cigarette butts	◯	◯	◯	◯

Your responses to the following questions will help us figure out the best ways to inform the public about preventing stormwater pollution.

35. **Where have you read or heard information about stormwater pollution prevention in this region?**

Check all that apply.

- [ ] Education in school or camp
- [ ] Newspaper articles or advertising
- [ ] Brochures
- [ ] Community events, workshops, meetings or fairs
- [ ] City or County website
- [ ] Interpretive displays at community centers, parks or other facilities
- [ ] Bus advertisements
- [ ] Storm drain stencils such as "No dumping, drains to creek or bay"
- [ ] Public service announcements on TV
- [ ] Public service announcements on radio
- [ ] Never heard of stormwater pollution prevention in this region
- [ ] Social media
- [ ] Other: ______________________

36. **How well do you think local agencies are performing with educating the public about stormwater pollution prevention?**

Mark only one oval.

- ( ) Poor
- ( ) Fair
- ( ) Good
- ( ) Excellent

37. **What do you think would be the most effective mechanisms to increase awareness of stormwater pollution locally?**

Check all that apply.

- [ ] Public meetings and workshops
- [ ] Education in school or camps
- [ ] Brochures
- [ ] Posters
- [ ] Watershed work days
- [ ] Email notices
- [ ] Social media/Youtube
- [ ] Newspaper, TV and radio public service announcements
- [ ] Bus advertising
- [ ] Utility bill inserts
- [ ] Movie theater advertisements
- [ ] Other: ____________________

38. **To help us improve our stormwater outreach, what organizations do you think we should contact?**

____

39. **Please indicate your age group:**

Mark only one oval.

- ( ) Under 18 years old
- ( ) 18 - 24 years old
- ( ) 25 - 34 years old
- ( ) 35 - 44 years old
- ( ) 45 - 54 years old
- ( ) 55 - 64 years old
- ( ) 65 - 74 years old
- ( ) 75 years old or better

40. **Please indicate your gender**

Mark only one oval.

- ( ) Male
- ( ) Female
- ( ) Other: ____________________

41. **What is your highest level of education completed?**

Mark only one oval.

- Middle School or lower
- High School
- Some College
- College
- Graduate School or higher

You have completed the survey.

Thank you! We appreciate your input.
For more information about keeping our local waterways clean, please visit
www.northcoaststormwatercoalition.org/

Sincerely, North Coast Stormwater Coalition

To learn about the Eureka Area Watersheds Storm Water Resource Plan (EAWSWRP) and how you can get involved go to www.northcoaststormwatercoalition.org/index.php/stormwaterresourceplan/

Appendix H Humboldt Community Services District Smoke Testing Summary

Humboldt Community Services District

Post Office Box 158 Cutten, Ca 95534 (707) 443-4558 Fax (707) 443-0818

<u>RESULTS OF HCSD'S WINTER 2017 SEWER SYSTEM SMOKE TESTING SURVEY</u>

KING SALMON, FIELDS LANDING, MAPLE LANE SEWER DRAINAGE BASIN IN MYRTLETOWN, AND THE WELLINGTON ROAD SEWER DRAINAGE BASIN IN MYRTLETOWN

The Humboldt Community Services District (District) with assistance from members of the Eureka Storm Water Resource Plan coalition performed a sanitary sewer collection system smoke test of four areas within the District's Boundaries. The areas that the smoke testing was conducted is the entire King Salmon community west of Highway 101, the entire Fields Landing community west of Highway 101, the sewer drainage basin of Wellington Road east of Hall Avenue in the Myrtletown area, and the sewer drainage basin of the area of Maple Lane west of Myrtle Avenue in the Myrtletown area (see attached map Exhibit A).

These areas were chosen due to I&I (Infiltration & Inflow) issues related to the sewer collection system as well as these areas have not been surveyed in several years. Both King Salmon and Fields Landing are known during storm events coupled with high tides to flood, at times overwhelming the sewer collection system. The Maple Lane and Wellington Road drainage basins also have issues with I&I.

This sanitary sewer collection system smoke testing was done to locate breaks and defects in the sewer system. A special non-toxic smoke that is manufactured specifically for this use was used in these tests. The District conducted leak tests in the sanitary sewer system by blowing smoke into manholes therefore into the sewer system piping. The smoke revealed sources of sewer odors in the neighborhoods, within buildings, as well as places where storm water and other surface waters are entering the sewer system.

In the King Salmon area the smoke testing results identified 27 issues. The Fields Landing area also identified 27 issues. In the Maple Lane drainage basin, 6 issues were found and finally the Wellington drainage basin survey found 4 issues (see attached Exhibit B). These issues ranged from property owners directing their roof rain gutters to the public sewer system, broken or not properly sealed under-house sewer piping (a problem in flooding areas), interior improper sewer plumbing (no pea traps or open sewer pipe drains), out door open sewer pipes, outdoor broken sewer piping, and not properly capped sewer lateral clean-outs. Some of these issues appeared to be manmade to drain rain water from flooding yards and in one case an overflow connection to the sewer system from a small manmade pond.

The District has now entered into the enforcement stage based on the results of the smoke testing program. The District is contacting property owners and requiring them to correct these defects.

march2018/mlh

EXHIBIT "A"

Maple Lane Drainage Basin

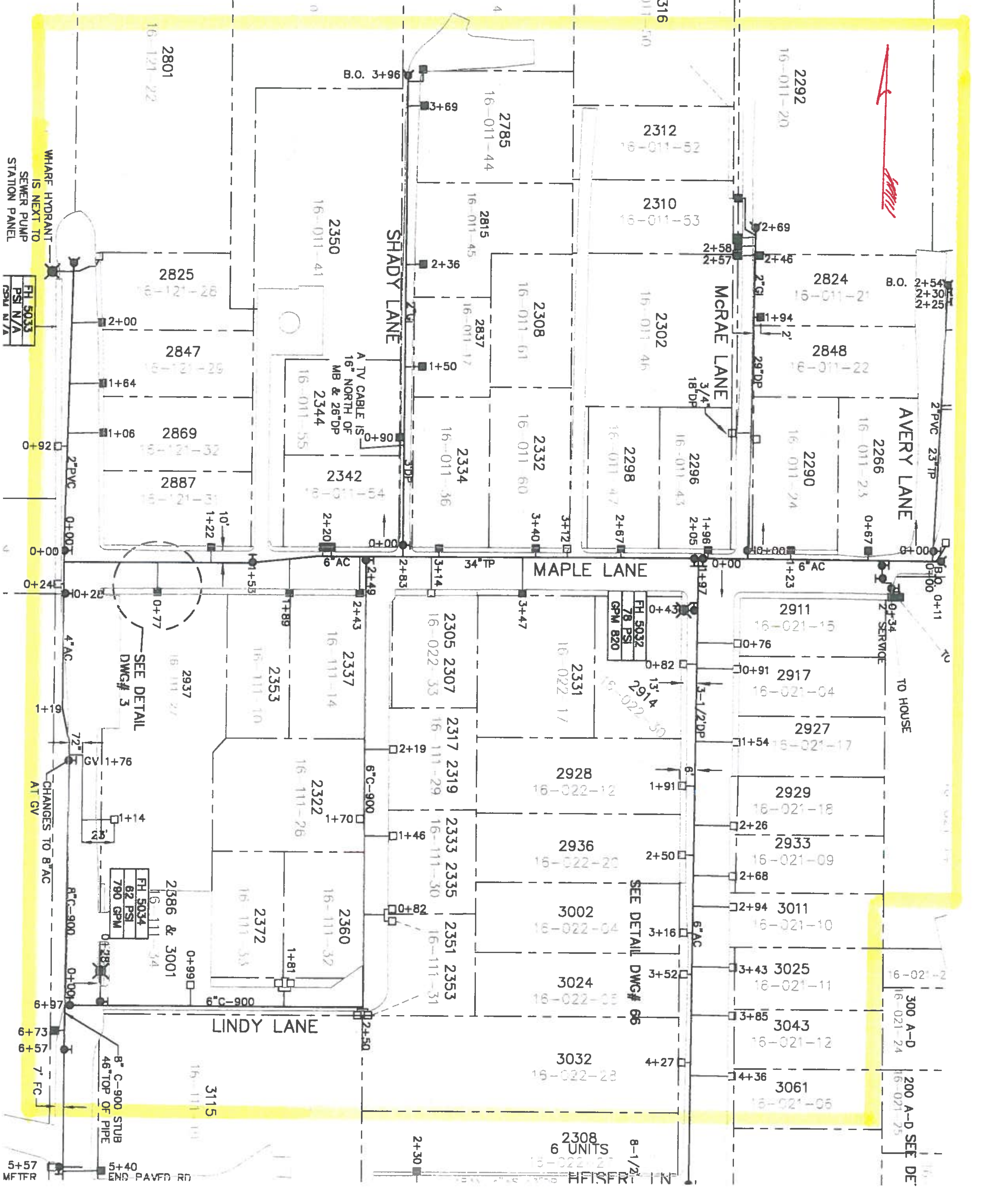


EXHIBIT "A"

Wellington Road Drainage Basin

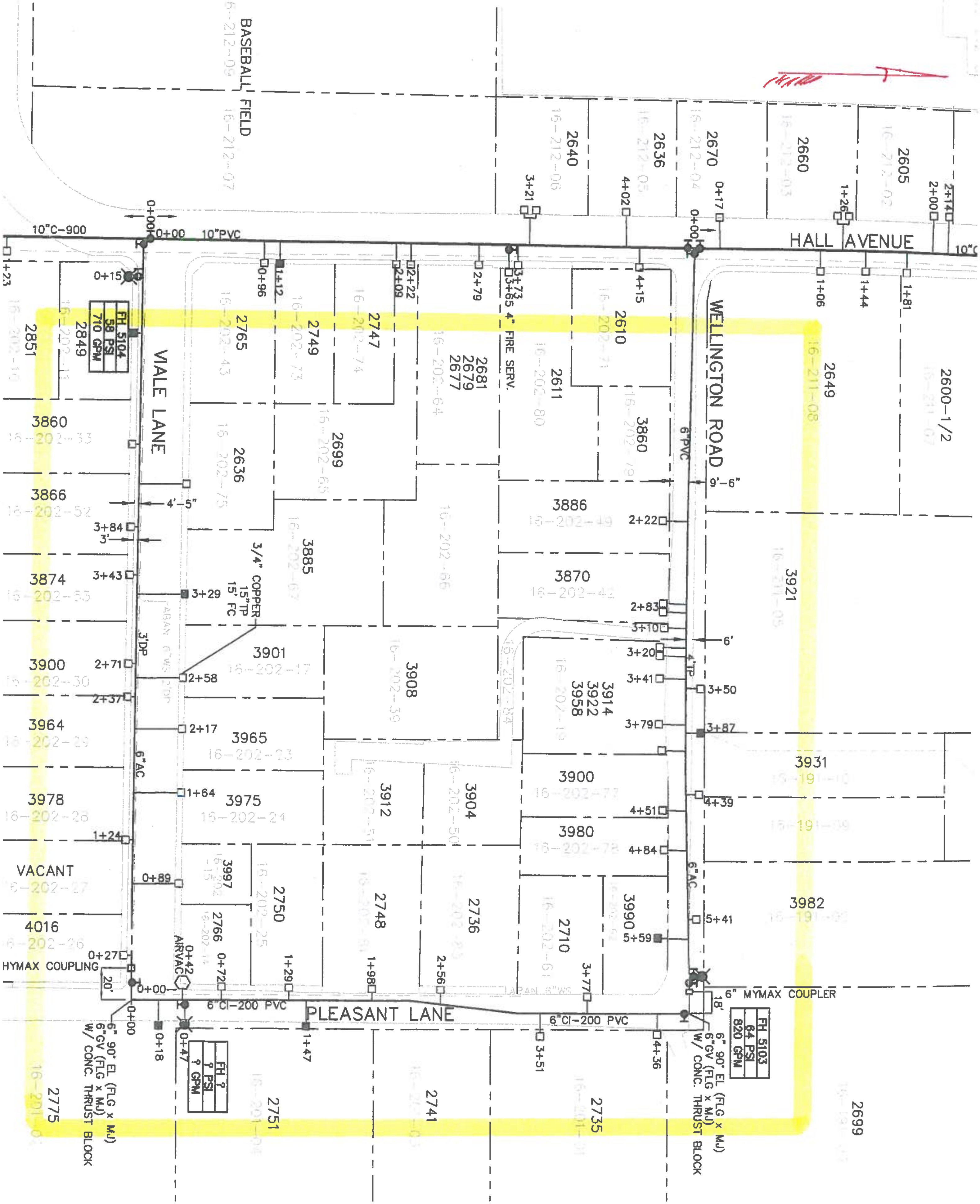


EXHIBIT "A"

King Salmon

EXHIBIT "A"

Fields Landing

EXHIBIT "B"

HCSD WINTER 2017 SMOKE TESTING RESULTS

	Maple Ln Drainage Basin	Wellington Drainage Basin	King Salmon Community	Fields Landing Community
out door issue:	5	3	17	15
under structure:	0	0	6	7
within structure:	1	1	1	4
roof drains:	0	0	3	0
approximate # of parcels:	60	40	145	135
footages of gravity sewer pipe tested:	2910'	1380'	5960'	7900'

Appendix I Hydraulic Modelling Technical Memorandum

Memorandum

August 2018

To:	Eureka Area Watersheds Storm Water Resource Plan Technical Advisory Committee	Ref. No.:	
From:	Richela Maeda and Patrick Sullivan, GHD	Tel:	
CC:	Rebecca Crow, GHD		
Subject:	**Decision Support Tool and Data Collection Memorandum**		

1. Introduction

An assessment of the Eureka Area Watersheds existing conditions storm water systems was conducted to determine potential inefficiencies and issues within the systems. The analysis incorporates existing data (As-builts and GIS), previous studies, and new field survey and flow monitoring data. Availability of City and County infrastructure data governed the extents of the assessment. The focus of this memorandum is the City's storm water system.

Due to the lack of availability of storm water infrastructure data within the County limits, a field evaluation of the storm drainage system in the County highest priority area was conducted. A summary of the County storm drainage evaluation, and potential solutions for the system's inefficiencies, can be found in Appendix M of the Eureka Area Watersheds Storm Water Resource Plan.

A hydraulic model was used to evaluate the City's storm water system. The model identified areas susceptible to flooding, provided a tool to evaluate solutions, and was used to evaluate potential effects from sea level rise. The following sections outline the current condition of the existing storm drain network, the data collection performed, the hydraulic model development and findings, and the sea level rise assessment.

2. Summary of Existing Storm Drain System

2.1 Existing Storm Drain Network

The study area encompasses the majority of the City of Eureka. Extents were selected based on hydrologic watersheds, hydraulic connection and available infrastructure data. The drainage pattern flows generally from the south or southeast to north or northwest. Much of the existing storm drainage network in the City is old and undersized. Street and gutter flow account for a large portion of existing storm water system (indicated by the dashed lines in Figure 1 of Appendix A). Some of the system is located on private property with no easy access. Street flooding is a common occurrence with more serious flooding occurring less frequently, which added uncertainty to the analysis.

3. Data Collection

3.1 Existing GIS Data

GIS data for this project were provided by the City of Eureka or were available from public data servers (NOAA). GIS data was used as the primary source for the storm drain system layout and physical parameters. The City provided the following storm water infrastructure data: culverts, drop inlets, drainage basins, storm mains, manholes, and outfalls. NOAA one-meter LiDAR elevation data was obtained to create the 2D surface model and supplement missing infrastructure elevation data in the City-provided storm water infrastructure dataset.

3.2 Data Gaps

The City GIS data was brought into the hydraulic model environment to determine areas in which data collection was required. Manhole and drop inlet invert elevations, which largely govern the flow through the system, were the primary attribute evaluated. Data gaps were identified by comparing upstream and downstream invert elevations. Data gaps were also identified by examining the data of existing infrastructure to determine if invert elevations, surface elevations, pipe size and material were available. Values were assumed based on As-builts, nearby infrastructure (upstream or downstream), or common practice and minimum cover depths. Adverse or unreasonable slopes in the drainage system indicated an area where data collection may be required. Flooding areas identified through interviews with City staff were considered critical for data collection.

In some cases, the necessary model information was not available within existing data provided. This data was referred to as “missing” data and included for certain facilities: pipe size, material, invert elevation, channel geometry, and channel roughness. In addition to missing data, unreliable invert elevation data was identified by comparing upstream and downstream invert elevations. Adverse or unreasonable slopes in the drainage system indicated an area where data collection may be required. Flooding areas identified through interviews with City staff were considered critical for data collection. The actions taken to gather the missing or unreliable information is categorized as:

1. **Field or as-built plan verification.** These parameters may be gathered by visual inspection of the item in the field or on plans. These parameters include: materials (RCP, CMP, etc.), item type (circular, elliptical, box, irregular channel, etc.) channel roughness (develop Manning’s n), pump station info.
2. **Field measurement.** This included going into the field and physically measuring the parameter with a tape or survey equipment. Items to be measured include: pipe diameter, rim elevation, invert elevation, or surface elevation.
3. **Interpolated or approximated.** This included interpolating or estimating a parameter value because it was not considered to be critical to the system analysis, or it was not possible to measure.

3.3 Summary of Data Collected

Invert elevations for approximately 80 manholes and drop inlets were collected. Pipe material, size, and conditions were also collected for these manholes and inverts. Open channel geometry, and overland flow patterns were collected for several areas. Of the fifteen outfalls, 11 were measured and 4 were not found. The data set used for the model was provided electronically as ESRI shapefiles to the City.

4. Existing Model Development

The City of Eureka storm drain system was modeled using PCSWMM 2017 Professional 2D, Version 7.1.2480 (SWMM5 version 5.0.013-5.1.012). The PCSWMM modeling package combines stormwater hydrology, collection, and conveyance simulation with a GIS/CAD interface. The hydrology and hydraulics computational engine employs the standard US EPA SWMM5, which is a link-node model for the 1D modeling combined with a proprietary 2D modeling grid developed by CHI.

The PCSWMM model uses a GIS data structure for model construction and data handling, which makes it the ideal choice for the Eureka storm drain study. Additionally, the open-source 1D portion of the model can be used in the future to evaluate the potential quantitative benefits of proposed projects.

The overall approach for model construction is to use the City-provided GIS data, and the data collected to develop a trunk-line storm drain system model. Collected flow data was used to confirm the hydraulics of the system was accurately represented. The following sections outline the model parameters and elements used in developing an existing conditions model.

4.1 Drainage System Components

The PCSWMM model input data includes individual components that comprise the drainage system. In PCSWMM, these components are grouped into several categories. The main categories used in this model are: conduits, junctions, outfalls, and sub-catchments (shown in Figures 1 of Appendix A). Conduits are linear features that convey flow; they include: pipes, ditches, and channels. Junctions include: manholes, drop inlets, curb inlets, concrete boxes (with and without grates), blind connectors, and culvert inlets/outlets.

4.1.1 Pipes

In PCSWMM pipes are defined as conduits. Locations of pipe conduits were assigned by the GIS shape files. The model GIS layer included 409 pipe sections. Some pipe reaches have multiple sections because of blind connectors. The pipe size, shape, and material were assigned based upon the attributes recorded in the GIS shape files. For pipes with missing properties, data was either collected, or assumed based on upstream and downstream properties.

4.1.2 Open Channels

In PCSWMM open flow channels are a type of conduit that is modeled similarly to pipes with irregular bottom geometries. The flow characteristics of channels are modeled using the slope of the channel, Manning’s roughness, and channel geometry. The channel alignments were based upon the GIS shapefiles. Channel slope was based upon the inlet and outlet junction elevations and is assumed to be constant between the junctions.

There are 31 channel segments represented in the GIS model layer. The channel geometry for the majority of the open channels was assigned assuming a representative cross section obtained from the DEM. Several channels were defined as critical open channels and were field measured as part of the identified data gap efforts.

4.1.3 Gutter Flow

In the 1D environment, surface street flow can be defined using an open channel that captures gutter flow geometry. Although the routing of subcatchments does account for surface flow, the additional conduits allow the user to assign a gutter geometry and route runoff from subcatchments that are not hydraulically connected. The 1D model for this study included 53 gutter flow sections. Because the cell size did not sufficiently capture a typical street cross section, gutter flow sections were included in the 2D model.

4.1.4 Junctions

In PCSWMM, junctions are nodes that connect conduits. Junctions include manholes and drop inlets, and any location that connects two sections of pipe, open channel, or gutter flow sections. The model has 503 junctions. Junctions defined by manholes or drop inlets were assigned a loss coefficient of 0.1. Outfalls are a special type of junction where the outflow from the junction is defined by an associated boundary condition. Fifteen outfalls were included in the model with a boundary condition defined by a tidal cycle (discussed in Section 4.2.4). Junctions are shown as blue circles in Figure 1 of Appendix A.

4.1.5 Sub-watershed ("subcatchment" in PCSWMM)

Sub-watersheds (or "subcatchments" in PCSWMM) are a key feature for developing the inflow to the storm drain system. A sub-watershed is an area that receives rainfall and concentrates the overland runoff flow into a point of concentration where the stormwater runoff enters the storm drain system.

The sub-watersheds were delineated using the Watershed Delineation Tool in PCSWMM. The tool uses the DEM and the junctions capable of receiving runoff storm water to delineate sub-watersheds drainage areas. The model has 365 subcatchments. The subcatchments were verified against topography, aerial imagery and Google Street View.

The Set Area/Length Tool in PCSWMM was used to determine the longest flow path for each subcatchment. This distance sets the time of concentration, which is a key parameter in PCSWMM because it governs the time at which surface flow runoff reaches a subcatchment outlet. Manual verification of select subcatchments was checked based on topography, aerial image, and Google Street View. Subcatchmets are shown in Figures 4-6 in Appendix A.

4.2 Hydrologic/Hydraulic Components

PCSWMM calculates rainfall runoff by applying the rainfall to watersheds and routing the runoff flow through the collection system. In the process, the model accounts for water infiltration and the overland flow timing. The following sections describe the methodology used for rainfall, overland flow routing, and infiltration.

4.2.1 Rainfall

In PCSWMM, rainfall is the primary source of water entering the system. The rainfall is represented as a hyetograph, which is referred to as a “Rain Gage”. “Rain Gages” are assigned to each watershed and can vary from sub-watershed to sub-watershed. The model was populated with storm events selected based on the indicated drivers shown in Table 4-1. The 24-hour storm events were developed with a SCS Type 1A 24-hour storm, which is a predetermined rainfall distribution. The scale of the design storm is based upon the NOAA Atlas, Volume 6, Version 2, 24-hour storm depths that are fit to the Type 1A storm. The one-hour storm event was developed using the Atmospheric Environment Service Method, developed for urban areas in British Columbia. A comparison of the SCS Method scaled to a one-hour storm event indicated that the AES Method provides a more conservative estimate of runoff that enters the storm drain system and was therefore used in the analysis. Evaluation of the spatial variation of precipitation indicated that there are not significant differences across the project watershed; therefore the rainfall hyetograph was applied uniformly across the model domain for each of the storm events.

Table 4-1. Modelled Storm Events

Storm Event	Treatment vs Capacity	Driver	Driver Source	Precipitation Source	Cumulative Precipitation (inches)
10-year, 24-hour	Capacity	Pipes and culverts to flow full with no head during a 10-year storm event, and no flooding in the traveled way	Eureka Storm Drain Master Plan	NOAA 14, SCS Method	4.18
85th percentile of a 24-hour event	Treatment	Achieve infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile 24-hour storm runoff event to the extent technically feasible. Any remaining runoff from may then be directed to one or more bioretention facilities	MS4 Permit	NOAA 14, SCS Method	0.65
	Treatment	Capture (retain) and treat excess runoff from the 85th percentile 24-hr storm event that is not retained or infiltrated by the site design measures	Humboldt LID Manual	NOAA 14, SCS Method	
1-year, 1-hour	Treatment	Trash capture projects need to have a design treatment capacity that is (1) not less than the peak flow rate for the one-year, one-hour storm or (2) equal or greater than the volume generated form a one-year, one-hour storm event.	Trash Amendment	NOAA 14, AES Method	0.43

4.2.2 Routing

The routing of stormwater runoff starts with overland flow to the point of concentration where it enters the collection and drain system. In PCSWMM overland flow may be modeled as steady, kinematic wave, or dynamic wave. The dynamic wave method is used in this model. The parameters used in the dynamic wave are not explicitly declared, they are derived from the parameters defined in the sub-watershed. The modeling of overland flow uses Manning's equation. The Manning's roughness coefficient is specified for the pervious and impervious areas and is stored in the sub-watersheds attributes. Routing utilizes the effective flow width as described above in Section 4.1.5.

4.2.3 Infiltration

In PCSWMM the storm water runoff accounts for the loss of runoff flow due to soil infiltration. The model provides three options for estimating the portion of rainfall that is infiltrated: Horton, Green Ampt, and SCS Curve Number. Each of the methods uses some or all of the following parameters: sub-watershed area, sub-watershed width, percent impervious, roughness coefficient for impervious area, roughness coefficient for pervious area, depth of storage of impervious area, and depth of storage pervious area. These parameters are stored in the sub-watersheds attributes.

The Curve Number method is used in this model. It is a widely used method that relates directly to known, readily available parameters including soil type and land use. It should be noted that the model input asks for pervious and impervious percentages. The impervious and pervious percentages were estimated for each subcatchment using aerial imagery. In PCSWMM each subcatchment is treated as a reservoir with nonlinear runoff properties. In each subcatchment there is a portion of the “reservoir” that is filled prior to any runoff and is referred to as the depression storage. The value of the storage depth varies by land type: impervious, lawns, pastures, forest, etc. A conservative value of 0.05 inches, typical for urban and impervious areas, was assumed suitable for this model.

4.2.4 Downstream Boundary Conditions

Outfalls are the locations where the modeled flow terminates and leaves the model. The flow conditions at the boundary are defined by the tidally influenced water level of Humboldt Bay. The tidal cycle time series boundary condition was applied to the outfalls, which all drain to Humboldt Bay. A typical tidal cycle is shown in Figure 4-1. The two high and low points in the figure are the daily high, higher high, low, and lower water levels that are typically observed. The tidal cycle applied as the boundary condition of the existing conditions model was determined by evaluating the higher high water for the 2017 calendar year. The day on which the 85th percentile of the higher high water (7.7 ft NAVD88) occurred was assigned as the boundary condition. The boundary condition can be adjusted to simulate various tidal cycles (as discussed in Section 6).

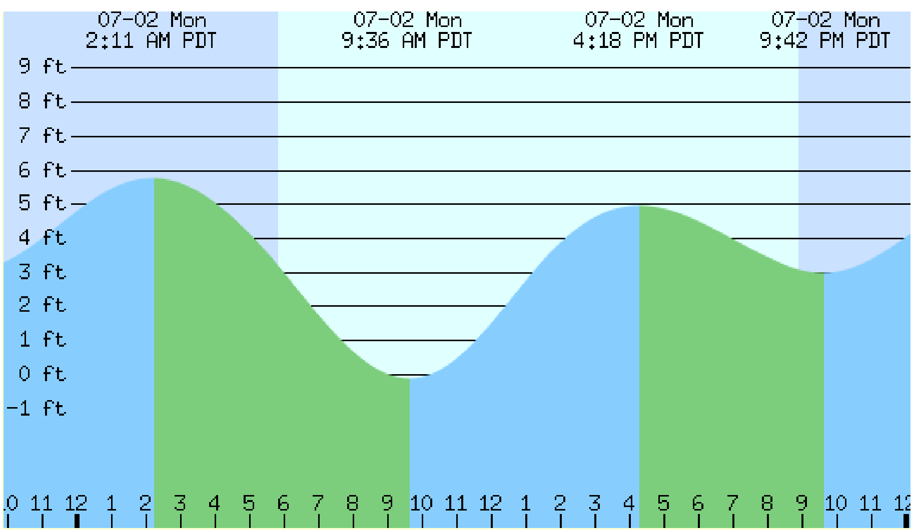


Figure 4-1. Typical Tidal Cycle.

4.2.5 Groundwater

Groundwater is generally assumed to have minimal impact in terms of added flow when compared to runoff from significant storm flows. Although groundwater isn't assumed to directly contribute flows to the storm drain network, in areas of high groundwater, the watershed infiltration can be impacted which can contribute to higher runoff. The soil was modeled as saturated and this effect on runoff was accounted for by assigning poorly-drained soils.

4.3 Calibration

Four pressure transducers were deployed from November 2017 to February 2018. Locations for the pressure transducers were selected based on accessibility and proximity to outfalls (Appendix B). Based on the collected data, two of the four pressure transducers provided reliable water levels and were located outside the area of tidal influence. Discrete storm events with an appreciable amount of rainfall were identified and selected to evaluate in the 1D model. One-hour rainfall data was provided by NOAA and assigned to a rain gage in the model.

A comparison of observed and modelled results is provided in Appendix B. The variability shown in the "6^{th} and C" pressure transducer suggests that the model does not capture the maximum peak values for the storm events. The opposite trend was observed in the "14^{th} and Union" pressure transducer. The variability was not considered significant, and sufficient data was not available to justify adjusting model parameters. The total runoff was sufficiently similar, and the timing of peaks was accurately captured.

4.4 Two Dimensional Model

PCSWMM allows a 1D model to be connected to a 2D environment. The pipe network remains one dimensional and the floodplain is modelled using the 2D environment. The following sections summarize the 2D model development.

4.4.1 Computational Grid

A digital elevation model was used to create a ground elevation surface. The ground surface is sampled at a user-defined resolution and a hexagonal grid is constructed. A resolution of 30-ft hexagonal cells (each cell is thirty feet across its narrowest width) was applied to this model. A 30-ft cell was considered appropriate for this level of analysis. Although a finer resolution would provide more accurate results, computational efforts would significantly increase. For design purposes, a finer resolution would be required. The purpose of this model was to assess areas that are most vulnerable to flooding. Building footprints were used to prevent flow across building locations.

4.4.2 Connection between the 1D and 2D Environment

When the hydraulic grade line of a pipe network exceeds the rim elevation of a model junction (e.g., manhole or drop inlet), runoff overflows from the storm water system onto the ground surface. The user defines all junctions where the 1D pipe (or open channel) system connects to the 2D floodplain.

5. Existing Conditions Model Results

The existing conditions model was run for three separate storm events (Table 4-1). The treatment storm events were run in the 1D model. From the 1D environment, peak flow rates and total runoff volume for each of the 365 subcatchments were exported and are included as Appendix C. Peak flow rates and runoff volumes provide a basis for designing water quality features such as low impact development units and trash capture devices. Total runoff volume is the amount of water that exceeds the ground surface of a manhole or drop inlet for the duration of the storm event.

The 10-year storm event was run in the 2D environment. Figure 1 in Appendix D shows the maximum flooding depth during the 10-year, 24-hour event. The results of this model run confirm that the storm water system does not sufficiently capture and convey a 10-year storm event. The dark blue regions, and regions in which the flooding area extends beyond the width of a street indicate areas that are most vulnerable to flooding under existing conditions.

6. Sea Level Rise Assessment

Sea level rise (SLR) scenarios were examined to assess the impacts on the drainage system operation. To incorporate SLR conditions, the downstream boundary conditions were adjusted. The select SLR projections, and associated model results are presented in the following sections.

6.1 Policy and Projections

The California Coastal Commission adopted SLR policy guidance in 2015 (CCC 2015). The document recommends using a range of climate change scenarios at multiple planning horizons. The three different scenarios represent outcomes regarding population growth, economic growth, fossil fuel use, and development of clean technology. The NRC (2012) defines the scenarios as follows:

Low Scenario – The low scenario assumes population growth that peaks mid-century, high economic growth, and assumes a global economic shift to less energy-intensive industries, significant reduction in fossil fuel use, and development of clean technologies.

Medium Scenario – The medium scenario assumes population growth that peaks mid-century, high economic growth, and development of more efficient technologies, but also assumes that energy would be derived from a balance of sources (e.g., fossil-fuel, renewable sources), thereby reducing greenhouse gas emissions.

High Scenario – The high scenario assumes population growth that peaks mid-century, high economic growth, and development of more efficient technologies. The associated energy demands would be met primarily with fossil-fuel intensive sources.

Regional increases in sea level are shown in Table 6-1. These regional projections are relative to mean sea level in the year 2000, and account for local projected vertical land subsidence. To evaluate the City of Eureka's storm water system, sea level increases of one, two, and three feet were used. These values were considered appropriate as they capture a range of potential climate scenarios.

Table 6-1. Sea Level Rise Projections by NHE (2015) for Humboldt Bay North Spit (ft)

Scenario	2030	2050	2100
High	0.9	1.9	5.3
Medium	0.6	1.1	3.2
Low	0.4	0.7	2.0

6.2 Model Results

Model results are shown in Figures 1-4 in Appendix D. Results are shown relative to the base conditions of a 10-year storm event using the boundary condition described in Section 4.2.4. Base condition results are shown in grey and the increase in flooding is shown in shades of blue. The results of these model runs suggest that the majority of flooding increases due to SLR do not extend beyond Highway 101. The lower portions of the watersheds, particularly in the northwest region, are the most vulnerable to the effects of SLR. These areas are the lowest in the watershed, and have low outfalls that do not allow the storm water system to drain when the water level in Humboldt Bay is above the crown of the outfall. In addition to being located in low-lying areas, several of the outfalls are not equipped with functioning tide gates, which would prevent ocean water from entering the storm water system. The results of this model suggest that upsizing pipes will not provide sufficient capacity for the system to mitigate for the effects of SLR. It is likely that a detention pond, or pump station will be required to reduce flood increases associated with SLR.

Model junctions that experienced an increase in surcharging or flooding are shown in yellow and red, respectively (Figures 2-4 in Appendix D). Junctions that experienced an increase in both are shown in red. Note that junctions that do not increase in surcharging or flooding are not shown. The colored junctions in Figures 2-4 indicate an increase in the amount of surcharging or flooding, including both increases at junctions that flooded under base conditions and increases that resulted in new surcharging or flooding at junctions.

A comparison of the number of junctions surcharged and flooded in the base condition versus the three sea level rise scenarios is presented in Appendix E. The increase in the number of junctions that surcharge or flood as shown in Appendix E only reflects the junctions where new surcharging or flooding occurred compared to the base condition. The number of new junctions that flood or surcharge is less than the total number of junctions that saw an increase as shown in Figures 2-4, which suggests that the increases in surcharge or flooding primarily occur in the junctions that experience issues under base conditions. Model junctions that surcharge suggest nearby manhole covers should be bolted. Model junctions that flood suggest that storm drain improvements (e.g., upsizing pipes) may be required to mitigate for the effects of SLR.

7. Model Application for Project Development

Using the base scenario model run and City staff knowledge, an area particularly susceptible to flooding was identified as a potential project area. The development of a conceptual design to mitigate for flooding under the 10-year storm event is illustrated by the methodology used for the development of the West Side Eureka

Sub-basin Flood Reduction and Climate Adaptation Program Phase 1 Project. The methodology outlined here is specific to this project, but can be applied to any area within the model extents.

An area susceptible to flooding (Washington Street near Clark Slough) was identified by City staff, and assessed using the large-scale model (discussed in Section 5). A smaller extent, more refined model within the large-scale model was isolated; all model components that were not hydrologically or hydraulically connected were removed from the model to allow for increased model resolution in critical areas without increasing model computational runtime. The area was first evaluated in the 1D environment. Data was collected for critical areas (i.e., areas where flooding occurred) with data gaps. In the 1D environment, pipe network profiles and hydraulic grade lines were assessed to determine the cause of flooding (e.g., undersized pipes and backwatering effects). The following potential solutions to flooding were evaluated in the 1D model:

- LID
- Upsizing pipes
- Disconnecting hydraulically-connected areas
- Including a detention pond at the downstream end of the basin
- Installing a pump station at the downstream end of the basin
- Adding underground storage capacity
- Installing a bypass to divert runoff from the upstream portion of hydraulically-connected basin to a different outfall
- Installing flap gates to control the direction of flow from one basin to another

The final design components were modeling in the 2D environment. The hexagonal grid resolution was increased in the 2D model. The 2D environment allows for a variable resolution in which areas of particular interest can have smaller cells than areas where flooding does not occur. A comparison of the 2D model results under existing conditions and proposed conditions demonstrated the effectiveness of the project (Figures 1-4, Appendix F). Project maps and conceptual design plans are included as Appendix G.

8. Model Summary and Concluding Remarks

The storm drain model provides a powerful and robust management and design tool to assist the City in managing its storm water program, design system improvements, and communicate existing and proposed conditions to stakeholders. The analysis incorporated the storm events shown in Table 4-1 to define a flooding problem area and design a potential solution to the problem. The model may also be used with other storm events to identify and address additional storm drainage issues within the City.

The results of this model provided insight into the areas of the watershed that are most vulnerable to flooding, and where improvements within the storm drain system can be made. The SLR assessment identified portions of the storm water system that are most likely to be impacted by the effects of increasing water levels in Humboldt Bay, and identified that increasing pipe sizes alone will not solve flood issues. The identification and development of the City's West Side Eureka Sub-basin Flood Reduction and Climate Adaptation Program Phase 1 Project provides a framework for the City to use the hydraulic model for storm water management and planning, and SLR adaptation.

9. References

California Coastal Commission (CCC). 2015. California Coastal Commission Sea-level Rise Policy Guidance: Interpretive Guidelines for Addressing Sea-level Rise in Local Coastal Programs and Coastal Development Permits, Adopted on August 12, 2015.

National Resource Council (NRC). 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, National Academy Press, Washington, D.C.

Northern Hydrology and Engineering (NHE). 2015. Humboldt Bay: Sea Level Rise, Hydrodynamic Modeling, and Inundation Vulnerability Mapping.

Appendix A: PCSWMM Screen Captures

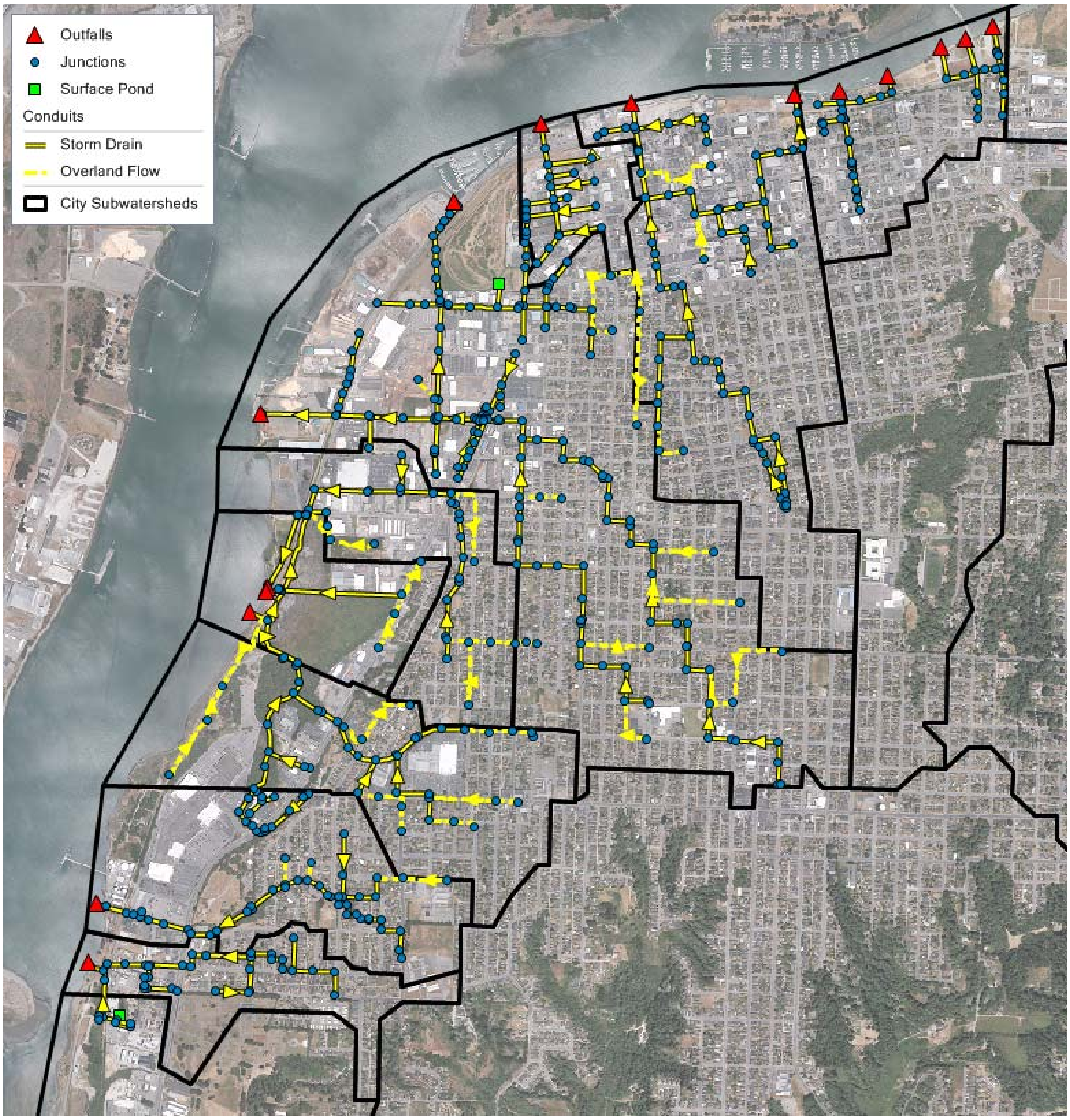


Figure 1. Screen capture within the PCSWMM environment. Junctions represent manholes, drop inlets, and connections between different pipe sizes.

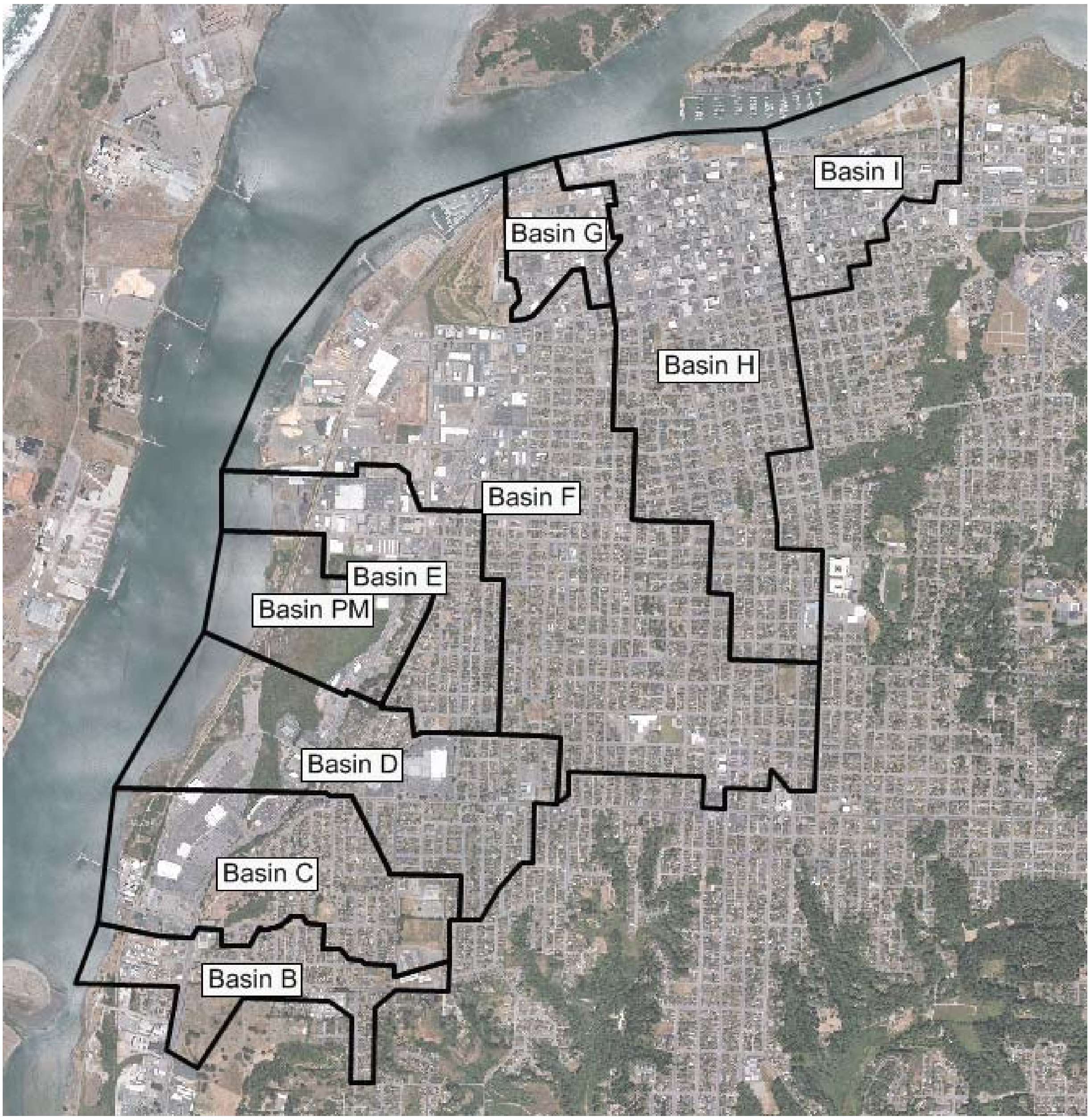


Figure 2. City Subwatershed Basin Names.

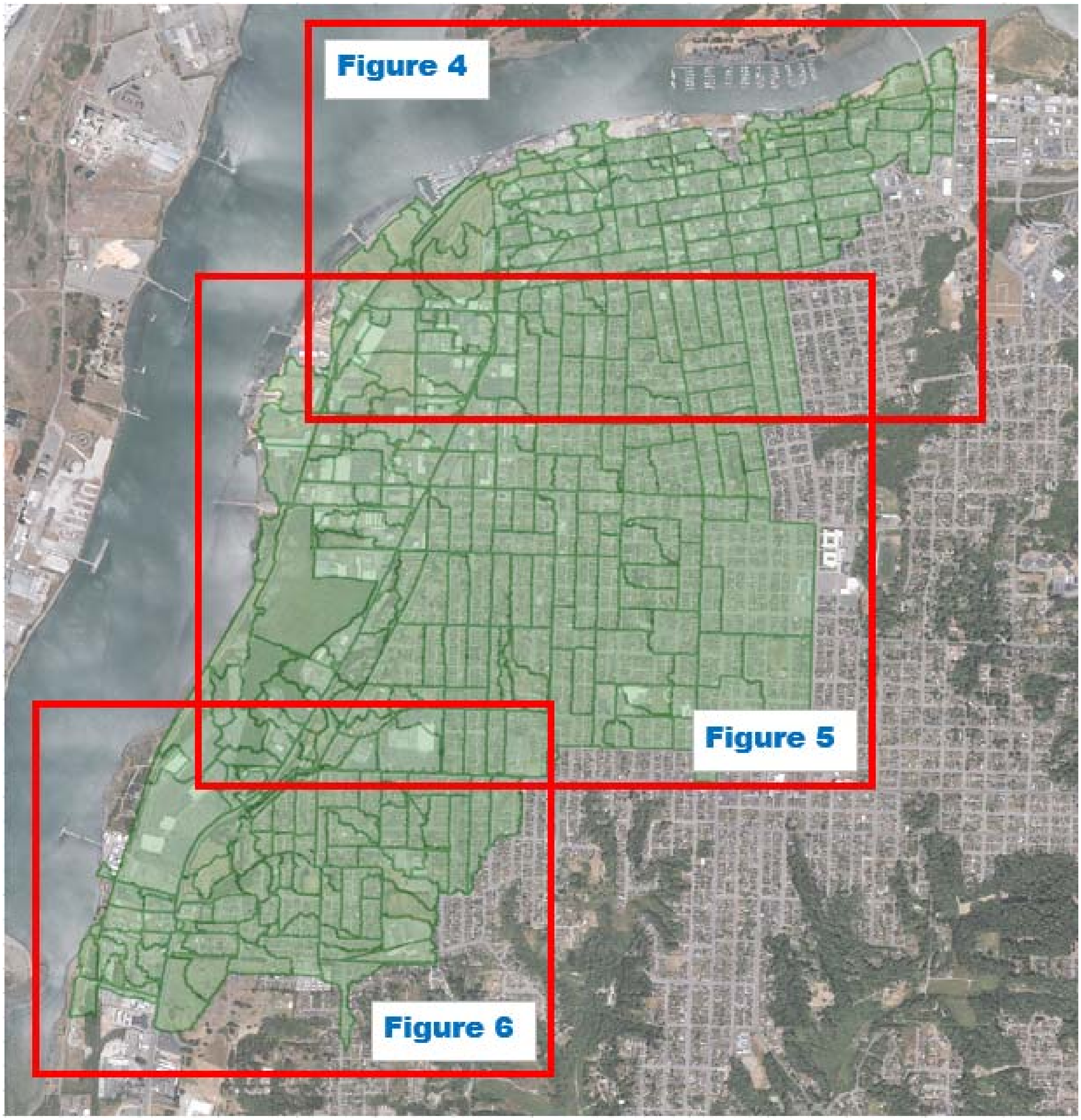


Figure 3. Map index for subcatchment names.

Figure 4. Subcatchment names.

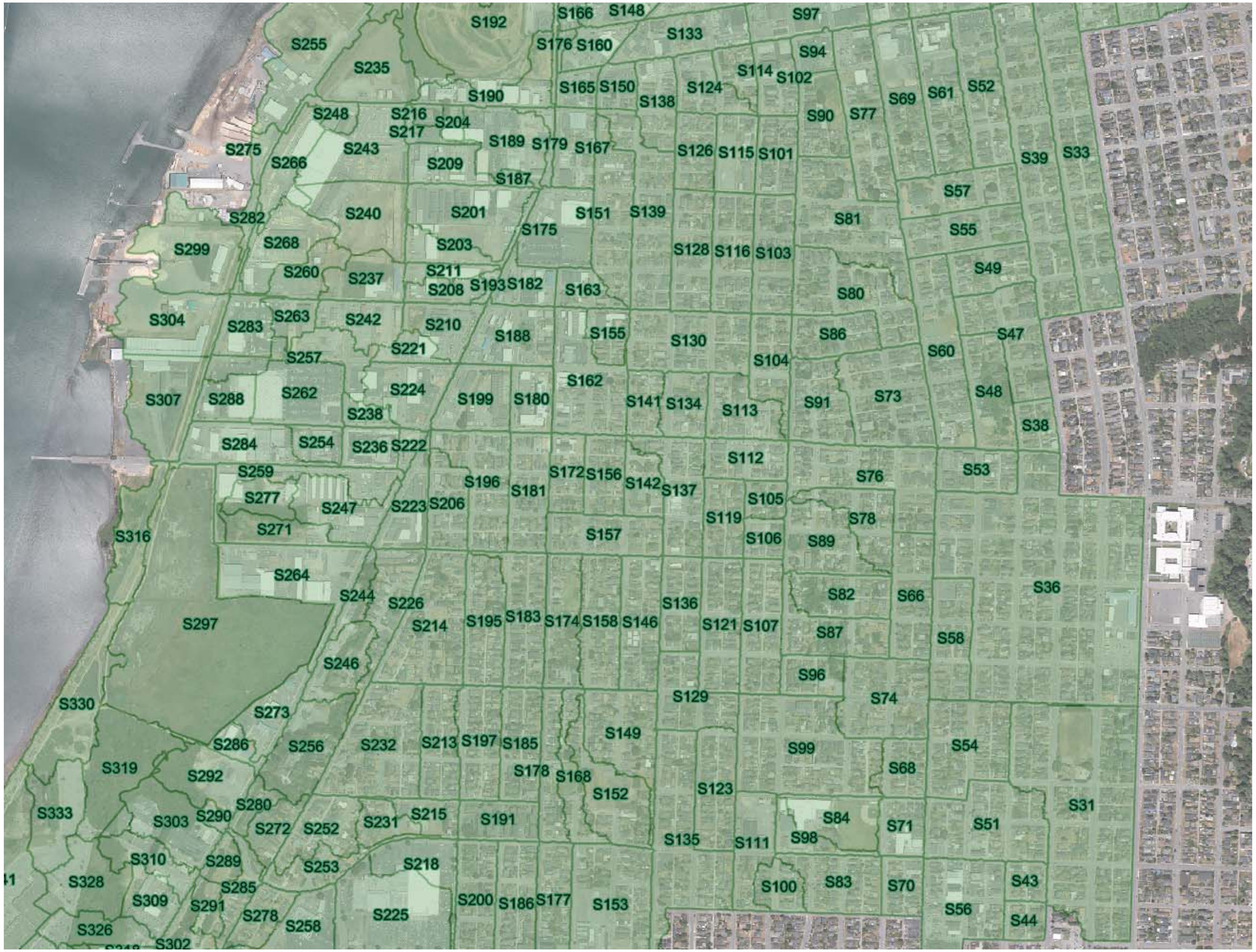


Figure 5. Subcatchment names.

Figure 6. Subcatchment names.

Appendix B: Model Calibration Figures

Figure 1. Approximate location of the four pressure transducers.

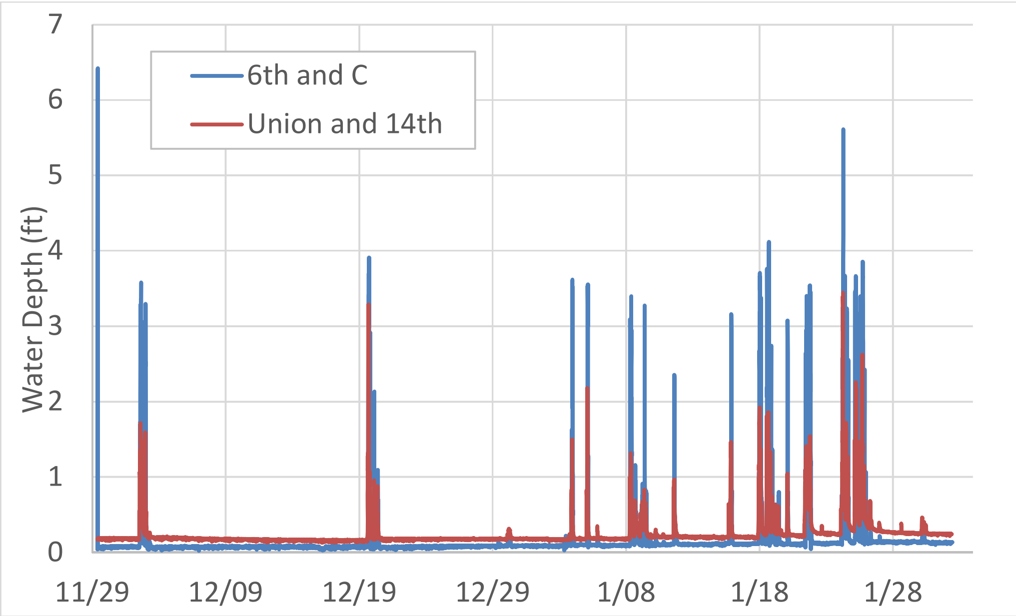


Figure 2. Water depth (ft) for the deployment period.

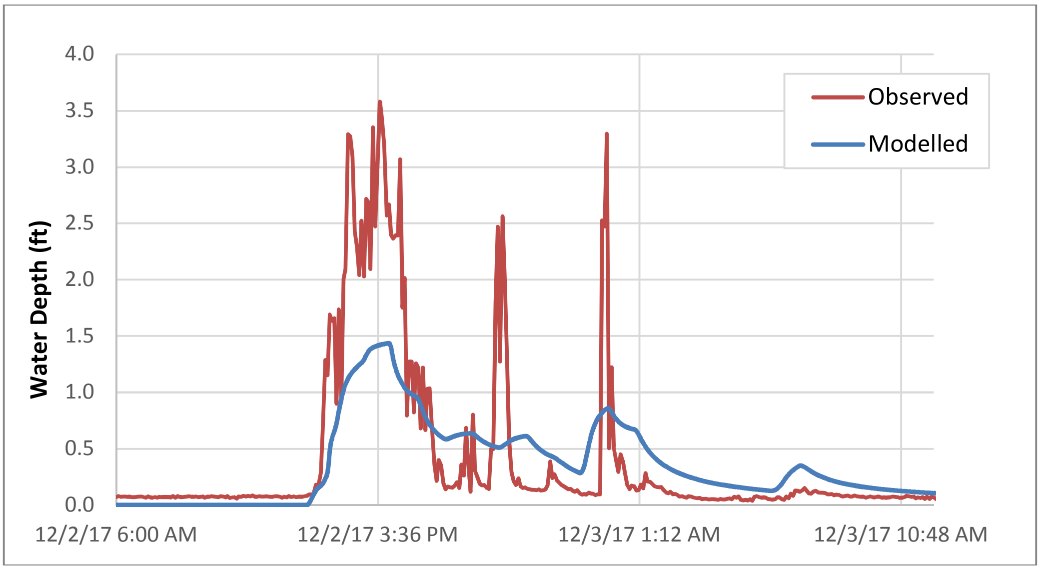


Figure 3. Comparison of modelled and observed water depths at 6th and C.

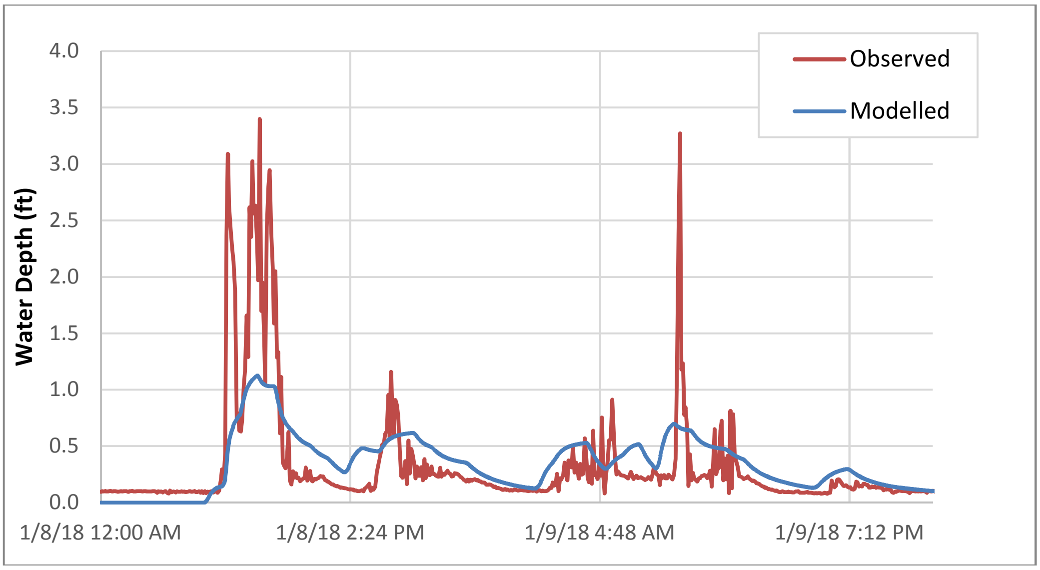


Figure 4. Comparison of modelled and observed water depths at 6th and C.

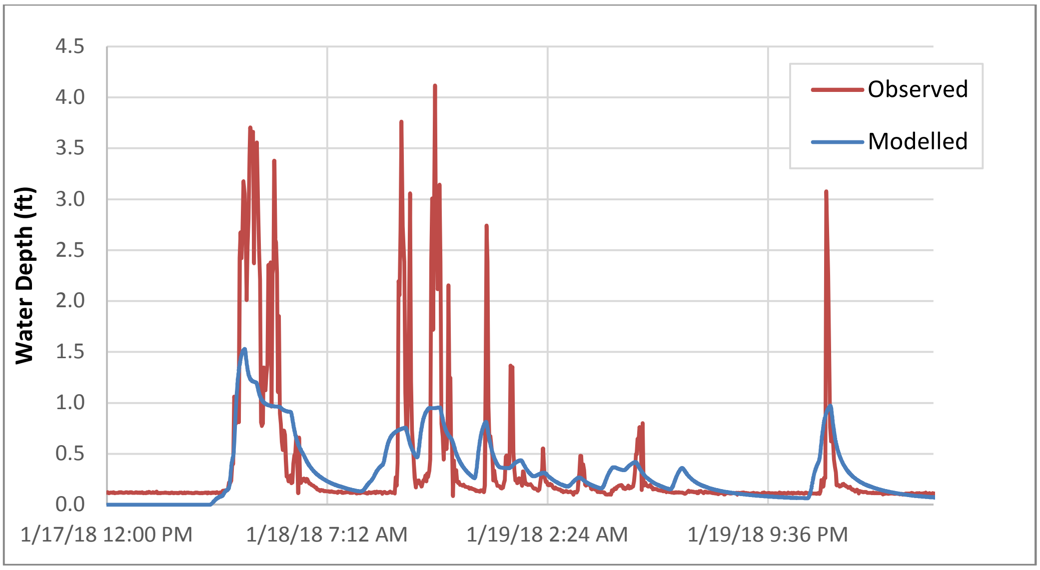


Figure 5. Comparison of modelled and observed water depths at 6th and C.

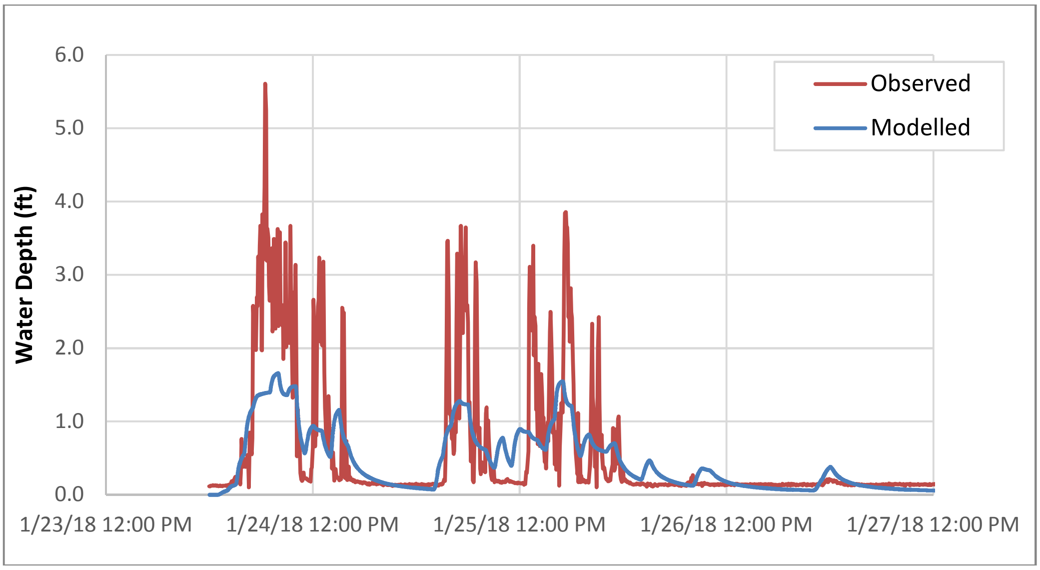


Figure 6. Comparison of modelled and observed water depths at 6th and C.

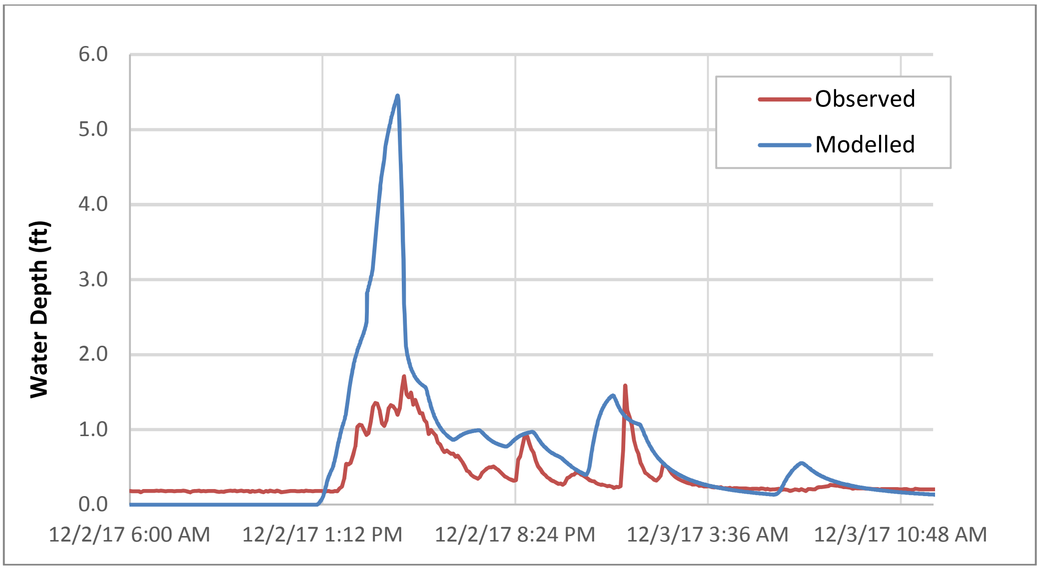


Figure 7. Comparison of modelled and observed water depths at 14th and Union.

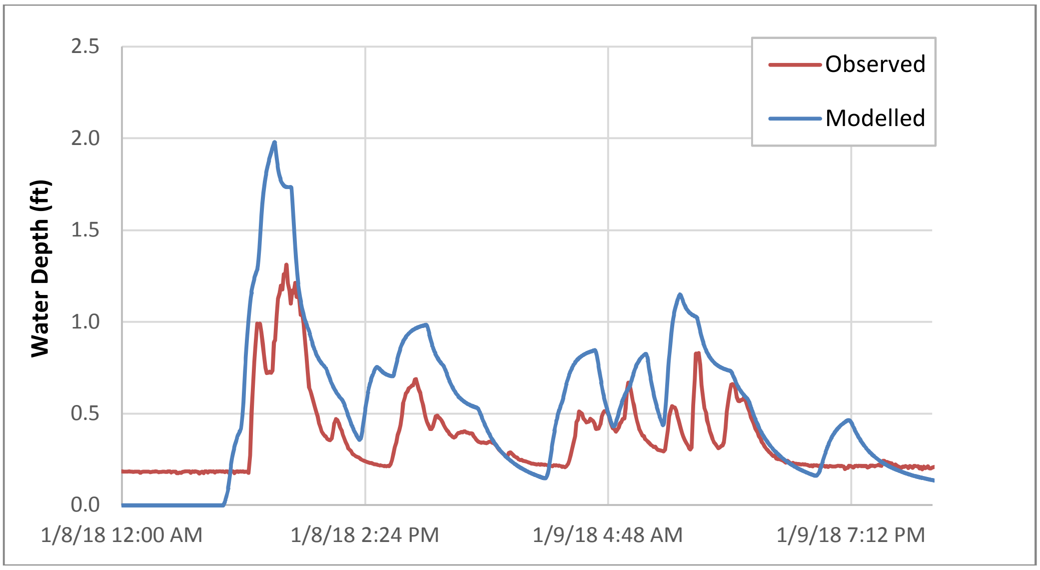


Figure 8. Comparison of modelled and observed water depths at 14th and Union.

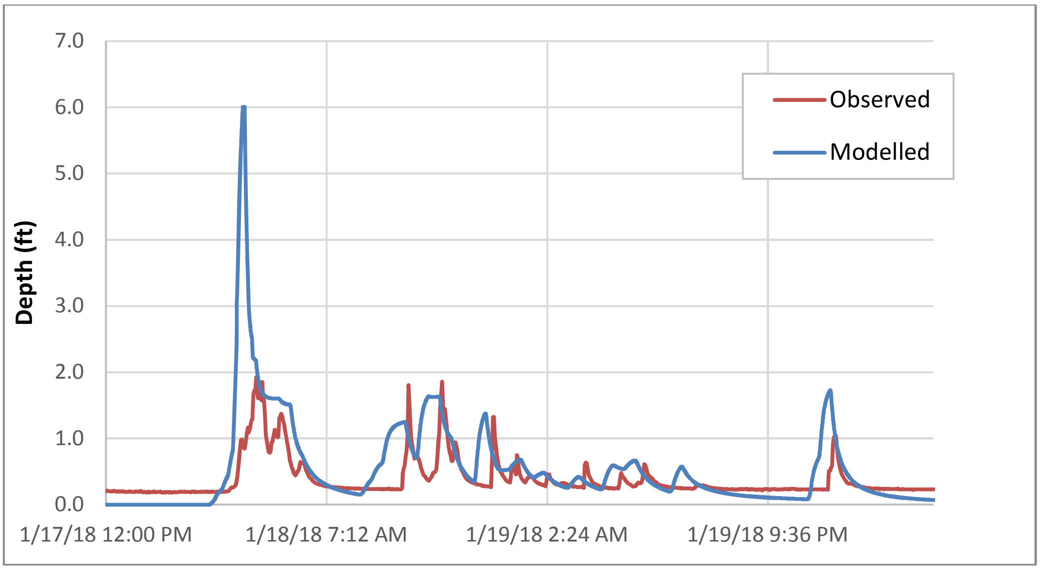


Figure 9. Comparison of modelled and observed water depths at 14th and Union.

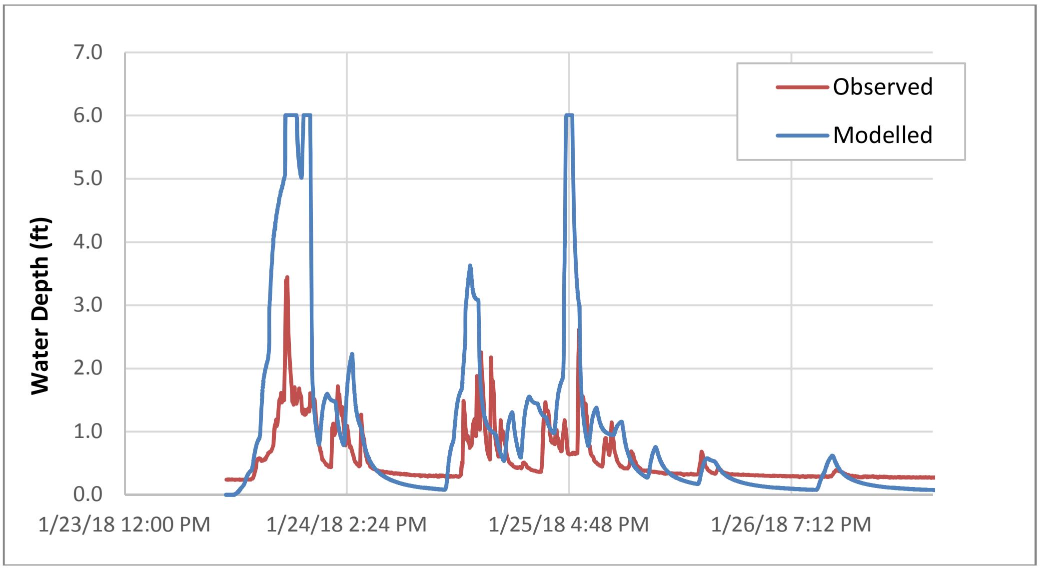


Figure 10. Comparison of modelled and observed water depths at 14th and Union.

Appendix C: Subcatchment Results for Water Quality Storm Events

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S1	0.41	0.03	0.13	0.24	0.01	1.32
S10	0.54	0.07	0.4	0.34	0.04	3.49
S100	0.49	0.04	0.22	0.3	0.02	1.99
S101	0.56	0.06	0.39	0.36	0.04	3.29
S102	0.52	0.06	0.33	0.32	0.03	2.91
S103	0.49	0.08	0.47	0.3	0.05	3.95
S104	0.54	0.07	0.43	0.34	0.05	3.4
S105	0.44	0.02	0.13	0.26	0.01	1.31
S106	0.54	0.03	0.19	0.34	0.02	1.8
S107	0.56	0.11	0.66	0.36	0.07	5.13
S108	0.6	0.06	0.37	0.39	0.04	2.76
S109	0.59	0.01	0.06	0.39	0.01	0.55
S11	0.1	0	0.01	0.02	0	0.04
S110	0.61	0.02	0.13	0.4	0.01	1.39
S111	0.58	0.08	0.52	0.37	0.05	4.11
S112	0.58	0.07	0.43	0.37	0.04	4.01
S113	0.54	0.08	0.47	0.34	0.05	3.9
S114	0.49	0.03	0.19	0.3	0.02	1.81
S115	0.49	0.06	0.31	0.3	0.03	2.81
S116	0.54	0.09	0.56	0.34	0.06	4.39
S117	0.6	0.03	0.18	0.39	0.02	1.75
S118	0.52	0.03	0.2	0.32	0.02	1.84
S119	0.56	0.06	0.39	0.36	0.04	3.12
S12	0.58	0.1	0.64	0.37	0.07	5.19
S120	0.4	0.05	0.25	0.23	0.03	2.32
S121	0.51	0.1	0.57	0.31	0.06	4.35
S122	0.6	0.05	0.29	0.39	0.03	2.71
S123	0.4	0.07	0.37	0.23	0.04	2.99
S124	0.56	0.06	0.39	0.35	0.04	2.9
S125	0.59	0.07	0.41	0.39	0.04	3.48
S126	0.54	0.06	0.36	0.34	0.04	2.91
S127	0.58	0.02	0.13	0.37	0.01	1.2
S128	0.54	0.09	0.56	0.34	0.06	4.42
S129	0.46	0.08	0.41	0.28	0.04	3.73
S13	0.07	0	0	0	0	0
S130	0.48	0.13	0.7	0.29	0.08	5.14
S131	0.59	0.1	0.62	0.39	0.07	4.41
S132	0.38	0.02	0.11	0.21	0.01	1.1
S133	0.55	0.1	0.6	0.35	0.06	4.25
S134	0.44	0.05	0.24	0.26	0.03	2.29
S135	0.53	0.19	1.09	0.33	0.12	7.32
S136	0.54	0.07	0.44	0.34	0.05	3.81

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S137	0.58	0.11	0.69	0.37	0.07	5.53
S138	0.57	0.07	0.41	0.37	0.04	2.53
S139	0.57	0.16	0.96	0.37	0.1	6.73
S14	0.59	0.09	0.59	0.39	0.06	5.07
S140	0.6	0.03	0.2	0.39	0.02	2.07
S141	0.32	0.03	0.12	0.17	0.01	1.27
S142	0.56	0.05	0.31	0.36	0.03	2.74
S143	0.6	0.06	0.39	0.4	0.04	3.43
S144	0.61	0.01	0.08	0.4	0.01	0.81
S145	0.6	0.06	0.37	0.39	0.04	2.91
S146	0.53	0.1	0.59	0.33	0.06	4.35
S147	0.15	0.01	0.04	0.06	0	0.37
S148	0.6	0.07	0.42	0.4	0.04	3.59
S149	0.51	0.11	0.63	0.31	0.07	4.77
S15	0.58	0.05	0.34	0.37	0.03	3.15
S150	0.54	0.03	0.21	0.34	0.02	1.88
S151	0.37	0.08	0.41	0.21	0.05	3.64
S152	0.31	0.06	0.3	0.16	0.03	2.73
S153	0.57	0.19	1.15	0.37	0.13	7.18
S154	0.58	0.01	0.08	0.37	0.01	0.74
S155	0.49	0.04	0.22	0.3	0.02	2.09
S156	0.49	0.06	0.31	0.3	0.03	2.6
S157	0.43	0.07	0.38	0.25	0.04	3.46
S158	0.48	0.09	0.51	0.29	0.06	3.95
S159	0.61	0.01	0.06	0.4	0.01	0.59
S16	0.54	0.09	0.55	0.34	0.06	4.34
S160	0.59	0.05	0.3	0.39	0.03	2.5
S161	0.56	0.05	0.29	0.36	0.03	2.42
S162	0.58	0.15	0.92	0.37	0.1	7.28
S163	0.56	0.04	0.25	0.36	0.03	2.35
S164	0.6	0.03	0.17	0.39	0.02	1.69
S165	0.54	0.03	0.19	0.34	0.02	1.67
S166	0.59	0.02	0.15	0.39	0.02	1.44
S167	0.56	0.07	0.41	0.36	0.04	3.65
S168	0.25	0.03	0.12	0.12	0.01	1.15
S169	0.19	0.01	0.03	0.08	0	0.35
S17	0.32	0.02	0.1	0.17	0.01	1
S170	0.48	0.1	0.57	0.29	0.06	4.18
S171	0.58	0.05	0.31	0.37	0.03	2.54
S172	0.49	0.05	0.27	0.3	0.03	2.56
S173	0.61	0.01	0.05	0.4	0.01	0.54
S174	0.18	0.03	0.13	0.08	0.01	1.29

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S175	0.6	0.11	0.7	0.39	0.07	5.26
S176	0.61	0.01	0.08	0.4	0.01	0.83
S177	0.48	0.07	0.39	0.29	0.04	3
S178	0.31	0.04	0.18	0.16	0.02	1.67
S179	0.61	0.02	0.11	0.4	0.01	1.12
S18	0.49	0.03	0.14	0.3	0.02	1.36
S180	0.58	0.06	0.35	0.37	0.04	3.06
S181	0.56	0.09	0.58	0.36	0.06	4.44
S182	0.6	0.05	0.33	0.39	0.03	3.16
S183	0.43	0.09	0.46	0.25	0.05	4
S184	0.43	0.1	0.51	0.25	0.06	3.93
S185	0.49	0.08	0.44	0.3	0.05	3.69
S186	0.53	0.1	0.56	0.34	0.06	4.27
S187	0.6	0.01	0.06	0.39	0.01	0.59
S188	0.58	0.1	0.63	0.37	0.06	4.97
S189	0.6	0.11	0.67	0.4	0.07	5.25
S19	0.46	0.04	0.22	0.28	0.02	2.05
S190	0.49	0.07	0.39	0.3	0.04	3.64
S191	0.43	0.05	0.25	0.25	0.03	2.06
S192	0.17	0.07	0.34	0.08	0.04	3.03
S193	0.61	0.01	0.05	0.4	0.01	0.52
S194	0.45	0.1	0.55	0.27	0.06	4
S195	0.43	0.08	0.42	0.25	0.05	3.85
S196	0.54	0.11	0.67	0.34	0.07	5.29
S197	0.49	0.08	0.47	0.3	0.05	3.85
S198	0.07	0.03	0.09	0.02	0.01	0.84
S199	0.56	0.09	0.55	0.36	0.06	4.39
S2	0.56	0.03	0.2	0.36	0.02	1.67
S20_2	0.23	0	0.01	0.11	0	0.11
S200	0.48	0.08	0.46	0.29	0.05	3.47
S201	0.59	0.14	0.87	0.39	0.09	6.52
S202	0.26	0.02	0.1	0.13	0.01	1.02
S203	0.6	0.06	0.35	0.4	0.04	3.04
S204	0.6	0.02	0.1	0.39	0.01	1
S205	0.37	0.06	0.31	0.2	0.03	2.48
S206	0.58	0.08	0.48	0.37	0.05	3.87
S207	0.43	0.06	0.34	0.25	0.04	2.73
S208	0.6	0.04	0.24	0.4	0.03	2.08
S209	0.59	0.06	0.39	0.39	0.04	3.14
S21	0.47	0.03	0.14	0.28	0.02	1.38
S210	0.58	0.06	0.41	0.37	0.04	3.15
S211	0.6	0.03	0.18	0.39	0.02	1.34

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S212	0.31	0.04	0.18	0.17	0.02	1.77
S213	0.43	0.07	0.35	0.25	0.04	3.26
S214	0.37	0.11	0.57	0.2	0.06	4.58
S215	0.15	0.01	0.04	0.06	0	0.44
S216	0.52	0.01	0.07	0.32	0.01	0.63
S217	0.6	0.02	0.13	0.39	0.01	1.27
S218	0.6	0.07	0.47	0.4	0.05	3.88
S219	0.38	0.02	0.08	0.22	0.01	0.81
S22	0.56	0.06	0.38	0.36	0.04	3
S220	0.43	0.05	0.29	0.25	0.03	2.23
S221	0.6	0.03	0.2	0.39	0.02	1.91
S222	0.61	0.02	0.11	0.4	0.01	1.09
S223	0.59	0.07	0.46	0.39	0.05	4.13
S224	0.6	0.1	0.6	0.4	0.06	4.58
S225	0.6	0.2	1.24	0.39	0.13	8.4
S226	0.48	0.07	0.41	0.29	0.04	3.01
S227	0.54	0.05	0.31	0.34	0.03	2.82
S228	0.05	0.01	0.03	0.01	0	0.13
S229	0.54	0.08	0.51	0.34	0.05	4.06
S23	0.56	0.03	0.2	0.36	0.02	1.85
S230	0.26	0.04	0.19	0.13	0.02	1.96
S231	0.22	0.02	0.07	0.1	0.01	0.69
S232	0.42	0.13	0.7	0.24	0.08	4.66
S233	0.18	0.04	0.15	0.08	0.02	1.53
S234	0.44	0.02	0.11	0.26	0.01	1.14
S235	0.15	0.03	0.12	0.06	0.01	1.23
S236	0.6	0.05	0.31	0.4	0.03	2.75
S237	0.19	0.02	0.09	0.08	0.01	0.95
S238	0.6	0.03	0.16	0.39	0.02	1.62
S239	0.49	0.07	0.39	0.3	0.04	3.58
S24	0.59	0.07	0.44	0.39	0.05	3.5
S240	0.08	0.02	0.05	0.02	0	0.43
S241	0.49	0.03	0.18	0.3	0.02	1.52
S242	0.6	0.07	0.43	0.4	0.05	3.43
S243	0.58	0.13	0.78	0.39	0.09	4.65
S244	0.44	0.02	0.13	0.26	0.01	1.28
S245	0.34	0.07	0.36	0.19	0.04	3.35
S246	0.44	0.06	0.29	0.26	0.03	2.9
S247	0.58	0.09	0.58	0.38	0.06	4.35
S248	0.23	0.01	0.05	0.1	0.01	0.49
S249	0.47	0.03	0.14	0.28	0.02	1.39
S25	0.6	0.01	0.07	0.39	0.01	0.77

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S250	0.52	0.05	0.31	0.32	0.03	2.87
S251	0.49	0.06	0.33	0.3	0.03	3.13
S252	0.43	0.06	0.33	0.25	0.04	2.91
S253	0.53	0.05	0.31	0.33	0.03	2.33
S254	0.6	0.04	0.24	0.39	0.02	2.15
S255	0.33	0.11	0.56	0.18	0.06	4.38
S256	0.28	0.06	0.27	0.14	0.03	2.76
S257	0.08	0.01	0.04	0.02	0	0.33
S258	0.59	0.08	0.5	0.39	0.05	4.02
S259	0.57	0.08	0.48	0.37	0.05	3.27
S26	0.6	0	0.02	0.39	0	0.18
S260	0.57	0.06	0.38	0.37	0.04	2.84
S261	0.49	0.05	0.3	0.3	0.03	2.67
S262	0.6	0.12	0.72	0.39	0.08	5.37
S263	0.6	0.04	0.24	0.39	0.02	2.2
S264	0.59	0.17	1.06	0.39	0.11	7.13
S265	0.56	0.1	0.62	0.36	0.06	5.25
S266	0.58	0.08	0.48	0.37	0.05	3.76
S267	0.56	0.12	0.74	0.36	0.08	5.64
S268	0.59	0.1	0.6	0.39	0.06	4.46
S269	0.46	0.05	0.26	0.28	0.03	2.46
S27	0.44	0.01	0.06	0.27	0.01	0.63
S270	0.49	0.06	0.33	0.3	0.04	2.71
S271	0.19	0.02	0.06	0.05	0.01	0.16
S272	0.32	0.03	0.12	0.17	0.01	1.25
S273	0.6	0.07	0.41	0.39	0.04	3.49
S274	0.44	0.03	0.18	0.26	0.02	1.8
S275	0.44	0.02	0.08	0.26	0.01	0.83
S276	0.54	0.1	0.61	0.34	0.06	5.13
S277	0.33	0.03	0.12	0.15	0.01	0.45
S278	0.38	0.03	0.17	0.21	0.02	1.63
S279	0.44	0.02	0.09	0.26	0.01	0.94
S28	0.59	0.07	0.42	0.39	0.04	3.34
S280	0.1	0	0.01	0.02	0	0.09
S281	0.49	0.06	0.35	0.3	0.04	3
S282	0.6	0.02	0.1	0.39	0.01	1.01
S283	0.56	0.06	0.38	0.36	0.04	2.99
S284	0.59	0.1	0.62	0.39	0.07	4.39
S285	0.56	0.04	0.28	0.36	0.03	2.64
S286	0.6	0.03	0.19	0.39	0.02	1.87
S287	0.41	0.03	0.16	0.24	0.02	1.62
S288	0.6	0.05	0.33	0.39	0.03	2.68

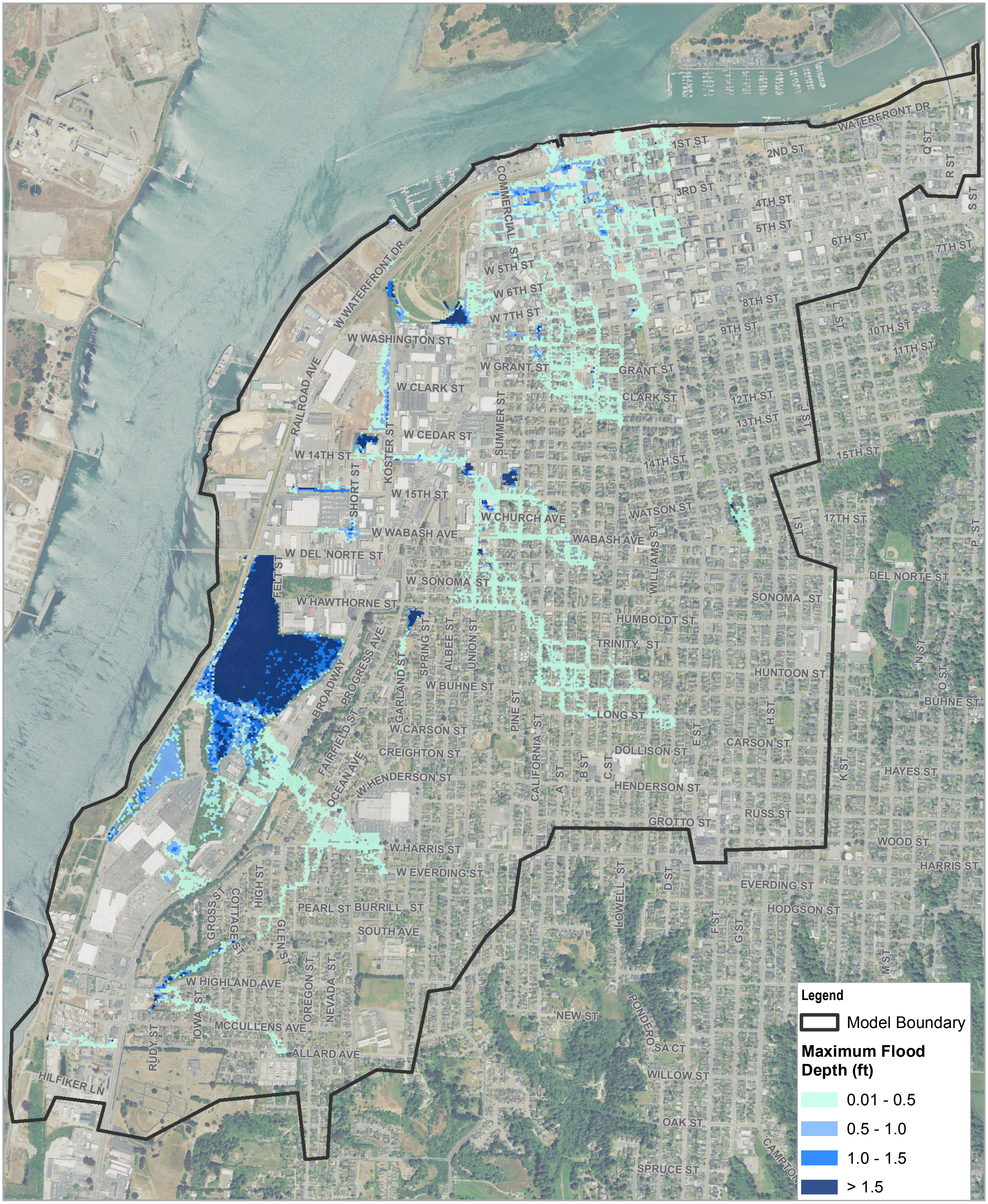
Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S289	0.1	0	0.01	0.02	0	0.1
S29	0.6	0.08	0.5	0.39	0.05	3.99
S290	0.6	0.01	0.08	0.39	0.01	0.87
S291	0.1	0.01	0.01	0.02	0	0.1
S292	0.32	0.05	0.23	0.14	0.02	0.79
S293	0.25	0.03	0.14	0.1	0.01	0.56
S294	0.44	0.03	0.14	0.26	0.02	1.44
S295	0.43	0.06	0.31	0.25	0.03	2.84
S296	0.58	0.01	0.04	0.38	0	0.38
S297	0.02	0.02	0.08	0.01	0.01	0.89
S298	0.54	0.05	0.28	0.34	0.03	2.53
S299	0.49	0.13	0.7	0.3	0.08	5.64
S3	0.13	0.01	0.04	0.04	0	0.43
S30	0.56	0.03	0.19	0.36	0.02	1.76
S300	0.58	0.08	0.51	0.37	0.05	4.06
S301	0.56	0.11	0.71	0.36	0.07	5.87
S302	0.35	0.03	0.17	0.19	0.02	1.72
S303	0.36	0.06	0.3	0.18	0.03	1.16
S304	0.53	0.13	0.75	0.33	0.08	5.44
S305	0.29	0.02	0.07	0.15	0.01	0.76
S306	0.43	0.05	0.26	0.25	0.03	2.3
S307	0.57	0.13	0.81	0.37	0.09	5.77
S308	0.44	0.02	0.12	0.26	0.01	1.22
S309	0.6	0.06	0.36	0.39	0.04	3.12
S31	0.43	0.34	1.69	0.26	0.21	8.91
S310	0.57	0.06	0.38	0.37	0.04	3.2
S311	0.55	0.07	0.42	0.35	0.04	3.11
S312	0.49	0.02	0.13	0.3	0.01	1.27
S313	0.1	0	0.01	0.02	0	0.06
S314	0.54	0.01	0.07	0.34	0.01	0.65
S315	0.26	0.02	0.07	0.13	0.01	0.74
S316	0.08	0.01	0.03	0.02	0	0.29
S317	0.41	0.02	0.1	0.24	0.01	1.04
S318	0.6	0.02	0.12	0.39	0.01	1.2
S319	0.05	0.01	0.05	0	0	0.02
S32	0.58	0.06	0.36	0.37	0.04	3.21
S320	0.28	0.05	0.24	0.14	0.03	2.36
S321	0.22	0.02	0.12	0.08	0.01	0.48
S322	0.54	0.01	0.05	0.34	0.01	0.48
S323	0.29	0.02	0.09	0.15	0.01	0.96
S324	0.6	0.03	0.21	0.39	0.02	2.11
S325	0.6	0.01	0.07	0.39	0.01	0.69

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S326	0.18	0.02	0.09	0.08	0.01	0.88
S327	0.18	0.02	0.1	0.08	0.01	1.02
S328	0.28	0.05	0.16	0.1	0.02	0.43
S329	0.52	0.01	0.05	0.32	0	0.44
S33	0.52	0.24	1.35	0.33	0.15	8.38
S330	0.07	0.02	0.05	0.02	0	0.49
S331	0.54	0.07	0.44	0.34	0.04	3.89
S332	0.38	0.02	0.12	0.21	0.01	1.3
S333	0.41	0.07	0.33	0.22	0.04	1.22
S334	0.15	0.01	0.04	0.03	0	0.12
S335	0.44	0.02	0.13	0.26	0.01	1.21
S336	0.6	0.04	0.25	0.39	0.03	2.17
S337	0.08	0.02	0.05	0.02	0	0.48
S338	0.15	0.02	0.07	0.06	0.01	0.74
S339	0.46	0.06	0.33	0.27	0.04	2.65
S34	0.58	0.01	0.04	0.38	0	0.42
S340	0.11	0.02	0.06	0.01	0	0.1
S341	0.28	0.12	0.64	0.16	0.07	4.9
S342	0.49	0.04	0.22	0.3	0.02	2.09
S343	0.26	0.01	0.02	0.13	0	0.25
S344	0.44	0.03	0.16	0.26	0.02	1.57
S345	0.57	0.01	0.03	0.36	0	0.32
S346	0.16	0.01	0.03	0.06	0	0.29
S347	0.21	0.06	0.29	0.1	0.03	2.72
S348	0.57	0.54	2.81	0.38	0.36	13.61
S349_1	0.51	0.05	0.29	0.32	0.03	2.18
S35	0.52	0.01	0.07	0.33	0.01	0.62
S350	0.54	0.04	0.26	0.34	0.03	2.24
S351	0.6	0.03	0.21	0.39	0.02	2
S352	0.56	0.01	0.09	0.36	0.01	0.87
S353	0.56	0.03	0.16	0.36	0.02	1.54
S354	0.32	0.03	0.15	0.17	0.02	1.5
S355	0.55	0.08	0.48	0.35	0.05	3.36
S356	0.6	0.03	0.17	0.39	0.02	1.7
S357	0.44	0.04	0.21	0.26	0.02	2.01
S358_1	0.45	0.02	0.1	0.27	0.01	0.99
S358_2	0.45	0.03	0.16	0.27	0.02	1.57
S359	0.25	0.03	0.13	0.12	0.01	1.26
S36	0.5	0.71	3.34	0.32	0.46	15.08
S360	0.54	0.04	0.24	0.34	0.03	2.15
S361	0.6	0.01	0.07	0.39	0.01	0.69
S362	0.1	0	0.01	0.02	0	0.04

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S363	0.09	0.01	0.02	0.02	0	0.18
S364	0.18	0.02	0.08	0.08	0.01	0.86
S37	0.36	0.02	0.11	0.2	0.01	1.14
S38	0.52	0.04	0.23	0.32	0.02	2.11
S39	0.53	0.25	1.44	0.33	0.16	9.6
S4	0.56	0.03	0.18	0.36	0.02	1.5
S40	0.58	0.04	0.22	0.37	0.02	2.1
S41	0.57	0.07	0.42	0.37	0.04	3.23
S42	0.38	0.02	0.11	0.22	0.01	1.14
S43	0.49	0.03	0.17	0.3	0.02	1.53
S44	0.52	0.03	0.17	0.32	0.02	1.53
S45	0.57	0.07	0.42	0.37	0.04	3.21
S46	0.54	0.06	0.37	0.34	0.04	3.08
S47	0.57	0.13	0.8	0.37	0.08	6.18
S48	0.45	0.08	0.47	0.27	0.05	2.97
S49	0.58	0.07	0.45	0.37	0.05	3.58
S5	0.57	0.07	0.45	0.37	0.05	3.48
S50	0.6	0.04	0.23	0.4	0.02	2.09
S51	0.53	0.16	0.91	0.33	0.1	5.96
S52	0.53	0.12	0.71	0.33	0.08	5.13
S53	0.58	0.07	0.45	0.37	0.05	3.69
S54	0.53	0.14	0.79	0.33	0.09	5.4
S55	0.54	0.09	0.55	0.34	0.06	4.25
S56	0.58	0.17	1.01	0.38	0.11	6.74
S57	0.58	0.1	0.6	0.37	0.06	4.7
S58	0.56	0.1	0.6	0.35	0.06	4.55
S59	0.59	0.07	0.43	0.39	0.04	3.56
S6	0.38	0.03	0.15	0.22	0.02	1.56
S60	0.53	0.14	0.85	0.33	0.09	6.22
S61	0.53	0.12	0.69	0.34	0.07	5.18
S62	0.58	0.07	0.44	0.37	0.05	3.44
S63	0.6	0.07	0.41	0.4	0.04	3.42
S64	0.6	0.07	0.44	0.39	0.05	3.37
S65	0.6	0.1	0.64	0.39	0.07	5.15
S66	0.54	0.1	0.6	0.34	0.06	5.04
S67	0.6	0.06	0.37	0.4	0.04	3.26
S68	0.51	0.05	0.3	0.32	0.03	2.49
S69	0.53	0.12	0.72	0.34	0.08	5.33
S7	0.12	0.02	0.06	0.04	0.01	0.62
S70	0.49	0.04	0.24	0.3	0.03	2.23
S71	0.55	0.05	0.33	0.35	0.03	2.42
S72	0.6	0.02	0.13	0.39	0.01	1.31

Name	85th of 1-yr, 24-hr (0.65 inches)			1-yr, 1-hr (0.43 in)		
	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)	Runoff Depth (in)	Runoff Volume (MG)	Peak Runoff (cfs)
S73	0.53	0.15	0.9	0.33	0.1	6.56
S74	0.53	0.13	0.78	0.34	0.08	5.79
S75	0.6	0.07	0.42	0.39	0.04	3.6
S76	0.51	0.15	0.87	0.32	0.09	6.9
S77	0.56	0.14	0.84	0.36	0.09	6.38
S78	0.54	0.08	0.46	0.34	0.05	3.65
S79	0.61	0.02	0.12	0.4	0.01	1.15
S8	0.51	0.06	0.36	0.32	0.04	2.94
S80	0.46	0.12	0.64	0.27	0.07	5.09
S81	0.51	0.17	0.95	0.31	0.1	6.9
S82	0.44	0.06	0.34	0.26	0.04	3.26
S83	0.49	0.08	0.47	0.3	0.05	3.91
S84	0.24	0.04	0.15	0.08	0.01	0.48
S85	0.6	0.04	0.22	0.39	0.02	2.15
S86	0.54	0.07	0.41	0.34	0.04	3.21
S87	0.49	0.08	0.46	0.3	0.05	3.99
S88	0.59	0.11	0.71	0.39	0.07	5.53
S89	0.46	0.08	0.47	0.28	0.05	4.44
S9	0.56	0.08	0.51	0.36	0.05	3.86
S90	0.38	0.05	0.26	0.21	0.03	2.44
S91	0.56	0.1	0.59	0.36	0.06	4.66
S92	0.59	0.1	0.62	0.38	0.07	4.27
S93	0.58	0.07	0.42	0.37	0.04	3.75
S94	0.6	0.03	0.21	0.39	0.02	2.08
S95	0.59	0.1	0.62	0.39	0.07	4.01
S96	0.56	0.05	0.32	0.36	0.03	3
S97	0.59	0.1	0.58	0.39	0.07	3.58
S98	0.43	0.03	0.15	0.25	0.02	1.34
S99	0.42	0.18	0.96	0.24	0.11	6.65

Appendix D: 2D Model Results for Sea Level Rise



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Miles

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Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds Storm Water Resource Plan

Existing Conditions
10-Year Flood Event
Base Scenario

Project No.	**11110741**
Revision No.	**-**
Date	**08/23/2018**

FIGURE 1

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\AppJ_ModelingMemo\11110741_001_EC_10yrFlood_base.mxd
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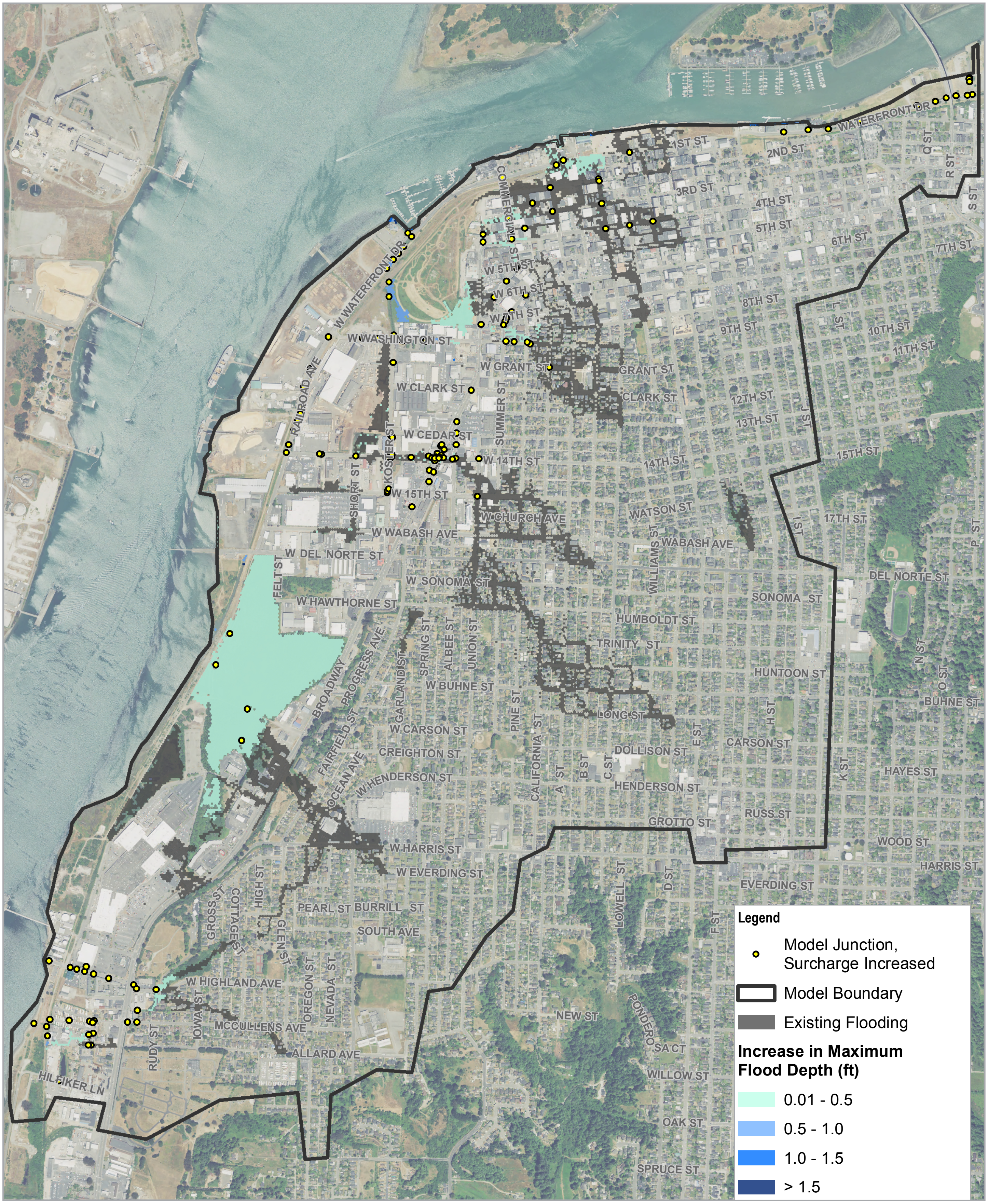
Data source: GHD modeling, 2018; NAIP orthoimagery, 2016; . Created by: jclark2



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Miles

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

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GHD

City of Eureka
Eureka Area Watersheds Storm Water Resource Plan

Existing Conditions
10-Year Flood Event
With 1 Foot of Sea Level Rise

Project No. **11110741**
Revision No. **-**
Date **08/23/2018**

FIGURE 2

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\AppJ_ModelingMemo\11110741_002_EC_10yrFlood_1ftSLR.mxd
Print date: 23 Aug 2018 - 13:04

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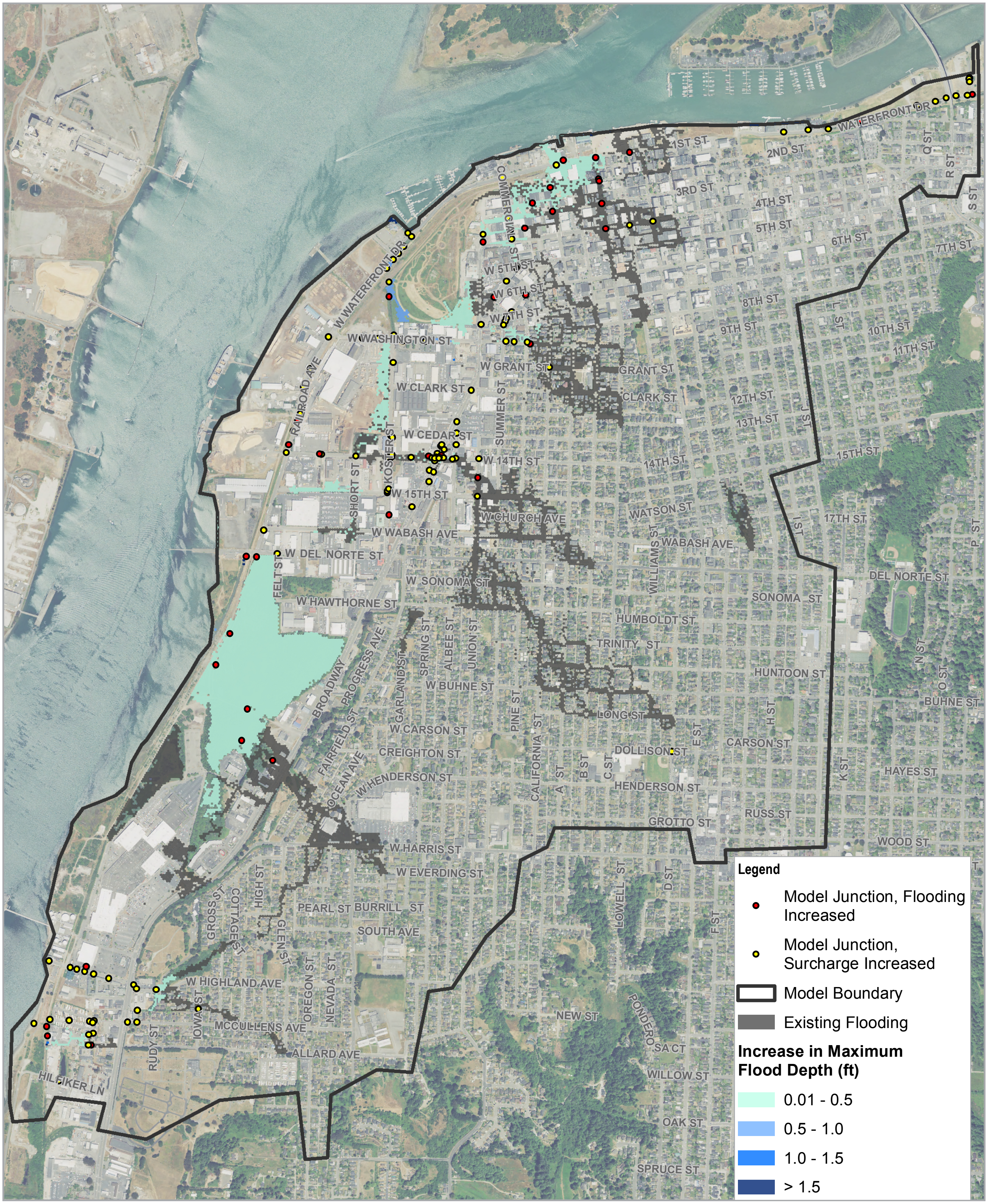

Paper Size ANSI A

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Miles

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds Storm Water Resource Plan

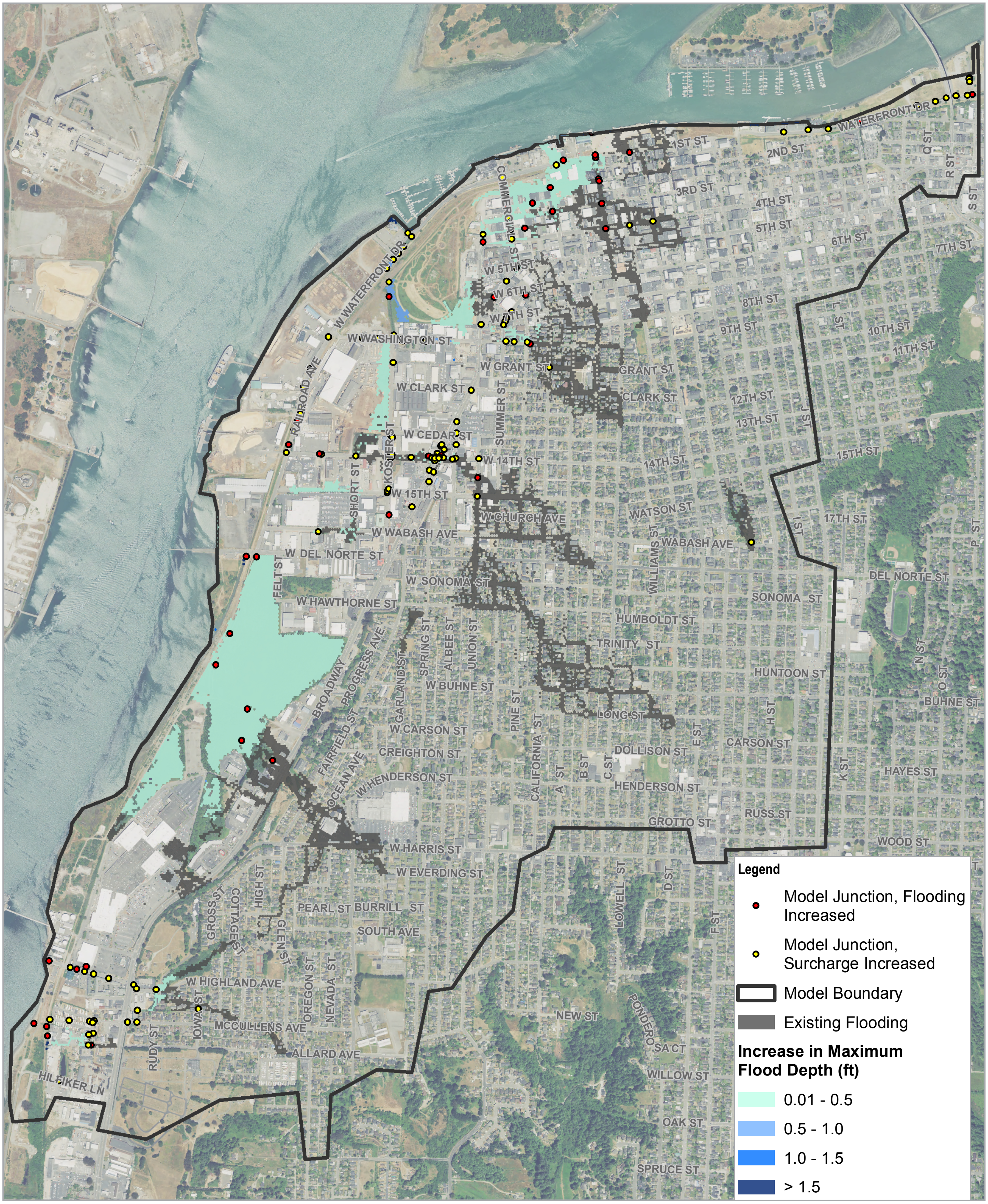
Existing Conditions
10-Year Flood Event
With 2 Feet of Sea Level Rise

Project No. **11110741**
Revision No. **-**
Date **08/23/2018**

FIGURE 3

\\Acv-svr-001\ghd\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\AppJ_ModelingMemo\11110741_003_EC_10yrFlood_2ftSLR.mxd
Print date: 23 Aug 2018 - 13:29

Data source: GHD modeling, 2018; NAIP orthoimagery, 2016; . Created by: jclark2



Paper Size ANSI A

0 0.09 0.18 0.27 0.36

Miles

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Eureka Area Watersheds Storm Water Resource Plan

Existing Conditions 10-Year Flood Event With 3 Feet of Sea Level Rise

Project No. **11110741**
Revision No. **-**
Date **08/23/2018**

FIGURE 4

N:\US\Eureka\Projects\111\11110741 Eureka-Stormwater Resource Plan\08-GIS\Maps\Deliverables\AppJ_ModelingMemo\11110741_004_EC_10yrFlood_3ftSLR.mxd
Print date: 23 Aug 2018 - 13:29

Data source: GHD modeling, 2018; NAIP orthoimagery, 2016; . Created by: jclark2

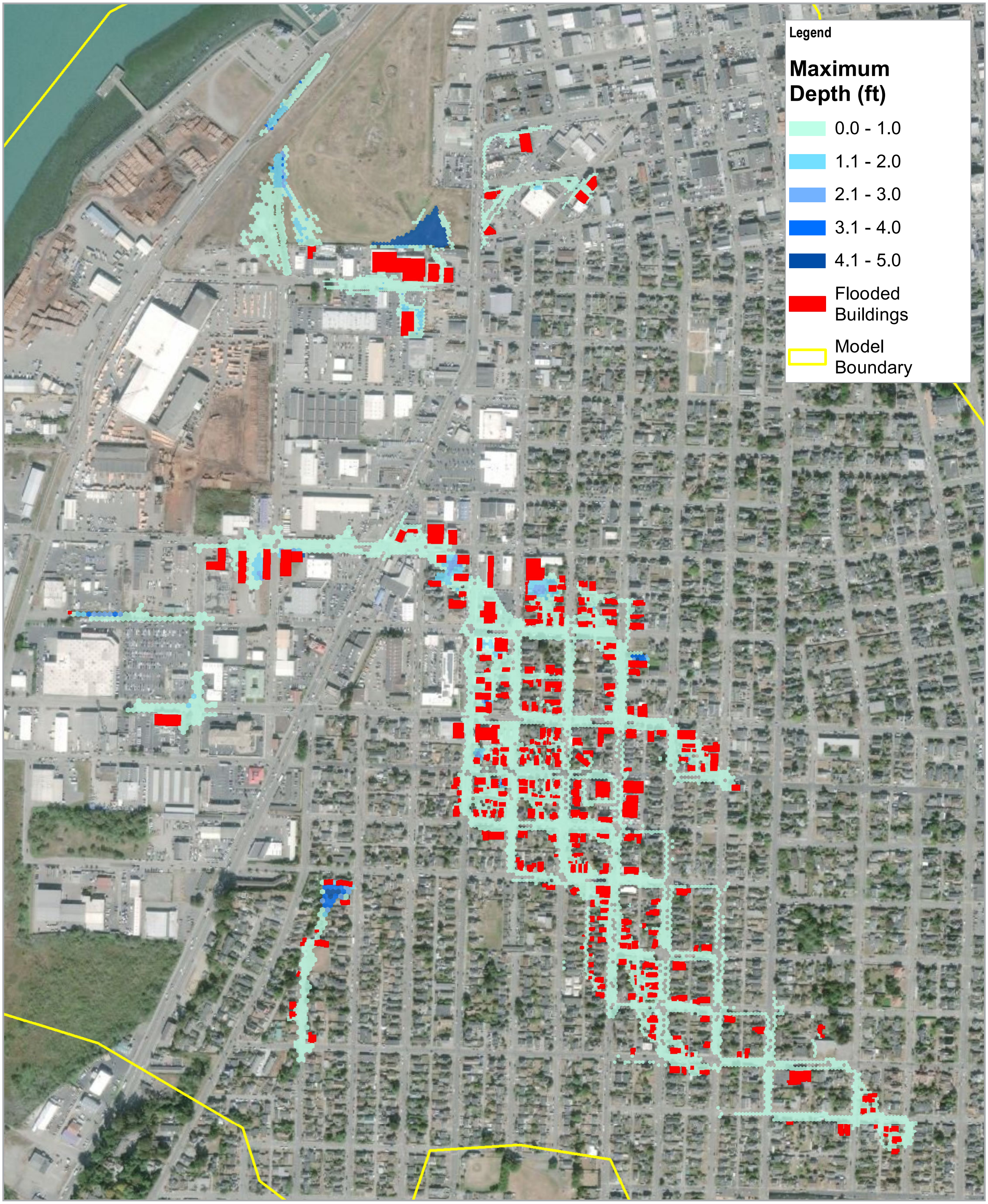
Appendix E: 1D Model Results for Sea Level Rise

Basin	Total Number of Junctions	Total Hrs	Base Condition					SLR: +1ft						
			Number of Junctions Sur-charged	Hrs Sur-charged	% of Time Sur-charging Occurs	Number of Junctions Flooded	Total Flood Volume (MG)	Number of Junctions Sur-charged	Increase in Number of Junctions Sur-charged	Increase in Hrs Sur-charged (hrs)	Increase in % of Time Sur-charging Occurs	Number of Junctions Flooded	Increase in Number of Junctions Flooded	Increase in Total Flood Volume (MG)
B	41	984	31	127	13%	6	0.8	33	2	26	2.6%	8	2	0.3
C	62	1488	22	143	10%	4	0.4	22	0	15	1.0%	4	0	0.6
D	44	1056	11	161	15%	9	17.9	11	0	0	0.0%	9	0	0.1
PM	18	432	9	178	41%	4	15.7	9	0	2	0.4%	4	0	1.2
E	31	744	17	158	21%	6	1.7	17	0	0	0.0%	6	0	0.0
F	166	3984	108	705	18%	14	7.5	109	1	218	5.5%	16	2	6.8
G	22	528	15	50	10%	5	0.6	15	0	26	4.9%	5	0	0.5
H	72	1728	36	485	28%	18	16.0	36	0	9	0.5%	18	0	1.7
I	41	984	17	117	12%	1	0.1	22	5	32	3.2%	1	0	0.1
Total	497	11928	266	2124	18%	67	61	274	8	327	3%	71	4	11

Basin	Total Number of Junctions	Total Hrs	Base Condition					SLR: +2ft						
			Number of Junctions Sur-charged	Hrs Sur-charged	% of Time Sur-charging Occurs	Number of Junctions Flooded	Total Flood Volume (MG)	Number of Junctions Sur-charged	Increase in Number of Junctions Sur-charged	Increase in Hrs Sur-charged (hrs)	Increase in % of Time Sur-charging Occurs	Number of Junctions Flooded	Increase in Number of Junctions Flooded	Increase in Total Flood Volume (MG)
B	41	984	31	127	13%	6	0.8	33	2	52	5.3%	8	2	1.3
C	62	1488	22	143	10%	4	0.4	22	0	34	2.3%	6	2	2.1
D	44	1056	11	161	15%	9	17.9	11	0	0	0.0%	10	1	0.3
PM	18	432	9	178	41%	4	15.7	10	1	7	1.6%	4	0	83.5
E	31	744	17	158	21%	6	1.7	17	0	0	0.0%	4	-2	0.0
F	166	3984	108	705	18%	14	7.5	109	1	481	12.1%	21	7	15.0
G	22	528	15	50	10%	5	0.6	15	0	61	11.6%	7	2	1.9
H	72	1728	36	485	28%	18	16.0	36	0	10	0.6%	21	3	3.8
I	41	984	17	117	12%	1	0.1	22	5	73	7.4%	2	1	0.5
Total	497	11928	266	2124	18%	67	61	275	9	719	6%	83	16	108

Basin	Total Number of Junctions	Total Hrs	Base Condition					SLR: +3ft						
			Number of Junctions Sur-charged	Hrs Sur-charged	% of Time Sur-charging Occurs	Number of Junctions Flooded	Total Flood Volume (MG)	Number of Junctions Sur-charged	Increase in Number of Junctions Sur-charged	Increase in Hrs Sur-charged (hrs)	Increase in % of Time Sur-charging Occurs	Number of Junctions Flooded	Increase in Number of Junctions Flooded	Increase in Total Flood Volume (MG)
B	41	984	31	127	13%	6	0.8	33	2	95	9.6%	9	3	4.9
C	62	1488	22	143	10%	4	0.4	22	0	65	4.4%	7	3	9.3
D	44	1056	11	161	15%	9	17.9	11	0	0	0.0%	10	1	0.5
PM	18	432	9	178	41%	4	15.7	10	1	11	2.5%	4	0	221.3
E	31	744	17	158	21%	6	1.7	17	0	0	0.0%	4	-2	0.0
F	166	3984	108	705	18%	14	7.5	109	1	715	17.9%	22	8	21.1
G	22	528	15	50	10%	5	0.6	15	0	112	21.1%	8	3	3.4
H	72	1728	36	485	28%	18	16.0	36	0	11	0.6%	22	4	6.6
I	41	984	17	117	12%	1	0.1	22	5	122	12.4%	2	1	8.6
Total	497	11928	266	2124	18%	67	61	275	9	1130	9%	88	21	276

Appendix F: Flood Reduction and Sea Level Rise Model Results



Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

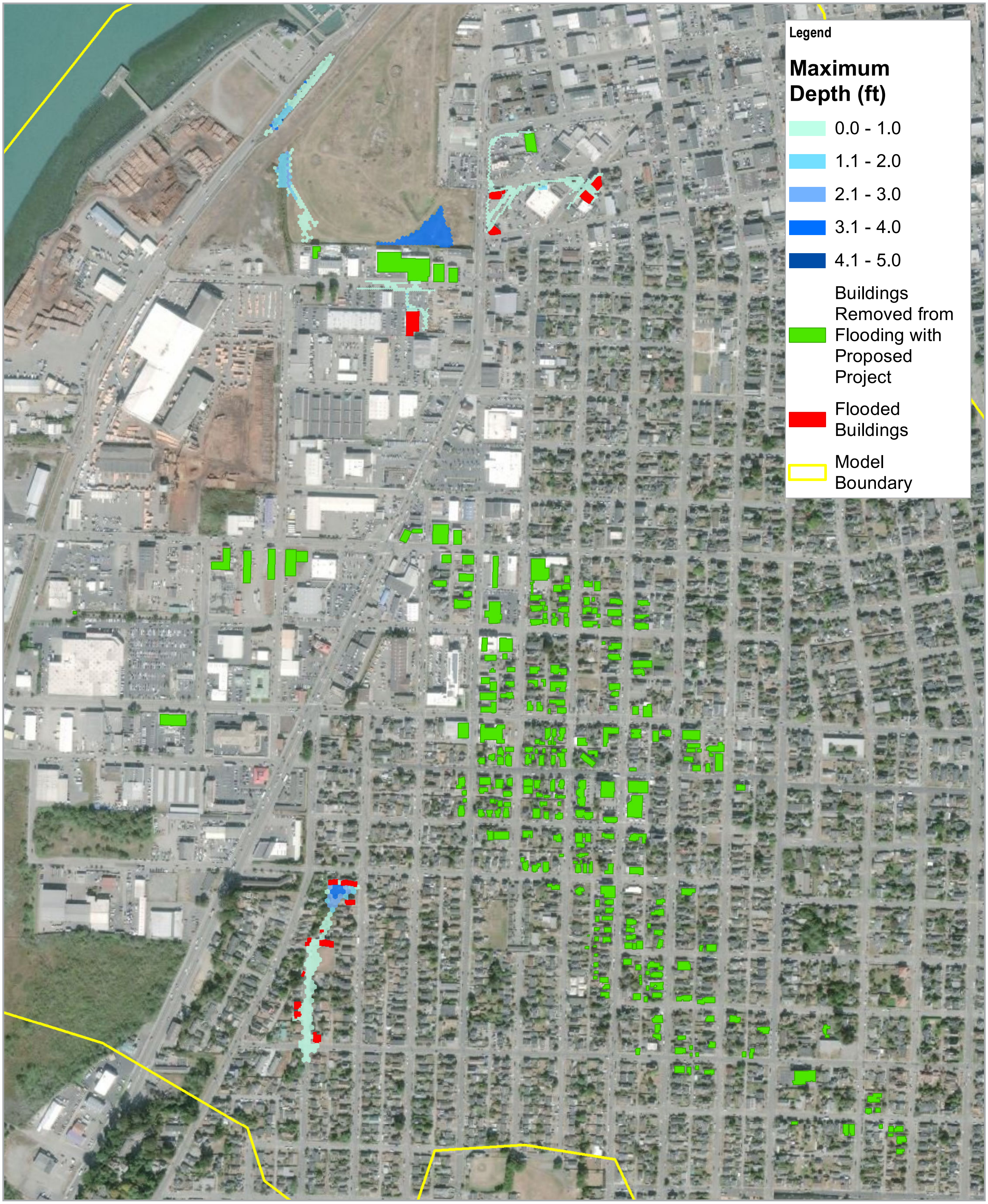
Project No. **11159210**
Revision No. **-**
Date **August 2018**

Existing Conditions 10-Year Flood Event

FIGURE 1

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F1_Existing10yr.mxd
Print date: 23 Aug 2018 - 15:40

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ashows



Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

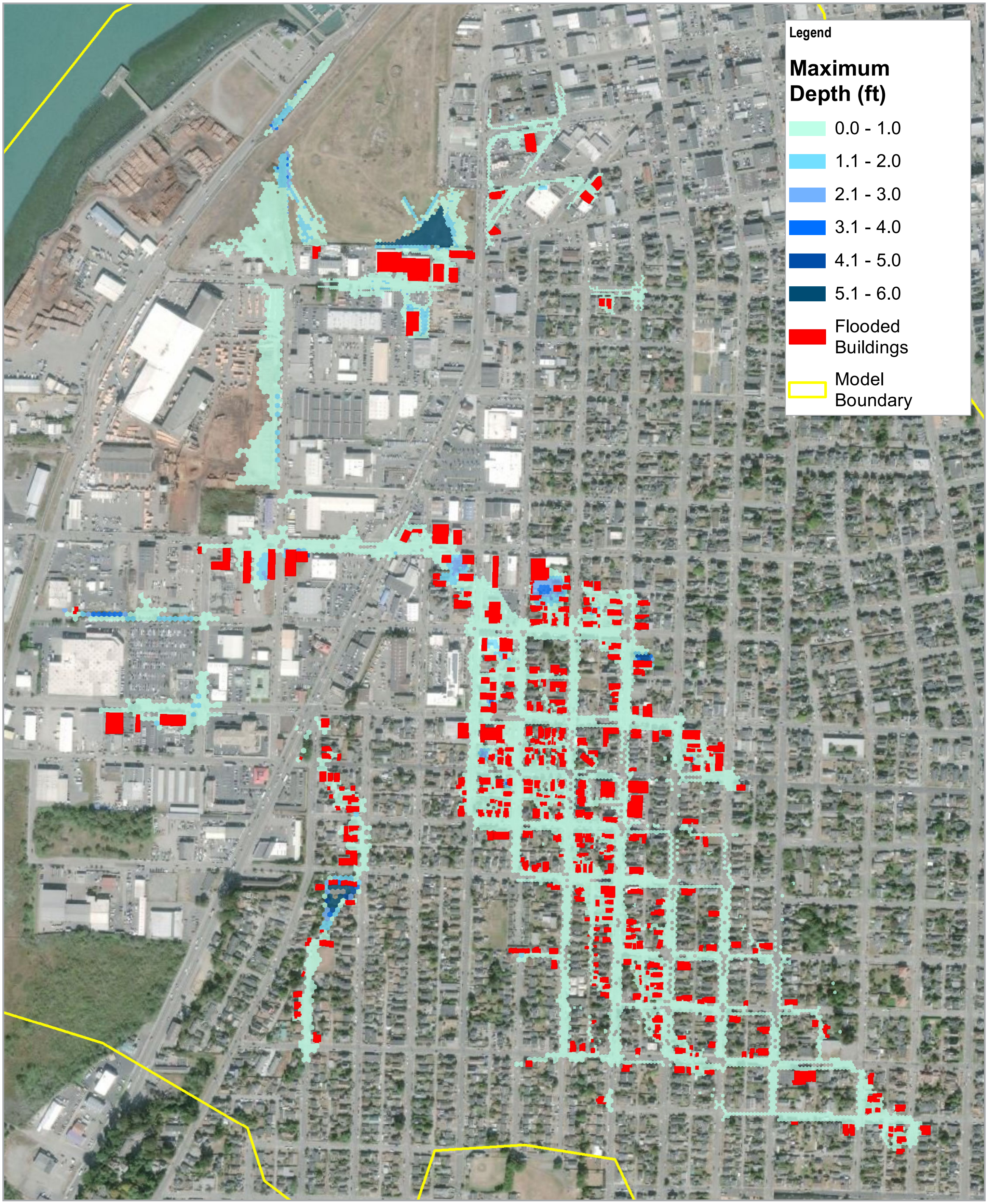
Proposed Conditions 10-Year Flood Event

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 2

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F2_Proposed10yr.mxd
Print date: 23 Aug 2018 - 16:00

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ashows



Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

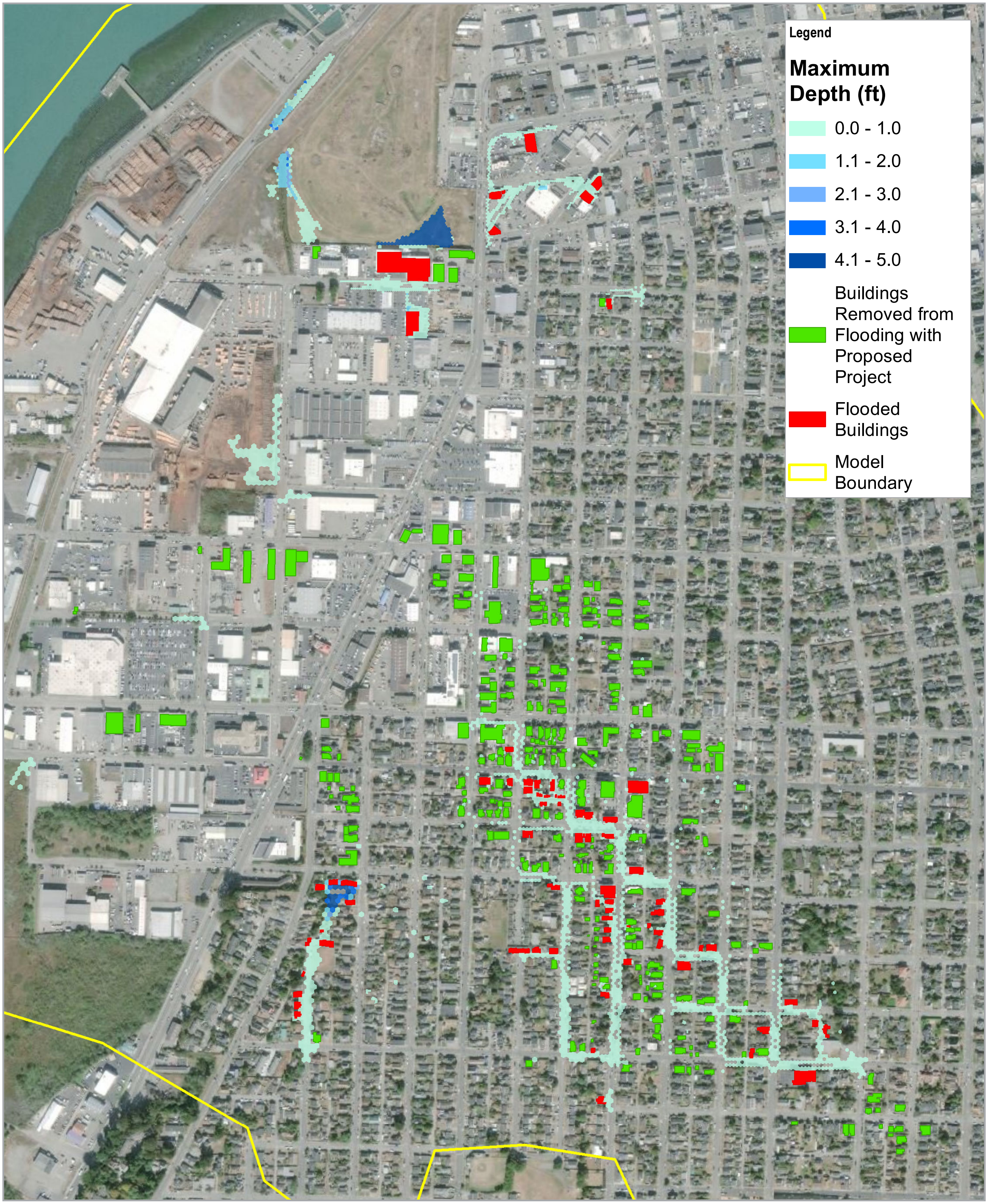
Project No.	**11159210**
Revision No.	**-**
Date	**August 2018**

Existing Conditions 25-Year Flood Event

FIGURE 3

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_Existing25yr.mxd
Print date: 23 Aug 2018 - 15:47

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ashows



Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

Project No. **11159210**
Revision No. **-**
Date **August 2018**

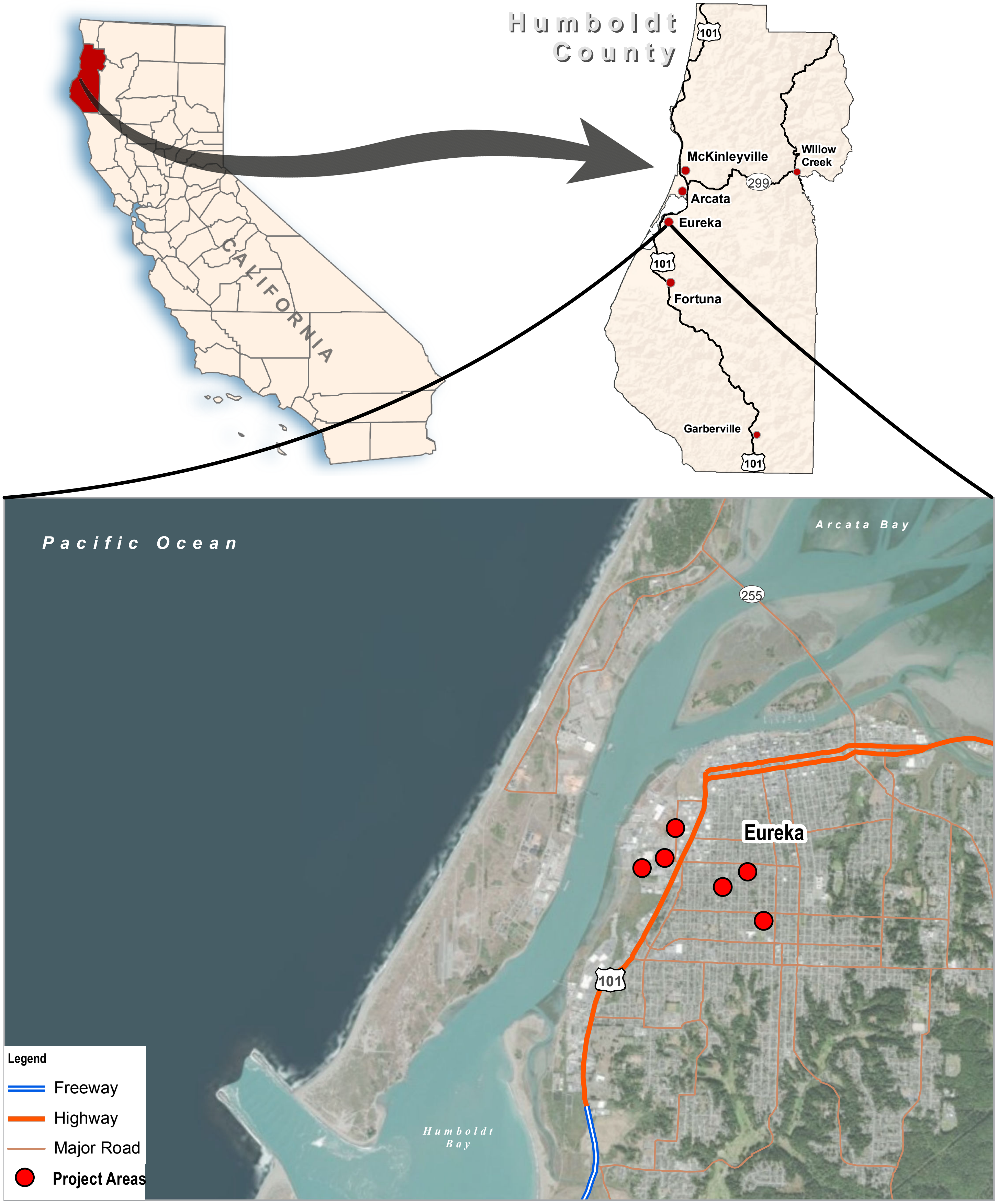
Proposed Conditions 25-Year Flood Event

FIGURE 4

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F4_Proposed25yr.mxd
Print date: 23 Aug 2018 - 15:55

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: ashows

Appendix G: Flood Reduction and Sea Level Rise Maps and Conceptual Design Plans



Paper Size ANSI A

0 0.25 0.5 0.75 1

Miles

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

Vicinity Map

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 1

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F1_Vicinity.mxd
Print date: 24 Aug 2018 - 15:13

Data source: Sources: Esri, USGS, NOAA
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: bvivyan

Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

Project No. **11159210**
Revision No. **-**
Date **August 2018**

Project Map

FIGURE 2

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F2_ProjectMap.mxd
Print date: 24 Aug 2018 - 09:23

Data source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community. Created by: bvivyan

Paper Size ANSI A

0 250 500 750 1,000

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

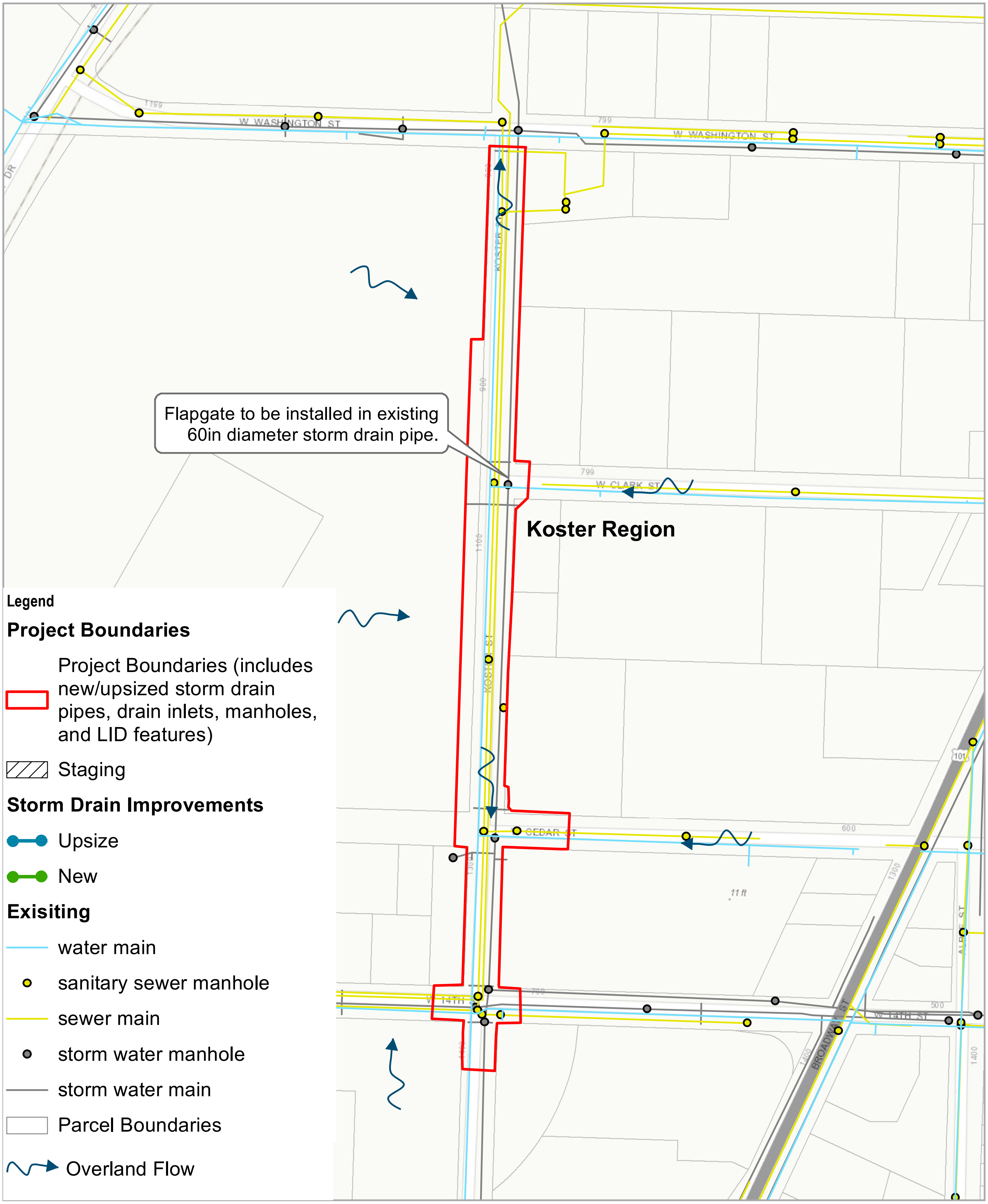
Project No. **11159210**
Revision No. **-**
Date **August 2018**

Design Plan Index Map

FIGURE 3

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_IndexDesignPlans.mxd
Print date: 24 Aug 2018 - 09:50

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 50 100 150 200

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

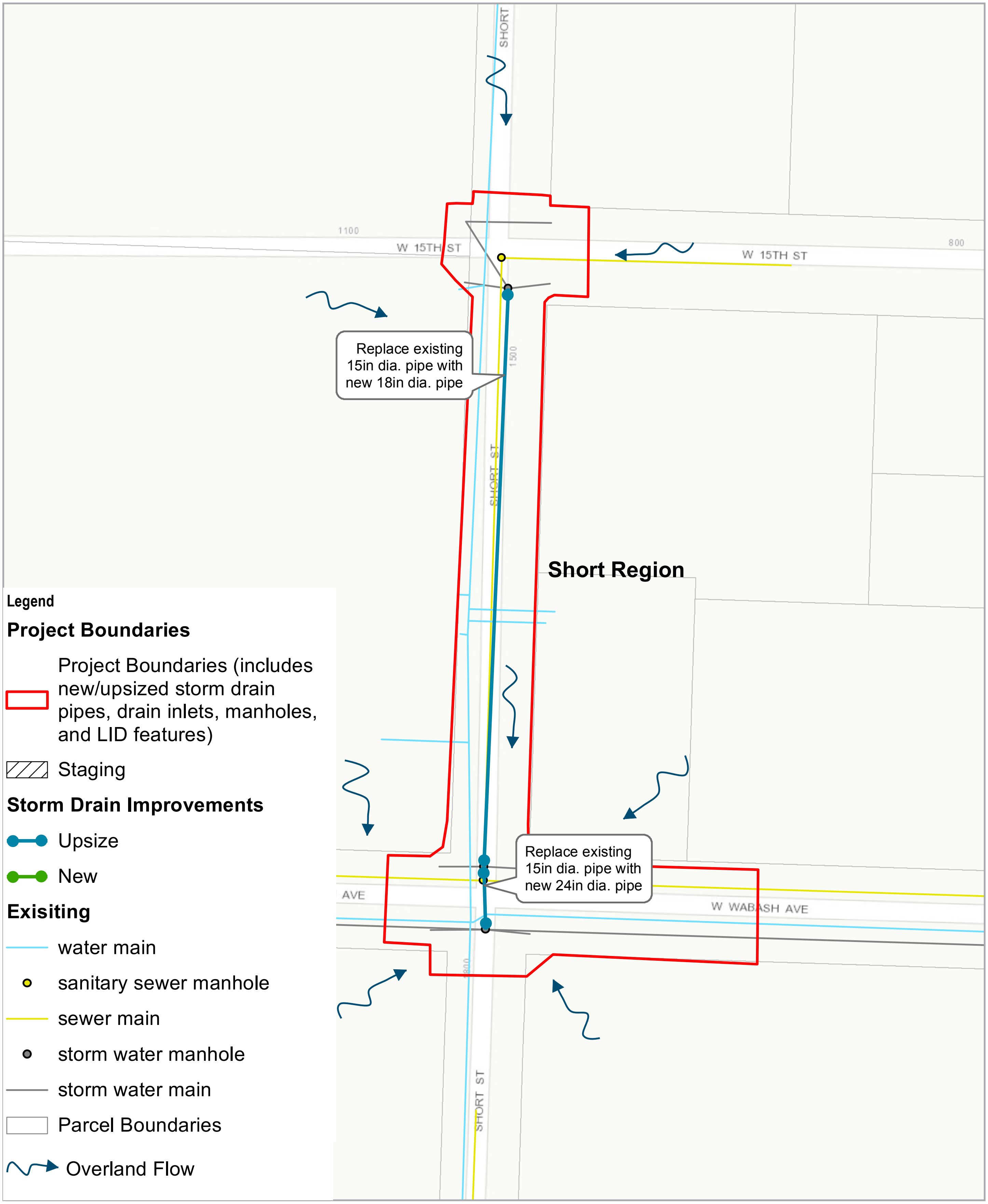
Design Plans
Koster Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.1

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:44

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 25 50 75 100

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

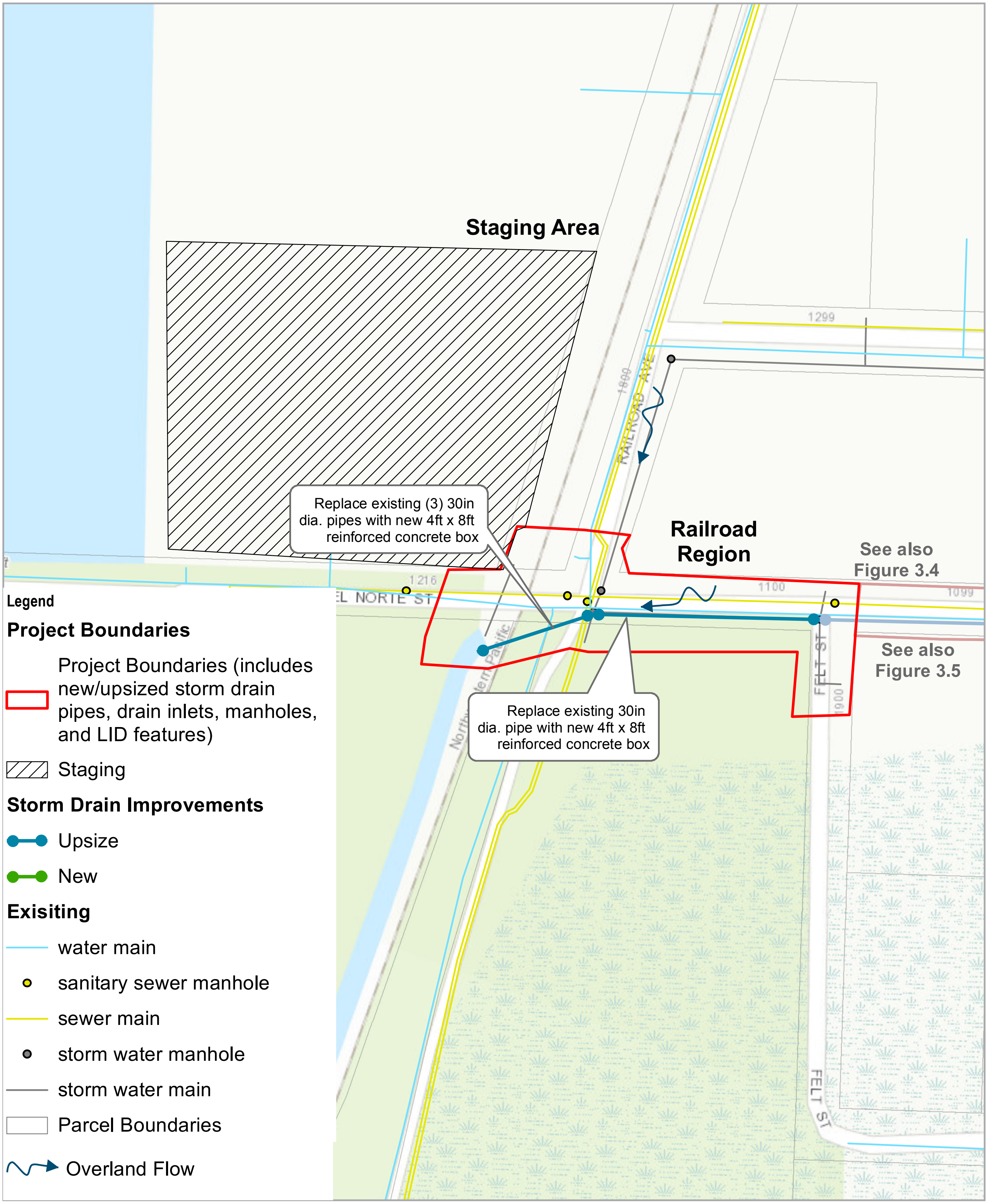
Design Plans
Short Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.2

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:44

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 30 60 90 120

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

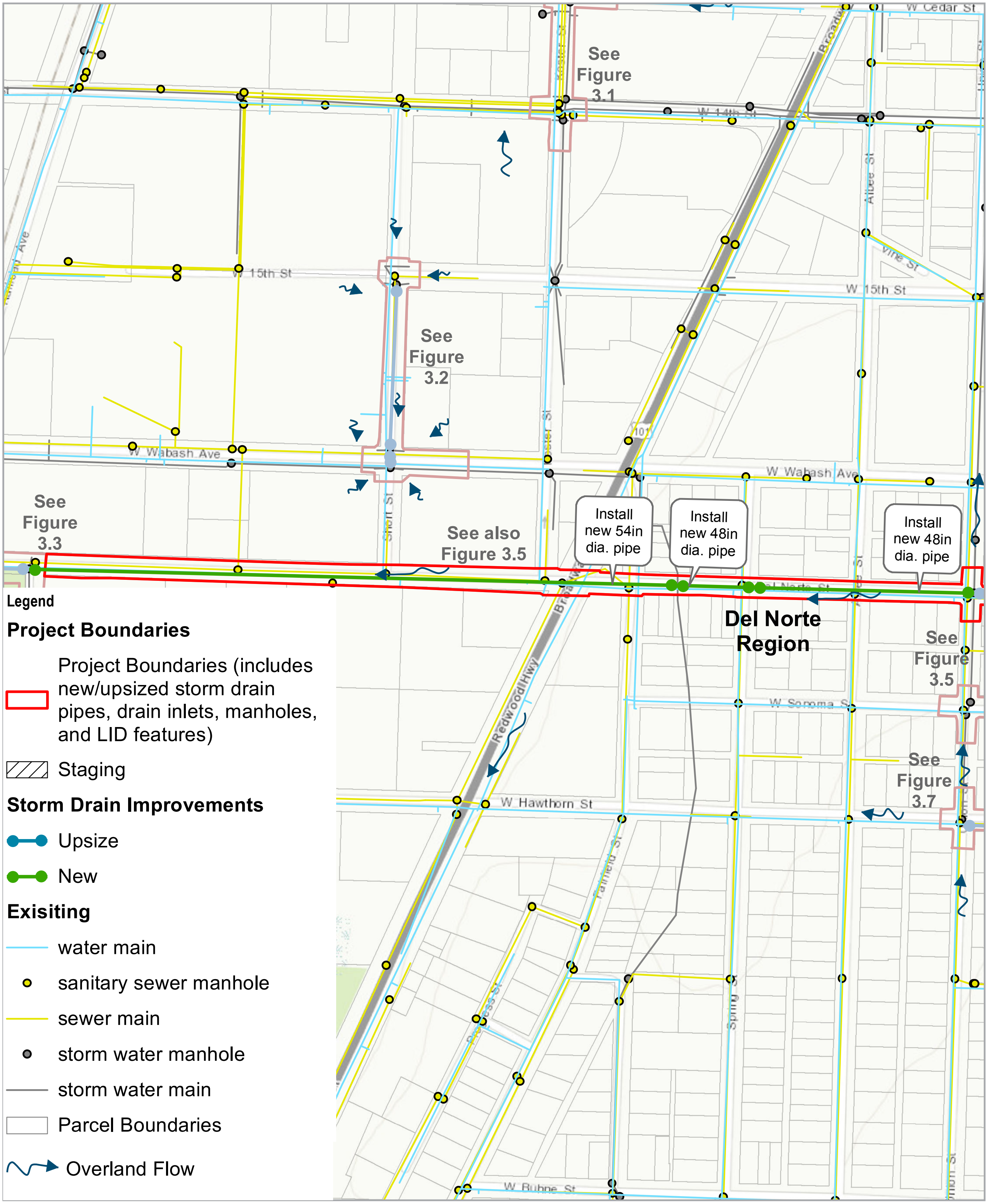
Design Plans
Railroad Region & Staging Area

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.3

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:44

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 90 180 270 360

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

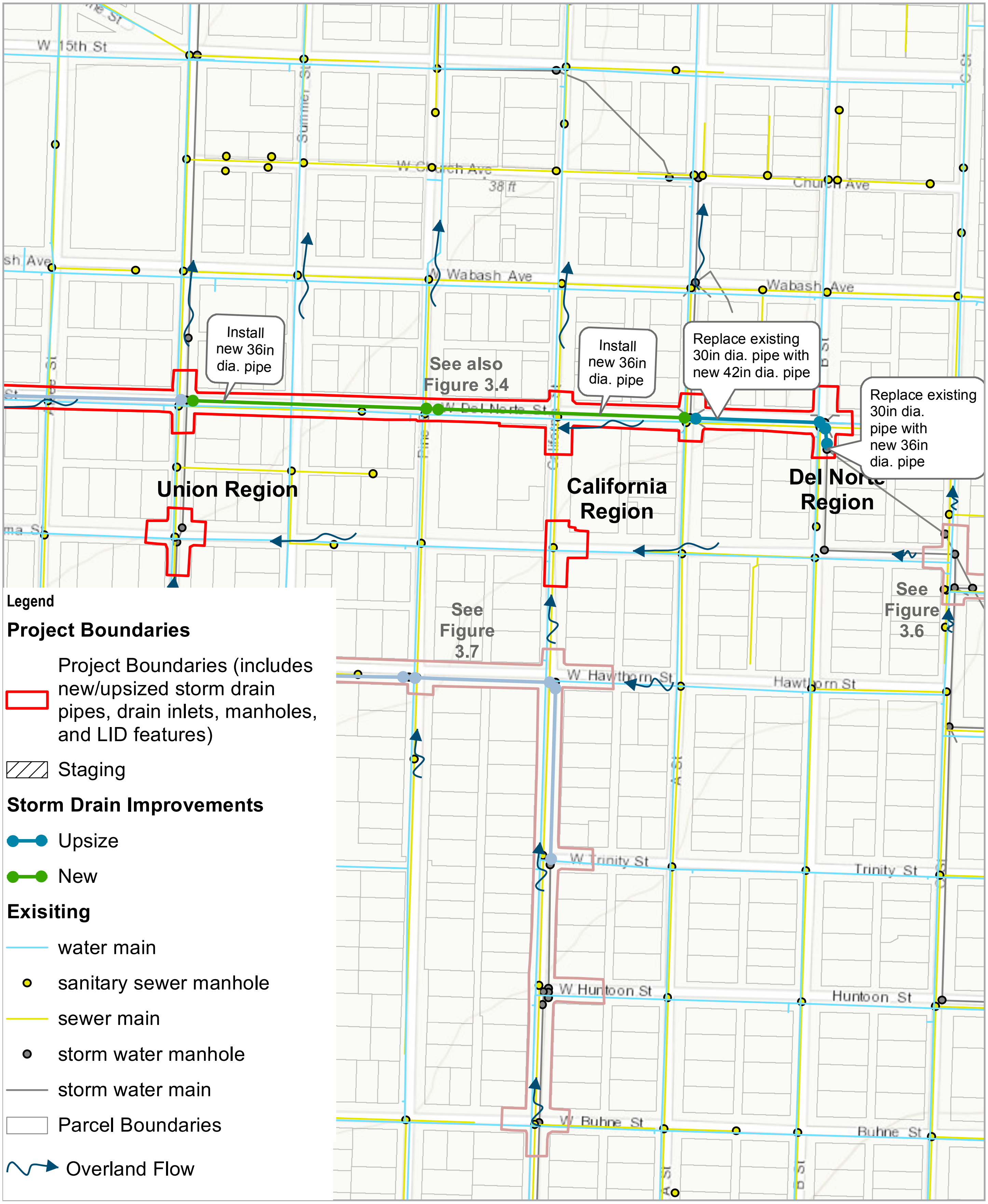
Design Plans
Del Norte Region - West

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.4

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:44

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 75 150 225 300

Feet

N

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

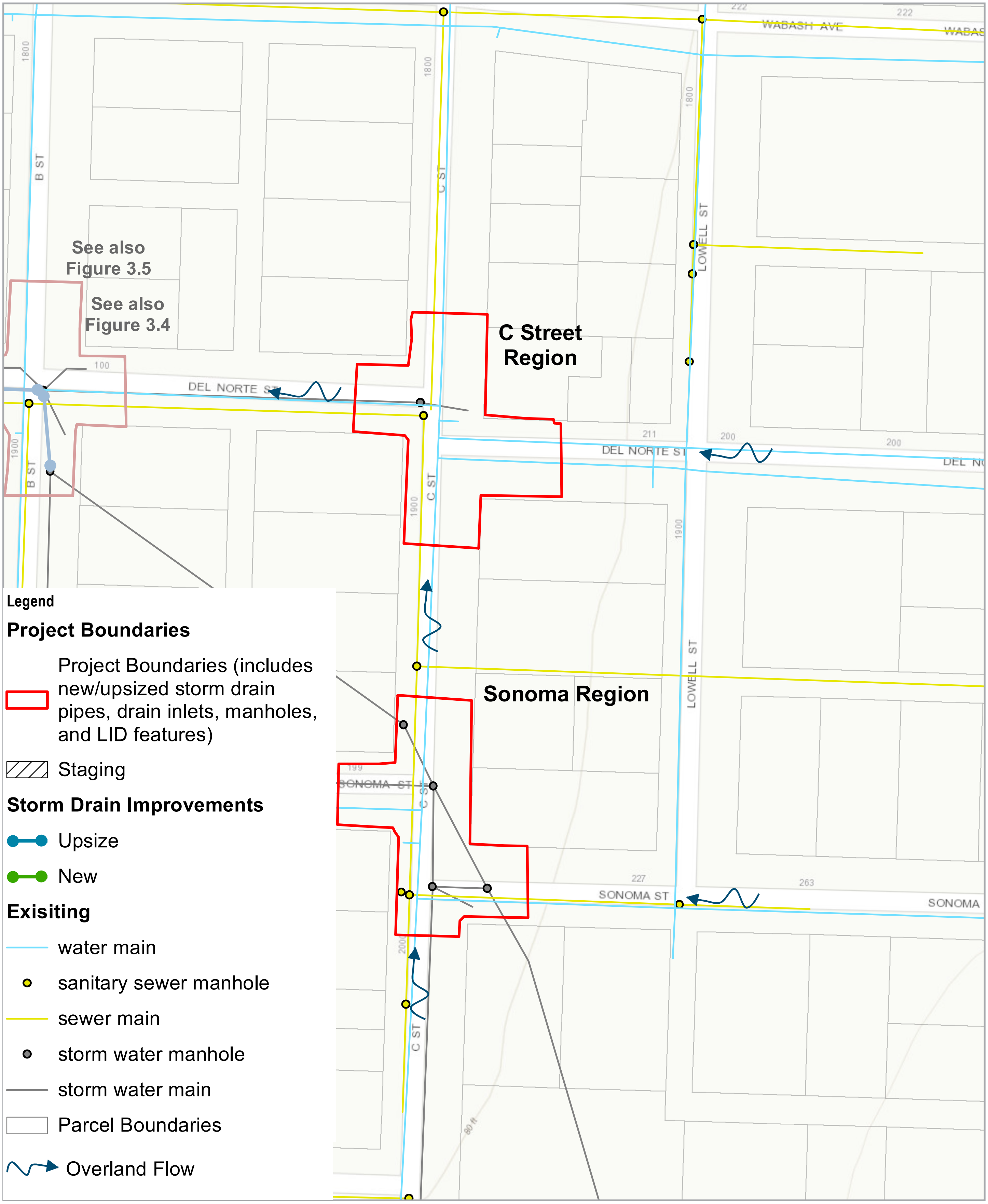
Project No. **11159210**
Revision No. **-**
Date **August 2018**

Design Plans
Union, California, Del Norte Region - East

FIGURE 3.5

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:44

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 25 50 75 100

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

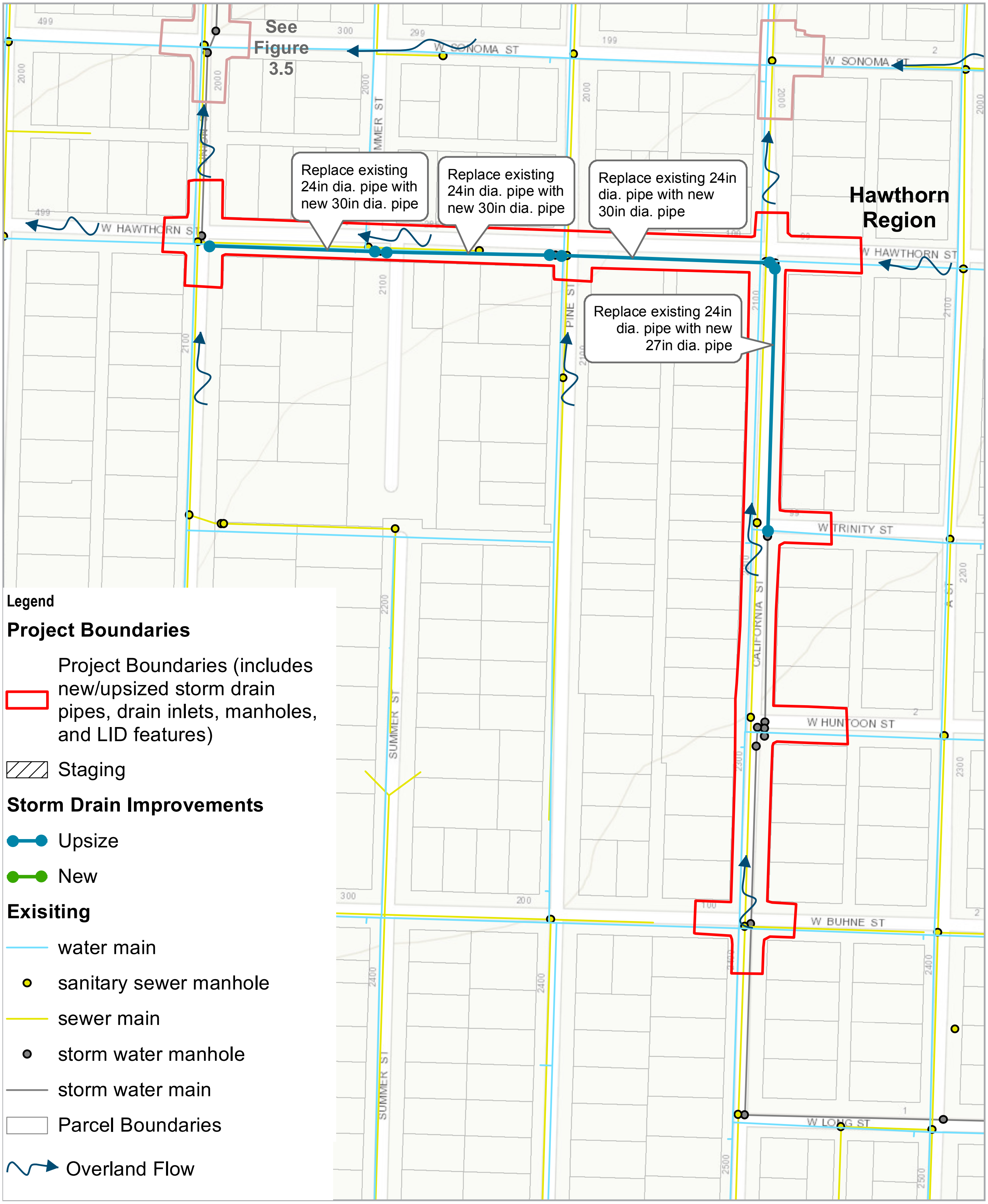
Design Plans
C Street & Sonoma Regions

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.6

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:45

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

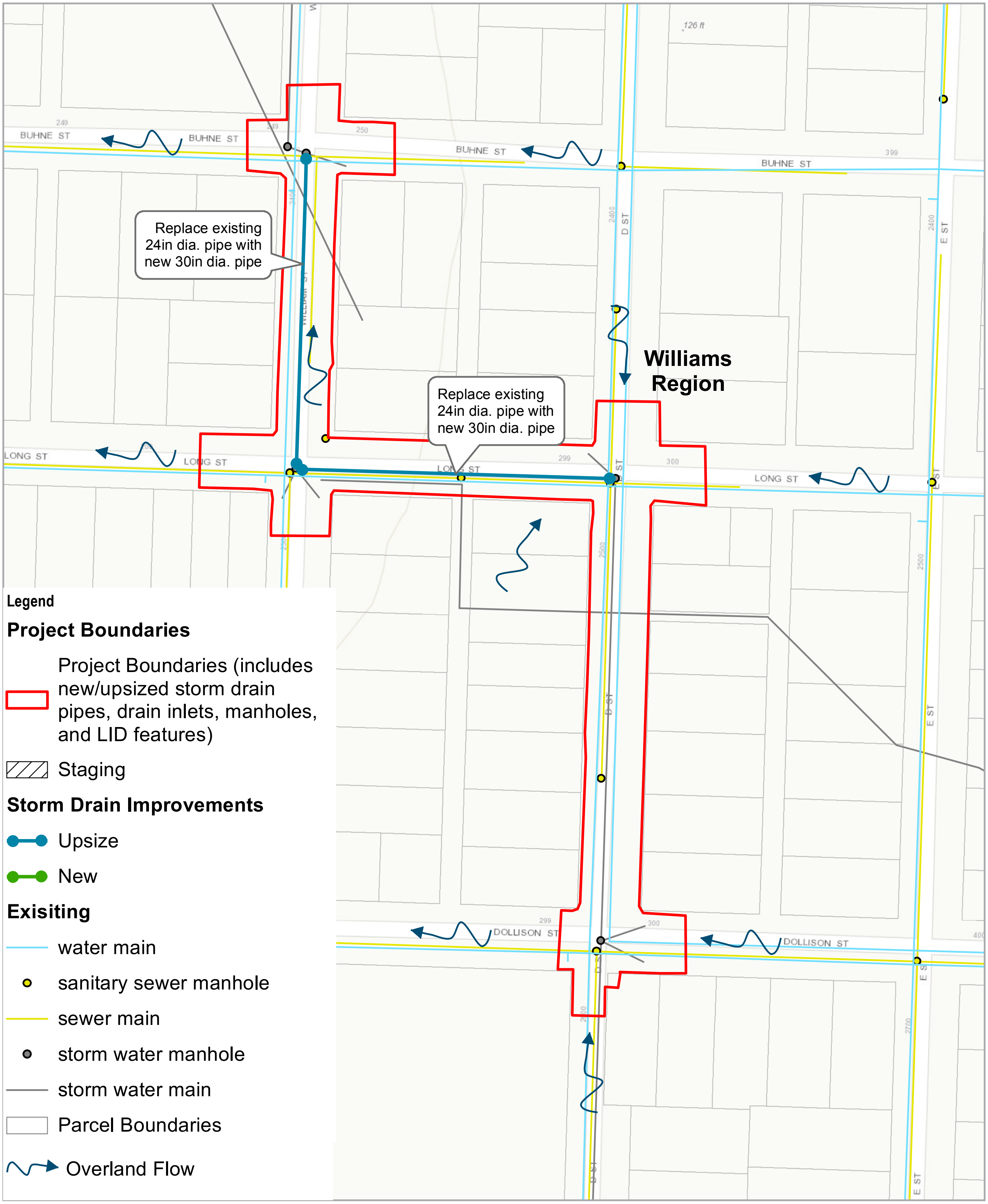
Design Plans
Hawthorn Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.7

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:45

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



Paper Size ANSI A

0 30 60 90 120

Feet

Map Projection: Lambert Conformal Conic
Horizontal Datum: North American Datum 1983
Grid: NAD 1983 StatePlane California I FIPS 0401 Feet

N

GHD

City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project
Hazard Mitigation Grant Application

Design Plans
Williams Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 3.8

G:\111\11159210 Eka-Clark Slough HMGP\08-GIS\Maps\Deliverables\HMG\F3_MB_DesignPlans.mxd
Print date: 24 Aug 2018 - 09:45

Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan

Appendix J EAWSWRP Storm Water Management Benefits

Stormwater Project Benefits Table and Example Projects

Benefit Category	Benefit	Example(s)
Water Quality *while contributing to compliance with applicable permit and/or TMDL requirements*	Increased filtration and/or treatment of runoff	• Bioretention facility, rain garden, green roof, bioswale
	Trash capture	• Program to organize community members to collect trash from streets • Low impact development project with trash capture system
	Nonpoint source pollution control	• Sediment reduction project at timber production site • Bioswale, rain garden, bioretention facility
	Reestablished natural water drainage and treatment	• Conversion of pervious surface to impervious surface • Creek restoration project to naturally filter storm water runoff
Water Supply *through groundwater management and/or runoff capture and use*	Water conservation	• Rainwater collection system • Native landscaping incorporated into projects to reduce potable water needs
	Water supply reliability	• Storm water infiltration project
	Conjunctive use	• Program or project that facilitates the use of groundwater infiltration of surface storm water into a drinking water supply aquifer
Flood Management	Reduced sanitary sewer overflows	• LID style basin to mitigate volumetric overflow • LID retrofit incorporated with illegal storm water connection removal
	Decreased flood risk by reducing runoff rate and/or volume	• Rainwater collection system • Bioretention facility, rain garden, bioswale • Conversion of pervious surface to impervious surface
	Increased sea level rise resiliency	• Tide gate installation or improvement that prevents backwatering in the storm water system • Project that increases storm water storage

Stormwater Project Benefits Table and Example Projects

Benefit Category	Benefit	Example(s)
Environmental	Reduced energy use, greenhouse gas emissions, or provides a carbon sink	• Creation of wetland with quantifiable greenhouse gas emission reduction
	Reestablishment of the natural hydrograph	• Conversion of pervious surface to impervious surface • Creek restoration project that removes riprap or concrete and converts river bed back to native material
	Water temperature improvement	• Deep media bioretetion facilities that shield water from sunlight • Riparian forest restoration for infiltration of stormwater
	Environmental and habitat protection and improvement, including: - wetland enhancement/creation; - riparian enhancement; and/or - instream flow improvement	• Storm water treatment wetland • Channel enhancement project to reduce storm water turbidity • Replacement of undersized culvert that causes flooding and debris accumulation • Floodplain enhancement project to infiltrate storm water
	Increased urban green space	• Green streets project
Community	Employment opportunities provided Public education	• LID project at public school • LID project with signage
	Community involvement	• Community built demonstration LID project
	Enhance and/or create recreational and public use areas	• Creation or enhancement of trail drainages to filter storm water runoff or wildlife areas • Installation bioswale or rain garden at existing public use area

Appendix K Parcels List

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00703102		2.01	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	14
00703103		9.92	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	14
00302108		1.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	13
00308222		2.14	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	12
00319107		1.00	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	12
00702104	949 W. HAWTHORN ST EUREKA	1.52	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	12
00702105	1059 W HAWTHORNE ST EUREKA 95501	5.02	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	12
00703104		20.31	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	11
00816203	719 CREIGHTON ST EUREKA	1.41	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	11
00904405		1.20	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	11
01301101		12.58	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	11
01311102		2.38	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	11

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00101110		0.24	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00101121	4 C ST, EUREKA, 95501	0.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	10
00101207		0.04	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00101210		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00101304	104 C ST EUREKA	0.47	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00101311		0.28	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00101403		1.04	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00105105		0.09	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00105106		0.05	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00105107	427 W 2ND ST EUREKA	0.18	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00105113		0.31	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00105201	314 WATERFRONT DR EUREKA	0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00105311	222 1ST ST EUREKA 95501	0.16	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00105413	307 W 1ST ST EUREKA 95501	0.22	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00106117		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00108101	605 B ST EUREKA 95501	0.23	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00108102	118 6TH ST EUREKA 95501	0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00108103		0.10	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00108104	138 6TH ST EUREKA 95501	0.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00109210		0.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00109313		0.07	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00109402		0.29	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00109602	312 3RD ST EUREKA 95501	0.15	Eureka City Of Cr	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00109603		0.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00110303		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00110602		0.61	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00112117	701 FIRST ST EUREKA 95501	0.60	Union Pacific Railroad Company	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00112118		0.40	Union Pacific Railroad Company	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00112119		0.06	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00113201		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00113204		0.21	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00113403		0.15	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	10
00113405		0.31	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00113601		0.31	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00113602		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00115505		0.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00116105		0.66	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	10
00117201		0.33	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00119102	825 5 TH ST EUREKA 95501	1.23	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	10
00119103	812 4TH ST EUREKA 95501	0.55	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	10

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00312118		0.42	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00312138		0.51	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	10
00314104		2.68	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	10
00314311		0.05	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00319104		1.00	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00319105		1.00	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00319106		1.00	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00402512	337 W CLARK ST EUREKA	1.66	United States Postal Service	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00404110		2.32	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	10
00404201		2.71	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10
00701102		0.95	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	10

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00101126	45 WATERFRONT DR EUREKA	1.96	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00101202		1.45	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00105445	1 E ST EUREKA	1.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00105447		1.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	9
00105448		0.59	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	9
00112122		3.07	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00112129		0.40	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00126109		0.67	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00211405	665 MYRTLE AV EUREKA	0.51	Humboldt County Office Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00211406	1908 6TH ST EUREKA 95501	0.52	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00211407	1912 6TH ST EUREKA 95501	0.44	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00217106		2.42	Humboldt County Board Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00217109	901 MYRTLE DR EUREKA	5.80	Humboldt County Board Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	9

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00223114		2.27	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00302107		1.54	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	9
00308210	945 W 14TH ST EUREKA 95501	3.90	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
00513108		0.52	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00513208	1157 DEL NORTE ST EUREKA	2.01	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00518101		0.11	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00518107		0.70	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00518108		0.32	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00518203		0.37	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00518204		0.08	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00518205		0.10	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00518206		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00518207		0.40	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00518208		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00518216		0.39	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00519101		0.96	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00519102		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519201		0.55	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519202		0.35	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00519203		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00519204		0.81	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00519205		0.61	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519206		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519302		0.45	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519403		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519404		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00519405		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00519406		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00520203		4.18	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00521213		1.97	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
00524303		0.20	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00524304		0.83	Eureka City Schools	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00524604		3.67	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00629103		10.72	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00704103		29.43	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00705102		5.18	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	9
00705111		9.00	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00713002		0.53	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00808112		4.34	California State Of Parks	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00809401	3431 FORT AV EUREKA 95503	8.01	California State Of Parks	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
00810109		2.73	California State Of Parks	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00813302		0.38	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00813303		0.41	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00813401		1.79	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
00816120		0.63	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
00823302		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
01027206		0.06	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
01101401		1.49	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
01103201		3.04	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
01112101	1030 DEL NORTE ST EUREKA	16.59	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
01113105		12.60	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
01203101		0.68	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	9
01308101		39.44	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	9
01621207		0.82	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
01621209		0.86	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01622217	3775 HARRIS ST EUREKA 95503	6.56	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
01622218	3455 HARRIS ST EUREKA 95503	0.61	Humboldt Fire District No 1	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
01622224		0.64	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	9
30513110	5630 S BROADWAY EUREKA 95503	2.52	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
30513118		2.76	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	9
00105437		0.18	Eureka City Of	Rain Barrel, Conservation Setback	8
00105444		0.22	Eureka City Of	Rain Barrel, Conservation Setback	8
00112104		0.06	Eureka City Of	Rain Barrel, Conservation Setback	8
00223102		4.56	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	8
00223104		3.27	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	8
00223112		10.29	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	8
00301101		10.54	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	8
00519301		0.15	Eureka City Of	Rain Barrel	8
00520101		1.32	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	8

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00617111		0.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	8
01222102		6.14	Eureka City Of	Rain Barrel, Conservation Setback	8
01222119		0.29	Eureka City Of	Rain Barrel, Conservation Setback	8
01222121		0.07	Eureka City Of	Rain Barrel, Conservation Setback	8
01311103		1.91	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	8
30639110	6062 PURDUE DR EUREKA	4.89	South Bay Union School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	8
00101111		0.08	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00114205		0.29	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00114207		0.41	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00116102		0.48	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00116113		1.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	7
00116208		0.38	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00116211		0.33	Northwestern Pacific Railroad Co Sb & Sbe 853-12-2	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00119104	901 5TH ST EUREKA 95501	0.46	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00119201		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00119204		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00119205		0.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00119401		0.61	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00119402		0.61	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00119501		0.30	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00119504		0.15	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00119505		0.15	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00120603		0.31	Humboldt Bay Municipal Water Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00121213		1.83	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00121301		0.30	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00121305		0.12	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00121306	1103 3RD ST EUREKA 95501	0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00123306		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00123307		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00124306	1115 8TH ST EUREKA 95501	0.08	North Coast Unified Air Quality Mngmnt District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00124307	1105 8TH ST EUREKA 95501	0.09	North Coast Unified Air Quality Mngmnt District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00124311	707 L ST EUREKA	0.45	North Coast Unified Air Quality Mngmnt District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00126110		0.03	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00126119		0.01	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00126120		0.75	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00126121		0.11	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00126122		0.85	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00205102		0.49	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00208105	2203 1ST ST EUREKA 95501	0.14	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00209103	2137 2ND ST EUREKA 95501	0.15	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00209108	104 W St EUREKA 95501	0.19	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00209110		0.97	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00212102	2213 1ST ST EUREKA 95501	0.15	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00212103		0.09	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00212408	2223 2ND ST EUREKA 95501	0.16	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00212409	2237 2ND ST EUREKA 95501	0.14	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00212410		0.86	Humboldt Transit Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00223119	139 Y St EUREKA 95501	0.70	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00223123		0.26	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00224108		2.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00302105		0.01	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00303102		0.11	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00308206		0.51	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00308221		0.92	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00308229		0.50	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00314201		0.67	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00405206	1822 ALBEE ST EUREKA 95501	0.08	Eureka City Of Housing Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00405207	502 W DEL NORTE ST EUREKA	0.22	Eureka City Of Housing Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00405701		0.09	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00411407	1335 B ST EUREKA 95501	0.31	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00413301		0.17	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00416301	1115 C ST EUREKA 95501	0.70	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00416319	1137 C ST EUREKA 95501	0.31	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00419912	1645 C ST EUREKA 95501	0.12	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00423201		1.32	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00502302	1018 H ST EUREKA	0.59	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00506108		0.09	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00511106		1.93	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00511116		1.16	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00512102		3.41	Eureka City Schools	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00515201		1.33	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00518102		0.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00518103		0.19	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00518104		0.10	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00518105		0.10	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00518106		0.40	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
00601101		0.07	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
00601111		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00618101	1310 MYRTLE AV EUREKA 95501	0.42	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00618113		0.65	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00707112	1930 TRUESDALE AV EUREKA 95503	0.13	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00708117		0.39	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00709110		1.15	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00811231	1643 MCCULLENS AV EUREKA	0.17	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00813101		0.47	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00813102		0.28	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00815155		0.03	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00817107		0.38	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	7
00901421	2102 SPRING ST EUREKA	0.49	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00902103	2230 SPRING ST EUREKA	0.55	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00902117	2218 SPRING ST EUREKA	0.28	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00903312	2523 ALBEE ST EUREKA 95501	0.27	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00906405		0.19	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00907201	3117 PROSPECT AV EUREKA	2.64	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00907301	708 BURRILL ST EUREKA 95503	1.62	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00907401	606 W EVERDING ST EUREKA 95503	1.96	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00907501	3244 ELIZABETH ST EUREKA 95503	1.27	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00907601	609 BURRILL ST EUREKA 95503	0.40	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00908301	3213 PROSPECT AV EUREKA	0.24	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00908302	3221 PROSPECT AV EUREKA	0.31	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00908303	3229 PROSPECT AV EUREKA	0.17	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
00913111	2315 UNION ST EUREKA	0.36	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
01024409	2925 F ST EUREKA	0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
01105510		0.59	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
01215105		0.67	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
01314103		0.42	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
01314104		0.42	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
01511108	2769 LUCAS ST EUREKA	7.04	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	7
01622208		0.16	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01821204		6.01	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
01826105		0.35	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	7
30103108		50.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
30103118	4750 FAIRWAY DR EUREKA 95503	64.53	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	7
30110107	EUREKA	4.08	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	7
30701114		155.85	Redwoods Junior College	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	7
00101115		0.09	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00116107		0.17	Eureka City Of	Rain Barrel	6
00116116		0.56	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00116117	921 WATERFRONT DR EUREKA	0.94	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00116210		0.61	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00211104		0.30	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00211404		0.17	Humboldt County Office Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00211501		0.15	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00213406		0.11	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00223121		0.05	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	6
00224102		1.61	Northwestern Pacific Railroad Co	Rain Barrel	6
00224106		3.57	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00224107		1.97	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00224113	1535 WATERFRONT DR EUREKA 95501	9.46	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00306227		2.85	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00519103		0.61	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00519104		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00519105		0.40	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00519106		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00519107		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00602102		0.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00602103		0.11	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00602104		0.52	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00602106		0.45	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00602107		0.51	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00602216		0.38	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00603103		0.17	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00609301		0.60	Humboldt County Board Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00622101		9.02	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	6
00705105		1.09	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00705109		3.39	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00705110		2.32	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00706102		1.49	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00707103		2.76	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00708116	1925 TRUESDALE ST EUREKA	1.21	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
00805215		1.47	Eureka City Of	Rain Barrel, Trash Capture Devices	6
00806101		0.31	Eureka City Of	Rain Barrel, Trash Capture Devices	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00808109		0.08	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00823303		0.15	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
00909131	717 SOUTH AV EUREKA	8.16	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00910118		11.70	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
00911106		2.39	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
00915119		0.27	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00915144		4.56	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
00924101		3.09	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01102301		1.35	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01118201	1020 WOOD ST EUREKA 95501	1.37	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01207205		0.73	Eureka City Of	Rain Barrel	6
01207211		0.31	Eureka City Of	Rain Barrel	6
01207225		1.05	Eureka City Of	Rain Barrel	6
01209204		0.61	Eureka City Of	Rain Barrel	6
01224101		2.93	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01224104		2.56	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01224106		0.57	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01225104		1.82	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01225110		0.81	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01225111		0.81	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01225112		0.80	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
01310106		0.75	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01310107	2020 WATSON DR EUREKA	3.07	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01314102		0.43	Eureka City Of	Rain Barrel	6
01314105		0.42	Eureka City Of	Rain Barrel	6
01316101		8.65	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01316103		12.91	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01316104		4.38	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01316105		0.41	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01323101	95501	10.15	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	6
01421308	95501	10.58	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01703101	3750 HARRIS ST EUREKA 95503	40.69	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01707105	2501 CYPRESS AV EUREKA 95503	4.86	Humboldt County School Dept	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
01707106		5.15	Humboldt County School Dept	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01807103	FOXWOOD DR EUREKA	4.22	Cutten School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	6
01808307	4158 WALNUT DR EUREKA	0.32	Cutten Elementary School Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	6
01808308	4182 WALNUT DR EUREKA	3.06	Cutten School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	6
01911417		0.00	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01927101		1.38	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01927103		0.65	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01927104		6.10	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01927105		5.82	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01932111		0.30	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01932113		1.33	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01933102		1.12	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01933106		0.46	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
01933107		0.69	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30001107	5055 WALNUT DR EUREKA	2.66	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30001109		1.21	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30001110		0.05	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30001201	2500 CYPRESS AV EUREKA 95503	30.00	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30209108	5230 VANCE AV EUREKA	7.75	South Bay Union School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
30217138		37.29	Eureka City Of The	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	6
30313105	2060 RIDGEWOOD DR EUREKA	12.12	Cutten School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	6
30313109	6400 SESAME LN EUREKA 95503	1.90	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	6
30606113	6550 SPRING ST FIELDS LANDING	2.09	State Of California	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30607135		0.34	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30621101		1.19	California State Of Highway	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6
30638148		0.57	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	6

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30639114	6077 LOMA AV EUREKA	10.05	South Bay Union School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	6
40503206		6.16	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	6
00101108		0.35	Eureka City Of	Rain Barrel, Conservation Setback	5
00101113		0.31	Eureka City Of	Rain Barrel, Conservation Setback	5
00101205		0.21	Eureka City Of	Rain Barrel, Conservation Setback	5
00101208		0.57	Eureka City Of	Rain Barrel, Conservation Setback	5
00219132		1.19	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
00223111		1.17	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
00306226	1 MARINA WY EUREKA	26.26	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
01223202		0.95	Eureka City Of	Rain Barrel	5
01224102		0.78	Eureka City Of	Rain Barrel, Conservation Setback	5
01401101		5.06	United States Of America Fish	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01401102		7.25	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01402101		1.69	United States Of America Fish	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01402102		18.62	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01403101		8.50	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01403102		0.89	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
01403104		2.04	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01404101		6.43	United States Of America Fish	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01404102		0.66	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
01405101		9.46	United States Of America Fish	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01405103		1.84	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
01406102		1.61	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01406103		7.27	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01407105		1.79	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
01410101		9.58	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01410102		1.80	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
01411101		1.10	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01411102		1.22	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01411103		1.09	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01412101		10.22	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01412102		1.30	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01418203		0.01	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01418210		0.11	Humboldt Comm Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	5
01420316	95501	2.56	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01430102	3575 PARK ST EUREKA 95501	19.46	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01703113		71.64	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01710203		5.22	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
01710206		22.86	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01710207	JACOBS AV EUREKA	15.17	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01710208		1.30	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
01710211		104.29	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01715107		6.74	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
01932105	2400 HILFIKER LN EUREKA	6.21	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01933101		0.80	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01933108		13.54	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
01933109		2.21	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
30001117		23.25	Humboldt Community Services District	Rain Barrel, Conservation Setback	5
30001124		226.57	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
30103113		2.18	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
30103136		0.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
30215111	815 PINE HILL RD EUREKA 95503	3.17	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
30217101		46.36	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
30217102		1.80	Eureka City Of The	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
30217125		3.65	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	5
30218102		18.16	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
30218130		4.61	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
30218131		5.27	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30218136		4.66	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
30218138		40.22	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
30218140	5300 TOOBY RD EUREKA 95503	37.88	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
30513126	6000 S BROADWAY EUREKA 95503	0.12	Humboldt Comm Serv Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	5
30513139		0.37	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	5
30514102		4.53	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
30514105		110.94	Humboldt Bay Harbor Recr & Cons Distpl	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
30516101		34.45	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
30518103		2.20	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
30518105		49.58	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	5
30520118		0.80	State Of California & State Lands Commission & Hum	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30710109	160 RAILROAD AV FIELDS LANDING 95537	1.89	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
40217110	4850 ST HWY 101 EUREKA	113.16	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
40227101		166.49	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
40503107		11.60	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
40503109		39.50	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
40503110		40.75	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
40503207		18.54	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
40503208		32.30	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	5
40506104		38.72	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
40506106		336.85	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	5
50124118		11.02	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
50124119		7.85	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
50124120		109.63	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	5
00116103		0.05	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00116108		0.03	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00116109		0.64	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
00119105		0.80	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00119506		0.15	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00119507		0.16	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00121210		0.23	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00121212		0.32	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00121402	1111 2ND ST EUREKA 95501	0.27	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
00203401		0.31	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00207405	1835 6TH ST EUREKA 95501	0.30	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00207406		0.17	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00207407		0.17	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00211402	1808 6TH ST EUREKA 95501	0.11	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00211403	1820 6TH ST EUREKA 95501	0.39	Humboldt County Office Of Education	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00213408	2104 4TH ST EUREKA 95501	0.18	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00306219		2.94	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	4
00408406		0.74	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00408410		0.20	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00416102	330 GRANT ST EUREKA 95501	0.18	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
00424402		1.17	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
00513313		0.28	Eureka High School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00523103		0.25	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
00709106		0.10	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
00709107		0.41	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
00709108		0.10	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
00709109		0.06	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00709112		0.11	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
00913109		0.41	Housing Authority Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01018306	2944 D St EUREKA 95501	0.13	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01018307	2956 D St EUREKA 95501	0.15	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01105506	2933 H ST EUREKA	0.13	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01105508	2925 H ST EUREKA	0.11	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01105602	2910 H ST EUREKA	0.33	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01106201	3039 H St EUREKA 95501	1.35	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01107303	730 HARRIS ST EUREKA 95503	0.17	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01122303		3.07	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
01310109		2.47	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
01310110		0.69	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01313302		0.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
01322107	95501	0.14	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
01423111		0.78	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01424212	1475 TERRACE WY EUREKA 95501	10.56	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01426314		2.89	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
01429102	3559 PARK ST EUREKA 95501	1.05	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01501111		0.01	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
01502114		0.33	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01502209		0.07	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
01503101	3100 PARK ST EUREKA 95501	7.74	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
01523131		1.44	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
01810107		0.05	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	4
01822303		4.03	Eureka Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
01932101		0.74	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
01932104		0.14	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
30001127		43.44	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
30026207		0.81	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30112106		0.23	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
30127128		0.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
30128101		1.42	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30207110	755 HERRICK AV EUREKA	0.34	Humboldt Fire District No 1	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	4
30302231		0.10	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30303301		0.07	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30303333		0.16	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30326004		1.15	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30618145	2507 DONNA DR EUREKA 95501	0.21	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30620139		0.74	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30620142		4.54	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	4
30620180		10.31	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30620181		0.09	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30622106	350 SOUTH BAY DEPOT RD FIELDS LANDING	9.50	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30702122		13.22	Redwood Junior College	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30704108		0.47	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30704201		12.36	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30704203		0.84	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30704204		1.66	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30704205		0.35	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
30704206		0.21	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
30704207		0.13	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
30705112		3.13	Redwoods Junior College	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30705204		0.24	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
30710107		0.01	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
40225101	75 GREENWOOD HTS DR EUREKA	10.18	Freshwater School Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
40308124		12.30	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
40508140		21.70	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
40508156	5775 CUMMINGS RD EUREKA 95503	89.91	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	4
40520402	2190 FRESHWATER RD FRESHWATER	0.04	Garfield School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
40520403	2200 FRESHWATER RD FRESHWATER	0.99	Garfield School Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
40520408	92 GRANGE RD FRESHWATER	0.72	Garfield Elementary School District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	4
00116115		3.11	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00223110		0.83	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00224115		3.94	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00307205		2.93	Eureka City Of Ld	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00308201		5.29	Eureka City Of Ld	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00705106		14.70	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
00706105		9.34	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00706106		5.17	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00707113		5.68	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00707114		12.65	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00708101		1.27	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00708113		0.26	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00708114		0.13	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00708115		0.24	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00709102		1.44	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
00709103		1.69	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00709105		0.10	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
00709111		1.94	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
01407115		0.49	California State Of Hwy	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
01409102		2.69	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01506101	3570 PARK ST EUREKA 95501	15.60	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
01517101		6.16	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
01618102		1.23	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
01619104		0.64	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
01620105		0.60	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
01707110		8.22	Humboldt County Of	Rain Barrel	3
01708201		1.52	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
01710209		31.14	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
01715103		1.28	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
01715104		0.72	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
01813119		4.51	Humboldt County Of	Rain Barrel, Trash Capture Devices, Conservation Setback	3
01815219		0.33	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
01932109		1.59	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01932112		6.63	City Of Eureka	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
01932114		5.37	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
30029130		0.19	Humboldt County Of	Rain Barrel	3
30104103		0.75	Humboldt Community Services Dist	Rain Barrel	3
30218112		15.79	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30218128		0.14	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
30301104	5371 NORTH RIDGE RD EUREKA 95503	81.47	Humboldt County Of	Rain Barrel, Conservation Setback	3
30503110		0.21	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
30503111	5120 ELK RIVER RD EUREKA	83.60	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30513103		5.59	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30513140		19.91	Humboldt Bay Harbor Recreation & Conservation Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30516202		1.75	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30517109		3.50	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30520110		0.40	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30520111		1.87	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30639107		0.21	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
30704202		3.96	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30705201		33.54	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30705202		4.03	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30705205		28.03	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30706201		84.71	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30707101		226.33	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30708101		124.88	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30709101		219.87	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30709102		0.89	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
30710102	1 YARD RD FIELDS LANDING 95537	33.02	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
30711103		11.95	Humboldt Bay Harbor Rec & Cons Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
31120101		140.38	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
31121101	1020 RANCH RD LOLETA 95551	437.05	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40216101		21.14	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40216110		13.40	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40216112		116.72	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
40217107		11.42	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40224112		0.50	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40224113		1.39	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
40308109		97.05	Humboldt Waste Management Authority	Rain Barrel	3
40504106		103.90	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
40504107		282.73	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
40505108		244.29	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
40508152	95503	165.21	Humboldt Waste Management Authority	Rain Barrel, Conservation Setback	3
40508155	95503	4.74	Humboldt Waste Management Authority	Rain Barrel	3
40528105		8.29	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
50100001		2.62	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
50106114		12.61	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
50109106		1.97	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
50118103		0.70	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
50118104		1.96	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
50118106		3.09	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	3
50124109		5.94	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	3
50124112	95521	13.03	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	3
50124121		12.80	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	3
50124127		1.23	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	3
01703212		5.22	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
01707303		1.15	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
30001112		0.69	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
30001126		0.49	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30301209		256.33	Humboldt County Of	Rain Barrel, Conservation Setback	2
30301220		0.47	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
30622102		0.17	Humboldt Comm Serv Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
30622103		1.74	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
30705203		3.70	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
31105311		0.68	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
31403401		162.46	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31403404		308.64	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31404303		164.64	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31404305		243.55	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31404307		1.47	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31404401		659.78	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
31404503		251.08	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31405201		244.63	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31405202		414.80	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31406106		85.84	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31406109		209.90	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31406110		123.23	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
31406112		158.95	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31406207		68.84	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
31406405		66.51	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
31413113	9313 KNEELAND RD KNEELAND	3.13	Kneeland Elementary School Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
40305126		0.50	Humboldt Community Services District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
40316134		0.01	Humboldt Community Services Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
40405137	GREENWOOD HTS DR KNEELAND 95549	41.22	City Of Arcata	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
40406102		32.17	Arcata City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
40413140	6201 GREENWOOD HTS DR KNEELAND 95549	1.58	Kneeland Fire Protection District	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	2
40508141		18.26	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
40508144		81.60	Humboldt Waste Management Authority	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
40517104		0.27	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	2
01703211		18.31	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
01707113		38.91	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
01707204		3.08	Humboldt County Of	Rain Barrel	1
01707306		6.60	Humboldt County Of	Rain Barrel	1

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
01708102		3.74	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
01714104		2.07	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	1
01715109		0.91	Eureka City Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	1
01716402		3.18	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter	1
01717303		3.66	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Conservation Setback	1
30001119		1.97	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30513136		1.22	Humboldt Bay Harbor Recr & Cons Distpl	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
30513141		9.78	Humboldt Bay Harbor Recreation & Conservation Dist	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
30516210	407 KING SALMON AV EUREKA	2.37	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices	1
30517116		5.63	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
30705206		8.68	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
30706105		0.67	Redwoods Junior College	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
30706203		3.83	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30706204		2.22	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30707102		28.69	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
30707103		64.52	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30709104		33.91	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
30818102		70.43	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30826205		1.64	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31105208		187.79	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31105314		35.89	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31107301		409.52	United States Of America	Rain Barrel, Conservation Setback	1
31107302		225.96	United States Of America	Rain Barrel, Conservation Setback	1
31108201		502.39	United States Of America	Rain Barrel, Conservation Setback	1

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
31108202		141.26	United States Of America	Rain Barrel, Conservation Setback	1
31116102		2.77	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31118104		2.45	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
31118109		0.54	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
31119105		3.00	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
31119108		5.17	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31121102		54.94	United States Of America	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31121106		3.44	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31123111		3.20	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
31403505		7.52	United States Of America	Rain Barrel	1
31405101		602.43	United States Of America	Rain Barrel, Conservation Setback	1
40224203		0.30	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
40224205		0.28	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
40224212		0.30	Humboldt County Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench	1
40307102		25.39	Humboldt Waste Management Authority	Rain Barrel	1
40412138		398.86	Arcata City Of	Rain Barrel, Conservation Setback	1
40414103	95501	4.75	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
40414105		0.95	Northwestern Pacific Railroad Co	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Trash Capture Devices, Conservation Setback	1
50124126		42.97	California State Of	Rain Barrel, Permeable Pavers, Bioswale / Vegetation Swale, Tree Planter, Rain Garden, Leaky Pipe / Infiltration Trench, Conservation Setback	1
30301214		201.79	Humboldt County Of	Rain Barrel, Conservation Setback	0
31106404		56.11	United States Of America	Rain Barrel, Conservation Setback	0
31107108		98.43	United States Of America	Rain Barrel, Conservation Setback	0
31107204		374.80	United States Of America	Rain Barrel, Conservation Setback	0
31404107		29.36	United States Of America	Rain Barrel, Conservation Setback	0
31404205		81.91	United States Of America	Rain Barrel, Conservation Setback	0
31404608		31.06	United States Of America	Rain Barrel, Conservation Setback	0
31404609		26.64	United States Of America	Rain Barrel, Conservation Setback	0

APN	APN Address	Area (acres)	Land Owner	Suitable LID/BMP Types	Ranking Score
31404612		30.70	United States Of America	Rain Barrel, Conservation Setback	0

Appendix L Project Descriptions

Berta Road Flood Reduction Project

Addresses flooding, water quality, environmental enhancement. Project includes implementation of natural systems to redirect drainage to reduce flooding and provide water quality and habitat enhancements.

Estimated Cost: $600,000

Buhne Street Drainage Enhancement Project

Addresses flooding and water quality. LID/BMPs will be installed to reduce peak flows in the storm drain system and provide pollutant removal. Groundwater monitoring and soil borings will indicate if infiltration is possible in the area. Flood reduction will be achieved by replacing 24" RCP crossing Buhne Street at "M" Street with a new 27" RCP, adding new 24" RCP on Buhne Street between "M" Street and "J" Street, adding new 18" RCP on "J" Street between Buhne Street and Henderson Street, and adding new 18" RCP on "M" Street between Buhne Street and Hayes Street.

Estimated Cost: $495,300

C Street Storm Water Enhancement Project

The C Street Storm Water Enhancement project provides trash capture and water quality treatment at the foot of “C” Street. It includes: new trash capture devices with water quality treatment, replacement of existing 54" RCP with new 5'x 5' RCB from Humboldt Bay to First Street and with new 5'x 4' RCB from First to Fourth Street, replacement of existing 36" RCP with new 48" RCP between Fourth and Sixth Streets. Replace existing 36" RCP on "C" Street between Sixth Street and Eighth Street and on Eighth Street between "C" Street and "D" Street with a new 42" RCP, and replace 36" RCP on "C" in Caltrans right-of-way on Fourth Street and Fifth Street with 48" RCP. Inspection of the existing outfall will indicate if a new tide gate at the outfall will be included as a portion of this project.

Estimated Cost: $2,938,000

City of Eureka Red Curb Program

The Red Curb Program includes the City's red curb segments at intersections that provide opportunities for low impact development for storm water management. Figure 1 shows a typical cross section of an LID feature next to a roadway. The following pages include a more detailed project description of the program, and plan views of potential LID feature layouts.

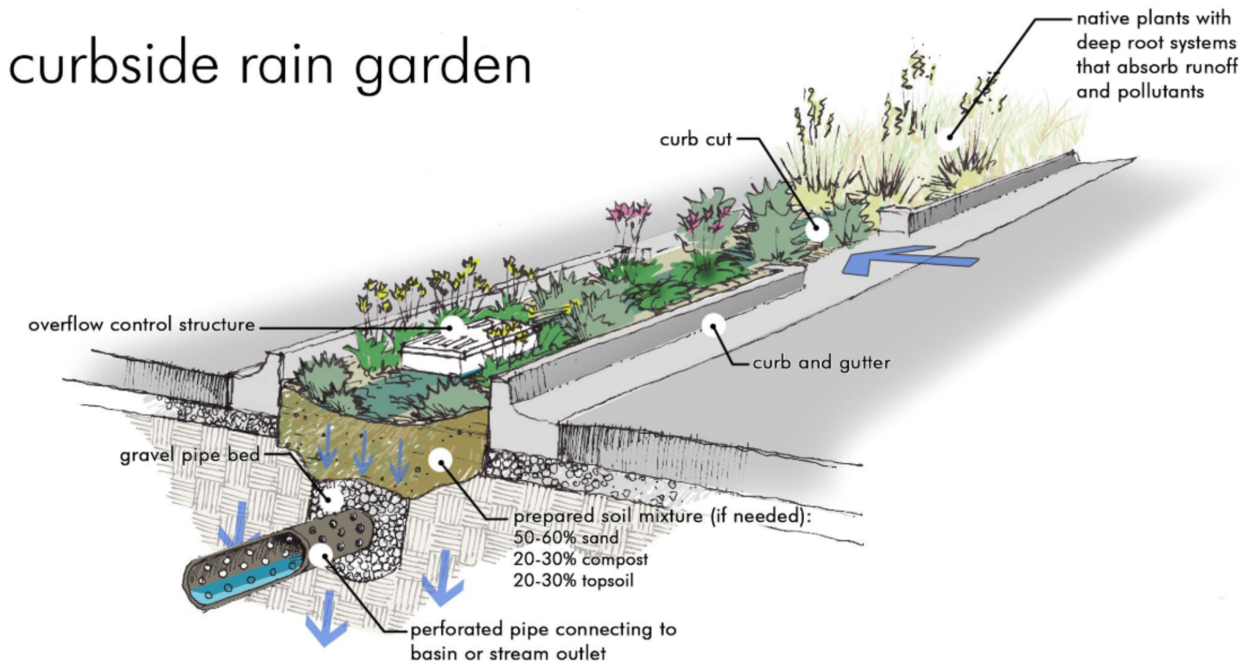
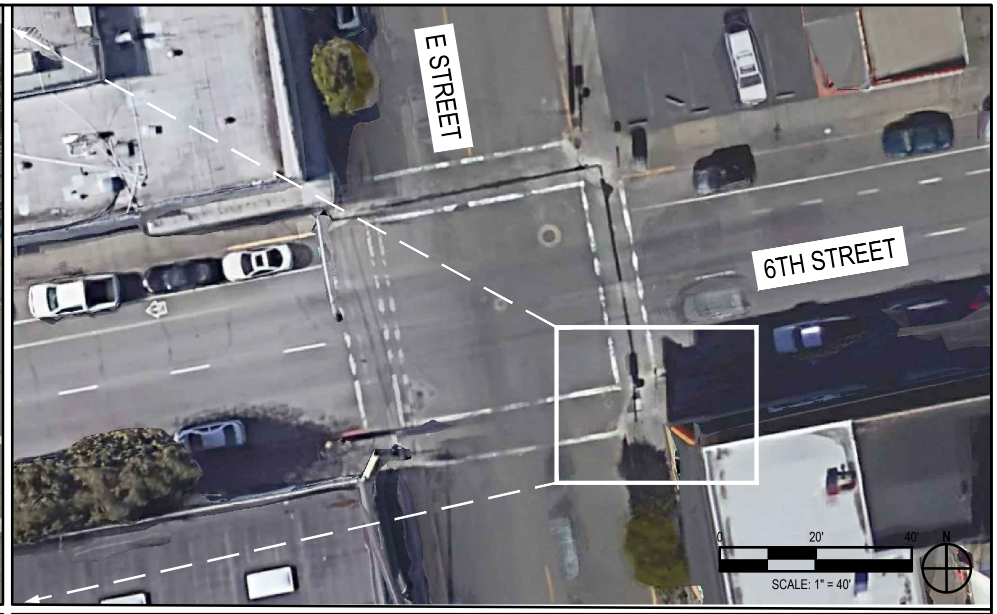


Figure 1. Typical rain garden next to roadway cross section.



Project Description:

Red curb segments located at intersections throughout the City of Eureka present opportunities for improvement of stormwater quality and pedestrian safety. Lengths of curb painted red to disallow parking may be reconfigured to accommodate LID rain garden features by extending the curb into the adjacent roadway and narrowing the sidewalk while still meeting ADA requirements. This adjustment of the sidewalk blended transition or curb ramp increases pedestrian visibility and shortens the length of pedestrian travel across traffic lanes. The corners of intersections being targeted for these improvements often include a curb cut subdrain and/or a drainage inlet. Typical schematics are provided for varying combinations of existing drainage infrastructure.

Site specific design considerations include but are not limited to existing drainage infrastructure, length of red curb, existing above and below ground utilities, accommodation of design vehicle turning radius, and turning sight distance.

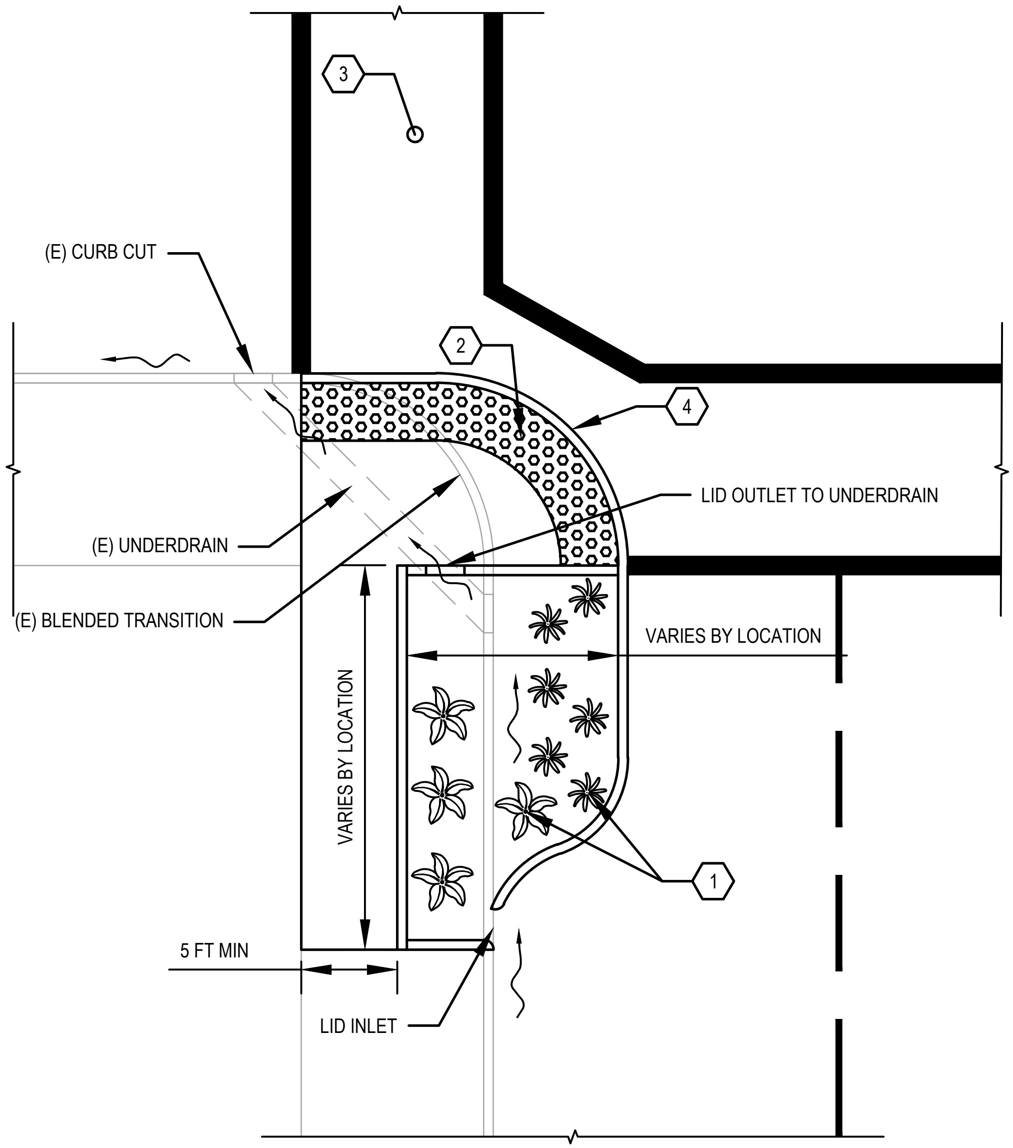
Cost Estimate (Curb Cut Subdrain with Two LID Features)

Item	Quantity	Unit	Unit Cost	Total
Mobilization and Traffic Control	1	LS	$5,200	$5,200
Miscellaneous Demolition and Removal	840	SF	$4.00	$3,400
Minor Concrete - 6" Sidewalk	215	SF	$20.00	$3,300
Minor Concrete - 4" Sidewalk	100	SF	$15.00	$1,500
Detectable Warning Surface	75	SF	$40.00	$3,000
Type A1-6 Curb	120	LF	$50.00	$6,000
Planting and Soil Preparation	355	SF	$25.00	$8,900
			Construction Subtotal	**$31,300**
Planning (20%)				$6,300
Design (30%)				$9,400
Contingency (25%)				$7,800
			Total Cost	**$54,800**

Note: Costs do not include utility relocation. This cost estimate assumes a twenty foot length of red curb and is for conceptual purposes only.

GHD

Project No. **11110741**
Report No.
Date **5/18/2018**



KEYNOTES

1. PLANTING PLAN TO BE DEVELOPED IN ACCORDANCE WITH THE HUMBOLDT LOW IMPACT DEVELOPMENT STORMWATER MANUAL (CURRENT EDITION).
2. BLENDED TRANSITION PER CHAPTER 11B 0F 2016 (OR MOST CURRENT EDITION) CALIFORNIA BUILDING CODE (CBC).
3. CROSSWALK DIMENSIONS AND PAVEMENT MARKINGS PER CAMUTCD (CURRENT EDITION).
4. SIDEWALK BULB OUT RADIUS TO ACCOMMODATE DESIGN VEHICLE TURNING MOVEMENTS SPECIFIC TO INTERSECTION BEING MODIFIED.

CURB CUT - SINGLE LID FEATURE

SCALE: 1" = 10'

GHD

Project No. **11110741**
Report No.
Date **5/16/2018**

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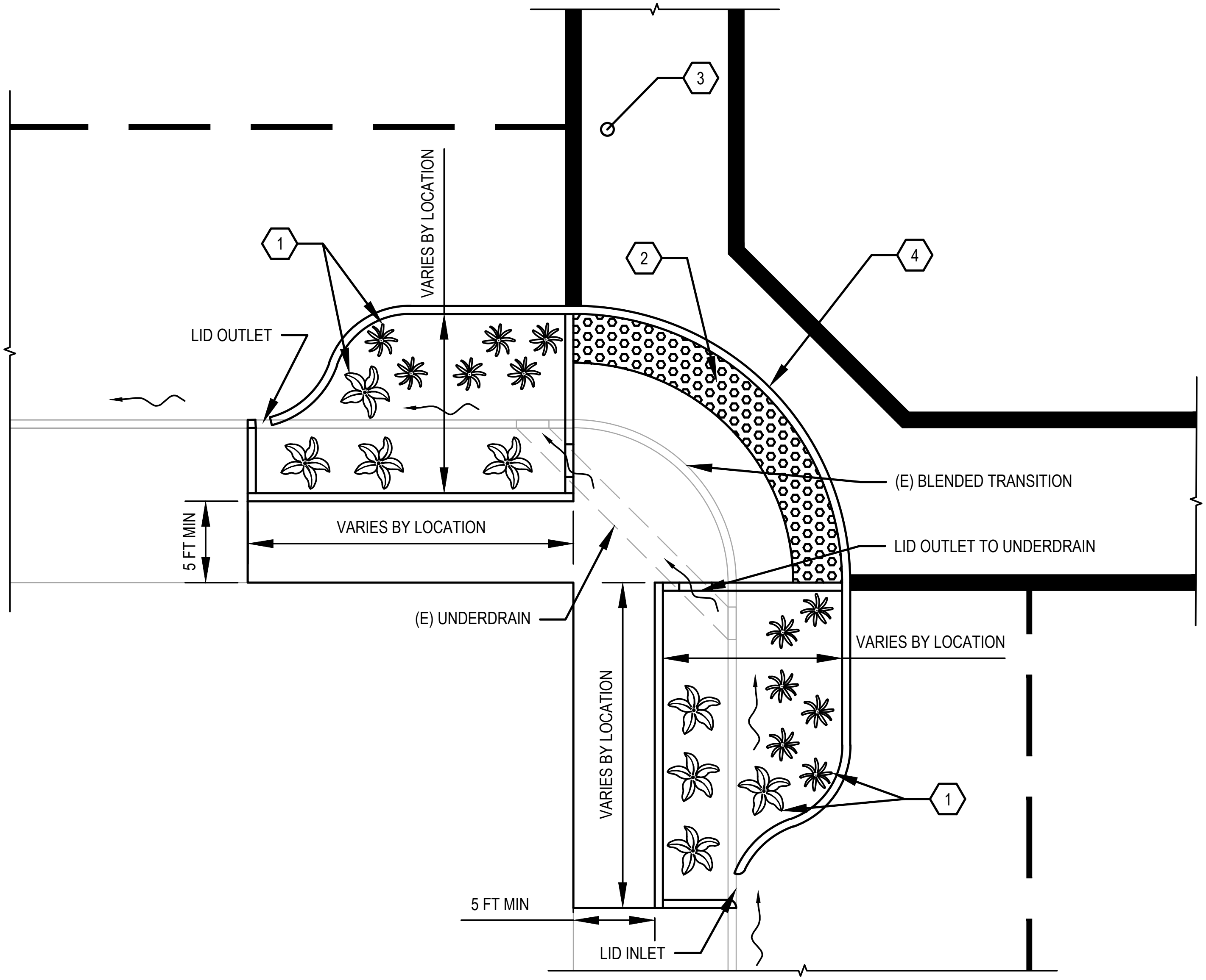

KEYNOTES

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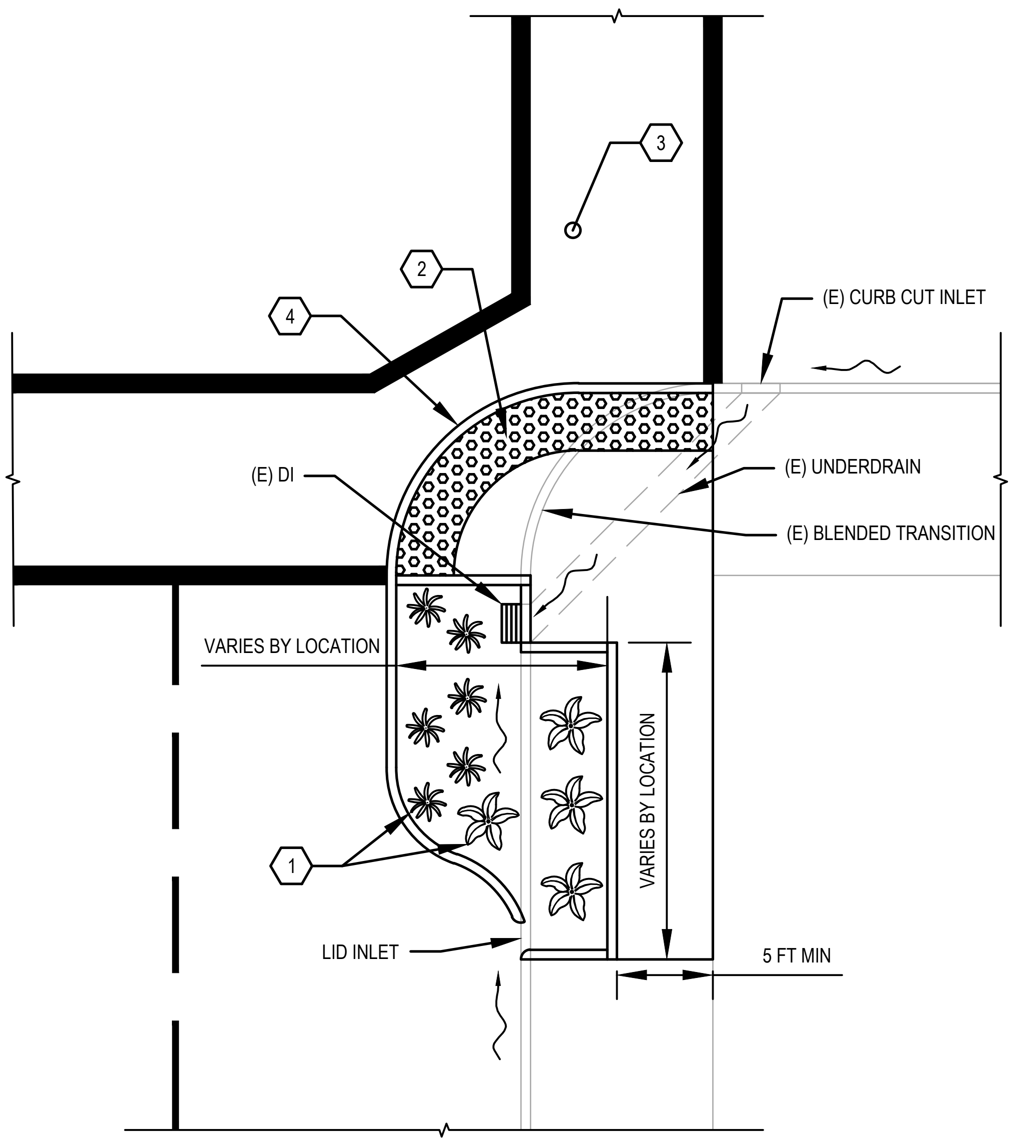
CURB CUT - TWO LID FEATURES

SCALE: 1" = 10'

GHD

Project No. **11110741**
Report No.
Date **5/16/2018**



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3. CROSSWALK DIMENSIONS AND PAVEMENT MARKINGS PER CAMUTCD (CURRENT EDITION).
4. SIDEWALK BULB OUT RADIUS TO ACCOMMODATE DESIGN VEHICLE TURNING MOVEMENTS SPECIFIC TO INTERSECTION BEING MODIFIED.

DRAINAGE INLET - SINGLE LID FEATURE

SCALE: 1" = 10'

Project No. **11110741**
Report No.
Date **5/16/2018**

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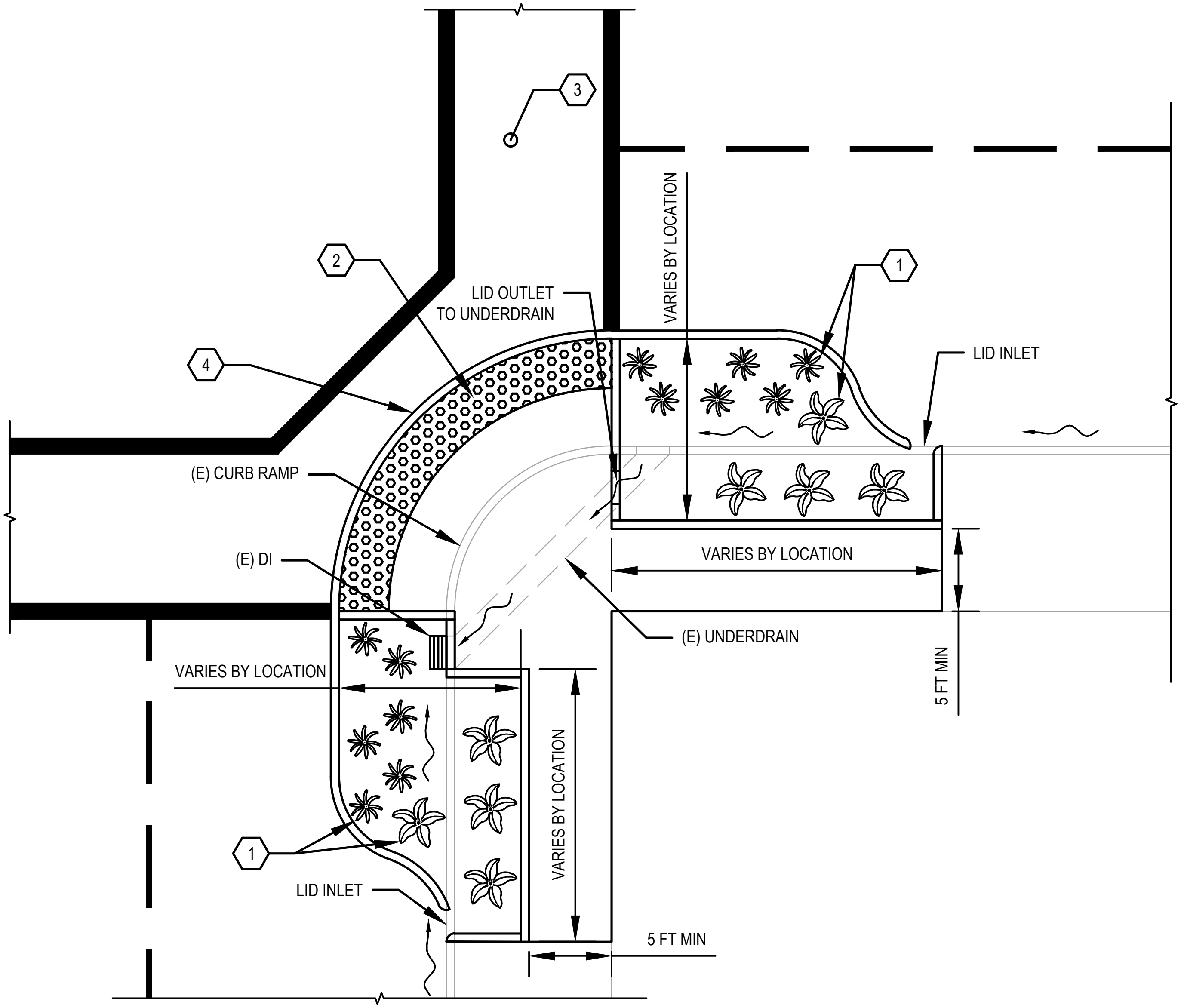

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3. CROSSWALK DIMENSIONS AND PAVEMENT MARKINGS PER CAMUTCD (CURRENT EDITION).
4. SIDEWALK BULB OUT RADIUS TO ACCOMMODATE DESIGN VEHICLE TURNING MOVEMENTS SPECIFIC TO INTERSECTION BEING MODIFIED.

DRAINAGE INLET - TWO LID FEATURES

SCALE: 1" = 10'

Project No. **11110741**
Report No.
Date **5/16/2018**

City and County Outfall Monitoring and Protection Program

Both the City of Eureka and Humboldt County maintain a series of stormwater outfalls to Humboldt Bay. These outfalls play a key role in the operation of both the City and County stormwater systems. The outfalls provide flood reduction benefits, especially with increasing sea levels, as well as being the last location stormwater can be treated prior to discharge to the Bay. The Outfall Monitoring and Protection Program consists of:

- Regular evaluation of the outfalls to identify those that may be impacted by high sediment loads upstream creating reduced capacity and preventing drainage.
- Development of restoration projects to reduce sediment loads to the outfalls and cleaning of the outfalls to restore capacity.
- Flood reduction evaluation to identify those outfalls for which tide gates are needed to reduce tidal flows upstream in the stormwater system, and installation of tide gates through time to mitigate for the potential backwatering effects of sea level rise.
- Water quality evaluations to identify those outfalls for which upstream water quality treatment is needed to further protect the Bay, and installation of water quality treatment and trash capture devices upstream of the discharge point.

Estimated Cost: $350,000

College of the Redwoods Storm Water Improvement Project

The College of the Redwoods resides within 276 acres of State land adjacent to Humboldt Bay. The campus itself encompasses 117 acres as developed land. The land starts at elevation 5 feet (NAVD88) and rises up to elevation of 420 feet. Of the overall property, over 25 acres is asphalt parking lot, over 44 acres are other types of impervious area, over 49 acres are other types of developed areas and 12 acres are managed pasture for cattle grazing. The developed areas of campus are on the northeast side of Tompkins Hill Road and occupy the upland areas of the 456 acre watershed. The drainage from these areas is conveyed through a series of ditches, culverts and streams that converge into three culverts that cross Tompkins Hill Road. The managed pasture area is the property to the southwest of Tompkins Hill Road and receives all drainage from the College of the Redwoods Campus. The managed pasture area drains to the northwest, into White Slough, and then into Humboldt Bay.

Typical watershed hydrology suggests that sediment from natural areas of the watershed is carried across the CR campus and into Humboldt Bay. In addition, runoff from developed areas of campus, including buildings, and parking areas, is expected to pick up pollutants from these areas and carry them to the bay as well. The 117 acres of impervious area increases peak storm runoff, exacerbating the potential for erosion and pollutant transport to the bay. Storm events routinely result in flooding of parking lots, walkways, and other developed areas of campus. Runoff from the managed grazing land where the campus drainage crosses can also contribute to pollutants entering the bay.

The strategy is to develop a CR Campus Stormwater Master Plan and implement improvements. The Master Plan will be developed to quantify the stormwater issues and opportunities in the context of current conditions and future conditions affected by climate change. A series of stormwater system improvements will be identified throughout campus and a multi-faceted cost-benefit analysis will be completed to evaluate economic and non-economic benefits and costs. The results will be prioritized into a Capital Improvement Plan, an Implementation Strategy, and Monitoring Recommendations. The highest priority improvements will be permitted, designed, and constructed under this project. Funding for future phases of improvements work will be then be pursued based on the Master Plan and readiness to proceed with additional work.

Estimated Cost: $695,000

Commercial Street Storm Water Enhancement Project

Addresses trash capture and water quality treatment at foot of “C” Street. Includes new trash capture device with water quality treatment. Includes replacement of storm drain pipes to reduce flooding and allow for new treatment units to be installed. Replace 30" RCP with 42" RCP (with tide gate) from Humboldt Bay to Third Street and with 36" from Third to Fifth Street, Caltrans replacement on Fourth Street and Fifth Street to 42" RCP, replace 18" RCP with new 21" RCP on Second Street between Commercial Street and "A" Street, replace 12" RCP with new 21" RCP on Third Street between Commercial Street and "A" Street, and replace 12/10" CMP on Commercial Street between Fifth and Sixth Street with new 15" RCP. Continue replacement of storm drain pipes along “C” Street up to 14th Street.

Estimated Cost: $623,800

Cooper Gulch Drainage, Environmental, and Community Enhancement Project

Addresses fish passage, habitat restoration, water quality, recreation, and climate change. This is a multi-benefit potentially phased project that incorporates riparian restoration, habitat improvements, recreational trails, and drainage improvements.

The Copper Gulch/1st Slough channel has been filled and placed in culverts to develop roads and accommodate alternate land uses. The channel at Myrtle Avenue has been modified and filled to flow into a 48-inch concrete pipe approximately 400 feet upstream and 25 feet downstream of the 75 foot wide road prism. The concrete pipe is a part of a stormdrain network with the outlet downstream of Myrtle Avenue. The system has been determined to be a barrier to salmonids and flows through subsurface pipes for approximately 500 feet. The channel at 14th Street exhibits similar characteristics, flowing through a 30” corrugated metal culvert and stand pipe. Two smaller undeveloped crossings, believed to be historical access routes, in the riparian area between 14th Street and Del Norte Street flow through 24-inch to 30-inch corrugated metal pipes and are perched at the outlet.

A stream inventory of Copper Gulch/1st Slough was conducted in 2007 by the California Department of Fish and Wildlife (CDFW). The report recommended that the stream be managed as an anadromous, natural production stream, establish a more complete and meaningful temperature regime, increase woody cover in pools and flatwater habitat units, increase canopy, inventory reaches above the surveyed section, and replace the Myrtle Avenue culvert to provide unimpeded fish passage (CDFW, 2007).

Data gaps and actions specifically recommended, in the CDFW stream inventory reports consisting of feasible fish barrier remediation options, summer water temperature monitoring and biological sampling need to be completed to better manage the sloughs and streams as anadromous natural production waterways.

Estimated Cost: $495,300

Duck and O Street Drainage Improvement Project

Addresses flood reduction, habitat protection, and habitat enhancement. Project includes repair of exposed storm drain line and environmental restoration near the replacement.

Estimated Cost: $95,000

E Street Drainage Enhancement Project

Addresses water quality, trash capture, and flooding. Project includes incorporation of LID features and trash capture and water quality devices within proposed pipe/ storage capacity improvements. Capacity improvements include: replace 24" RCP on "E" Street between Fourth Street and Fifth Street and on Fifth Street between "E" Street and "F" Street with 42" RCP, work with CalTrans to replace 24" RCP on 5th Street between “E” Street and “F” Street with 42" RCP; replace 12" storm drain on "G" Street between Sixth and Eighth Street with new 24" RCP, add new 21" RCP on "G" Street between Eighth Street and Ninth Street and on Ninth Street to "H" Street. Add new 21" RCP on "H" Street to Tenth Street and 18" RCP on "H" Street to Twelfth Street and on Twelfth Street to "I" Street, and add new 15" RCP on "G" Street in between Ninth Street and Tenth Street.

Estimated Cost: $611,600

Elk River Road at Wrigley Drainage Improvement Project

Addresses flooding, water quality, environmental enhancement. Project includes implementation of natural systems to redirect drainage to reduce flooding and provide water quality and habitat enhancements.

Estimated Cost: $495,000

Everding South Drainage Improvement Project

Addresses water quality and flooding. Where space allows, LID/BMP features will be included near the drainage inlets. Potential LID/BMP features include rain gardens, bioretention cells, and bioswales. Localized flooding would be addressed by installing a new (approximately 350 linear feet) 12" storm drain on Everding.

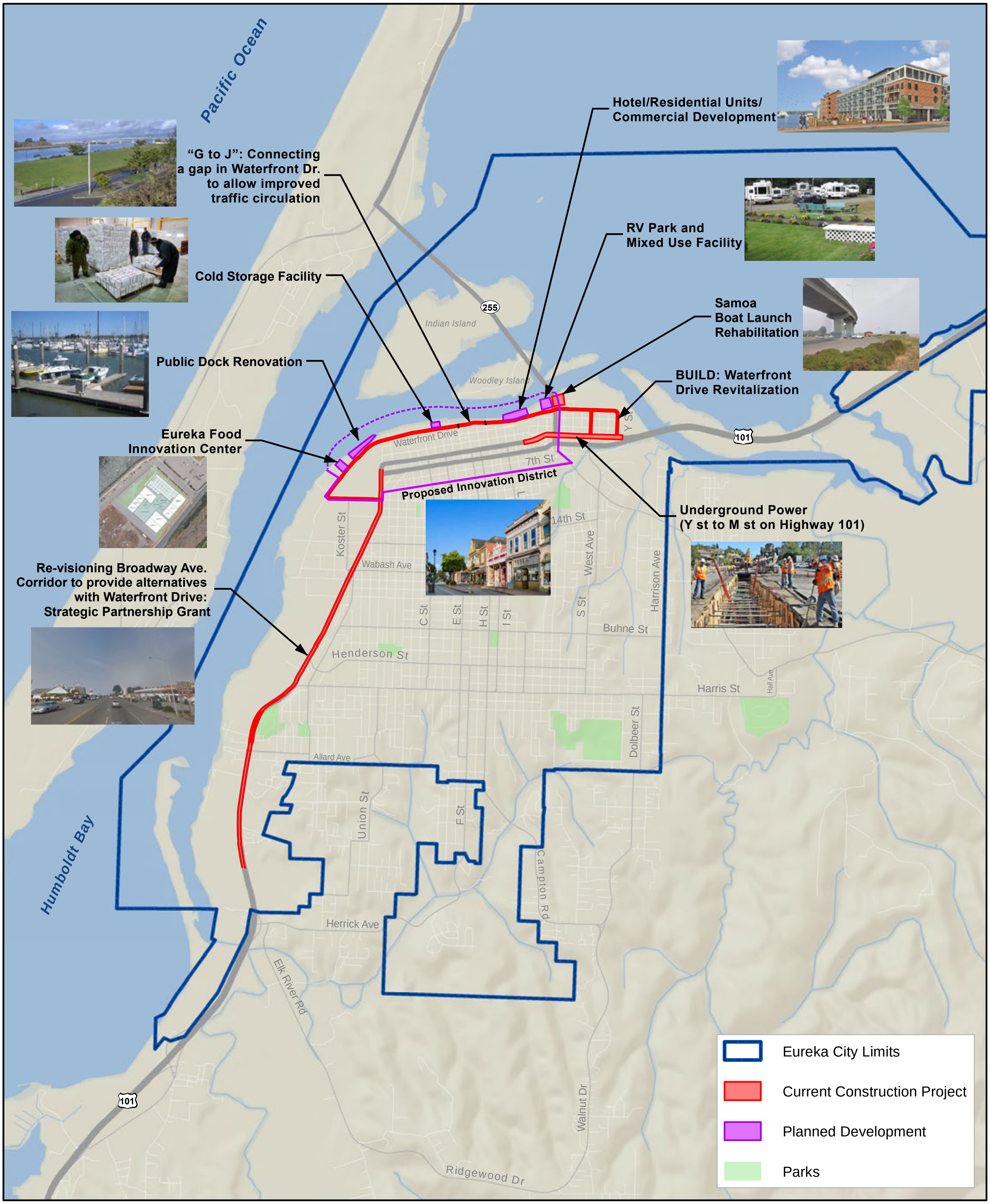
Estimated Cost: $75,000

Eureka Waterfront Drive Revitalization Project

The City of Eureka is planning a project that will lead to the complete revitalization of transportation infrastructure on Waterfront Drive (Figure 1). The project will construct two (2) miles of “complete streets” to include road realignment, Class II bike lanes, eliminate sidewalk gaps with a minimum six feet sidewalks, curb extensions/bulbouts to shorten crossing distances, water quality features such as bioswales and flow through planters to intercept pollutants prior to entering the bay. The goal of the City’s Waterfront Drive Revitalization Project is to continue the City of Eureka’s economic re-visioning to revitalize the Eureka waterfront, to enhance public use of the waterfront area by directing pedestrians, bicycles, and local traffic away from US Highway 101 to the waterfront to increase safety and ease movement of local goods and services through the City.

The proposed project is located in the Coastal Zone and is consistent with coastal development regulations. Reduced stormwater runoff is especially important to this project since storm drains empty directly into Humboldt Bay and reduction in runoff will help with the overall water quality of the bay. During the project design, it was extremely important to mitigate increased stormwater runoff. Within the two-mile project area, there are approximately fourteen water quality enhancement features, or bioswales, that filter runoff from streets in a series of planters to protect the water quality of Humboldt Bay. Additionally, there are approximately thirty solar powered LED street lights on Waterfront Drive that will be installed. The solar powered lights will reduce reliance on electricity from the grid and improve energy efficiency. Overall, the proposed project will reduce greenhouse gases by providing a less congested option for local vehicle traffic on a parallel route to Highway 101. Diverting motorized traffic will result in less start-and-stop traffic and congestion on the current motorized route (Highway 101), through the City of Eureka.

Estimated Cost: provided in table below



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EUREKA
CALIFORNIA

City of Eureka
BUILD Application

Planned Development and Current Construction Projects

Project No. 11125185
Revision No. D
Date 7/18/2018

FIGURE 1

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Print date: 18 Jul 2018 - 15:19

Data source: Copyright:© 2014 Esri; Getty images, Google Street view; City of Eureka 2040 GPU, Archetype PA. Created by: gldavidson

Broader Infrastructure Investments: Current Construction Projects and Planned Development

Current Construction	Cost	Date of Completion
"G to J": Connecting a gap in Waterfront Drive: 1st Waterfront Drive Revitalization Section	$3.3 million	2019-2020
12 Blocks of Underground Power	$3.5 million	Spring 2020
Humboldt Bay Dredging	$1.1 million	2018
Re-visioning Broadway Corridor to provide alternatives (Strategic Partnership Grant)	$365,000	2018-2020
Samoa Boat Launch Rehabilitation	$1.3 million	2019
BUILD Transportation Infrastructure	$11 million	2023
Planned Development	**Stage**	**Forecasted Completion**
Public Dock Renovation	Feasibility Study, Cost Estimate, Preliminary Designs	2025
Hotel/Residential Units/Commercial Development	Feasibility Study, Cost Estimate, Preliminary Designs	2020
RV Park and Mixed Use Facility	Cost estimate, Designs, Permitting, Environmental Review	2019
Cold Storage Facility	Architectural Designs, Cost Estimate	2023
Eureka Transit Authority Micro Grid	Feasibility Study, Plans, Specifications, Cost Estimate, Local Permitting	2025
Eureka Food Innovation Center	Market and Financial Feasibility Analysis	2023

Fields Landing Boatyard Stormwater Improvement Project

1.1 Introduction

The Fields Landing Boatyard is owned and operated by Humboldt Bay Harbor, Recreation and Conservation District. The boatyard is located at the south end of the community of Fields Landing in the Humboldt Bay, south bay area, the yard offers easy access to the Bay's Pacific Ocean entrance and to Highway 101. Fields Landing boatyard offers a variety of storage options; open air storage can accommodate boats up to 100 feet in length. Vessels may be hauled out of the water and moved via the mobile boat lifting hoist (150 ton capacity). An indoor facility is available for boat repair and can accommodate vessels up to 80 feet in length. Repair and maintenance services are available onsite.

1.2 Description of Proposed Project

The Fields Landing Boatyard Stormwater Improvement Project includes proposed stormwater system improvements at the Fields Landing Boatyard, located at 1 Yard Road in Fields Landing, California. The Fields Landing Boatyard site encompasses approximately 7.5 acres and is bound to the west and the north by Humboldt Bay, to the south by S. Bay Depot Road and to the east by an existing drainage ditch that drains northwest towards Humboldt Bay. The site is currently accessed from S. Bay Depot Road.

The proposed stormwater improvement project would be designed and constructed to capture and treat runoff from approximately 4.6 acres of impervious surface at the site, including approximately 4.4 acres of open asphalt pavement working surface and approximately 0.2 acres of existing buildings, including the office and indoor boat repair facility, and a small restroom facility.

The boatyard facility is relatively flat; however, the majority of the paved working surfaces are graded to drain away from Humboldt Bay to the west and towards the drainage ditch located to the east. There is one existing drain inlet located between the office building and the restroom building that intercepts the runoff from the paved working surfaces. The drainage inlet connects to an existing storm drain that runs along the south side of the existing office building and discharges to the drainage ditch to the east.

During the dry season, the existing drainage inlet is also used to capture process wash water from boat cleaning activities and convey it to the Humboldt Community Services District (HCSD) sewer system. There is an existing valve that is closed during the pressure washing operations to prevent the wash water from being discharged to the existing storm drain system. The pressure wash water is captured and processed through a filtration system prior to discharge to the sewer collection system.

The Fields Landing Boatyard facility has a Standard Industrial Classification (SIC) code 3732 for boat building and repairing activities, and stormwater runoff from the boatyard facility is subject to the stormwater regulations set forth in the General Permit for Storm Water Discharges Associated with Industrial Activities (General Industrial Permit, Order No. 2014-0057-DWQ). Based on the 2016-2017 monitoring and reporting results for the facility, the facility currently has a Level 2 status for stormwater discharges of total copper and total zinc.

The proposed stormwater improvement project would include the implementation of stormwater treatment best management practices (BMPs) that would provide, at a minimum, the following two direct benefits as required to be considered for the Eureka Area Watershed Storm Water Resource Plan:

1. Increased filtration and treatment of runoff, and

2. Nonpoint source pollution control

The proposed stormwater improvement project includes the following components:

1. Installation of additional drain inlets and storm water separator and conveyance systems;

2. Construction of stormwater retention basins; and

3. Potential asphalt resurfacing of specific active open pavement working surfaces.

1.2.1 Installation of New Drain Inlets and Storm Water Separator and Conveyance Systems

There are a number of options for capturing and conveying stormwater across the site that would allow for better and more direct removal of potential stormwater pollutants. The installation of new drain inlets and a new stormwater conveyance system throughout the site would provide opportunities to implement storm water capture and treatment BMPs that would help the facility comply with the current stormwater discharge criteria. The use of additional BMP treatment devices at each drain inlet, such as hydrodynamic separators and/or metal absorption media filters, would reduce the direct discharge of pollutants from the site. Two preliminary concept level options for new drain inlets and storm water separator and conveyance systems have been developed.

1.2.2 Construction of Stormwater Retention Basins

The State Water Resources Control Board (SWRCB) recently proposed amendments to the existing IGP to allow dischargers to implement specific compliance options to demonstrate compliance with the IGP (the amendments are still currently under review and have not yet been adopted).

The compliance options proposed in Attachment I of the amendment include both an on-site compliance option and an off-site compliance option. The on-site compliance option allows dischargers to implement on-site BMPs for capture and use, infiltration, and/or evaporation of storm water associated with industrial activity. The on-site compliance option requires that the BMPs maintain the effective capacity to capture, infiltrate and/or evapotranspire the volume of runoff produced up to and during the 85th percentile 24-hour precipitation event. The on-site BMPs must also be able to recover capacity within a 24-hour period.

There are a number of on-site locations at the boatyard facility where stormwater basins could be constructed to provide retention, infiltration, and evapotranspiration of stormwater. Site selection will depend primarily on the underlying soils at each proposed basin location and determination of whether the proposed retention basins would be able to infiltrate the captured stormwater and effectively recover capacity within a 24-hour period.

The 85th percentile, 24-hour storm event for the Humboldt County general area is estimated to be approximately 0.65 inches, or 0.054 feet. In order to effectively capture and retain the 85th percentile rainfall event for the estimated 4.6-acre (200,400-square foot) boatyard industrial drainage area, a minimum volume of approximately 11,000 cubic feet (0.25 acre-feet) of storage would be required.

The proposed stormwater retention basins located adjacent to the asphalt pavement areas, SW-1 (4,000 square feet), SW-2 (2,200 square feet) and SW-3 (1,800 square feet), encompass approximately 8,000 square feet total and could be used as the primary retention basins for the 85th percentile event. An alternative larger basin location, SW-4, encompassing approximately 18,000 square feet, could also be used to provide retention for the 85th percentile event. Ultimate selection, siting and sizing of the on-site retention basins will be dependent on further subsurface investigations and additional site survey information as needed for final design of these stormwater BMP features. Each retention basin system would be properly designed to provide retention of the 85th percentile, 24-hour event, and allow for bypass of larger storm events as needed to maintain compliance with the IGP requirements.

1.2.3 Potential Asphalt Resurfacing

Some of the existing asphalt surfaces at the boatyard facility could be resurfaced to prevent small particles from getting trapped in the asphalt during boat washing and boat maintenance activities. The paved surfaces are currently pressure washed following outdoor boat cleaning and maintenance activities, and the wash water is captured and treated prior to disposal through the HCSD sewer system. Resurfacing of the existing asphalt would allow for better recovery of small particles and materials that accumulate on the asphalt surfaces for proper treatment and disposal. Asphalt resurfacing may also be necessary to redirect surface runoff, to the new stormwater treatment BMP areas.

Estimated Cost: $1,000,000

Fields Landing Drainage Enhancement and Adaptation Project

Addresses, flooding, trash capture, water quality, and sea level rise. The Project includes modification of the existing tide gate on Railroad Avenue and evaluation of nearby outfalls that may be impacted by sea level rise and contribute to flooding. The Project includes installation of LID BMPs with trash capture and installation of new storm water pipes and culverts to increase storage capacity in the system between tidal cycles.

Estimated Cost: $900,000

Fifteenth Street Drainage Enhancement Project

Addresses flooding and water quality. LID/BMPs will be installed to reduce peak flows in the storm drain system and provide pollutant removal. Groundwater monitoring and soil borings will indicate if infiltration is possible in the area. Flood reduction will be achieved by replacing 24" storm drain discharging to Gulch near

Fifteenth Street and "M" Street with 30" RCP on Fifteenth Street discharging to gulch at "M" Street to "I" Street, replacing 21" RCP on "I" Street between 30" RCP on Fifteenth Street to Seventeenth Street, and replacing 12" storm drain on Seventeenth Street and north on "L" Street to 24" to gulch with 18" RCP on Seventeenth Street and "K" Street to Seventeenth Street and "L" Street and north on "L" Street to Fifteenth Street and "M" Street.

Estimated Cost: $567,300

G Street Drainage Improvement Project

Addresses water quality, trash capture, and flooding. Project includes: incorporation of LID features, trash capture devices, and water quality devices within proposed pipe/storage capacity improvements. Capacity improvements include: replace 24" RCP on Fifteenth Street between "F" Street and "G" Street and on "G" Street between Fifteenth Street and Seventeenth Street, 18" CMP on "G" Street between Seventeenth Street and Wabash Avenue and 15" CMP on "G" Street between Wabash Avenue and Del Norte Street with 30" RCP, add new 24" RCP on Del Norte Street between "G" Street and "I" Street, 15" RCP on "I" Street between Del Norte Street and Trinity Street, 21" RCP on "G" Street between Del Norte Street and Trinity Street, and 18" RCP on Trinity Street between "G" Street and "H" Street.

Estimated Cost: $825,700

H and Madrone Ave Drainage Improvement Project

Addresses water quality and flooding. Where space allows, LID/BMP features will be included near the drainage inlets. Potential LID/BMP features include rain gardens, bioretention cells, and biowswales. Localized flooding would be addressed by replacing existing 24"/18" pipe system with a new 30" RCP on "H" Street north to Manzanita Street. Project also includes redirecting surfacing groundwater during dry months to appropriate drainages. Features such as bioswales may be implemented to redirect dry weather runoff.

Estimated Cost: $149,700

Harris and Ingly Drainage Improvement Project

Addresses flood reduction, habitat protection, and habitat enhancement. Project includes repair of exposed storm drain line and environmental restoration near the replacement.

Estimated Cost: $90,000

Henderson Avenue/ Mauer Marsh Storm Water Enhancement Project

Addresses trash capture, water quality, flooding, sea level rise, and environmental restoration. Project includes addition of new trash capture device with water quality treatment within trash priority areas, flood improvement including incorporation of LID features where feasible; replace 36" RCP from Mauer Marsh to Broadway with new 42", coordinate with Caltrans to Replace 36" RCP across Broadway with new 42" RCP; replace existing 30" RCP with new 36" RCP on Henderson Street between Broadway and Central Avenue; replace 18" RCP on Henderson Street between Central Avenue and Spring Street with new 30" RCP; replace 15" RCP Central Avenue, Harris Street, and Prospect Street with new 30" RCP; extend 24" RCP on West Everding between Prospect Street and Elizabeth Street. Extend 18" RCP on West Everding Street between Elizabeth Street and Albee Street and obtain and easement and replace 36" RCP across Broadway with new 42" RCP at Henderson Street.

Estimated Cost: $1,201,200

Highland Avenue Area Storm water Enhancement Project

Project addresses water quality and flooding. The project is upstream of a Priority Trash Area. Enhancements include LID BMPs to treat for pollutant removal and slow flows by conveying runoff to an open ditch. Project includes new 36" RCP from outlet downstream of Gross Street to High Street and new 21" RCP Highland Avenue from Nevada Street to Glen Street and on Glen Street to Gibson Street.

Estimated Cost: $380,800

Humboldt Hill Storm Water Enhancement Program

1.3 Introduction

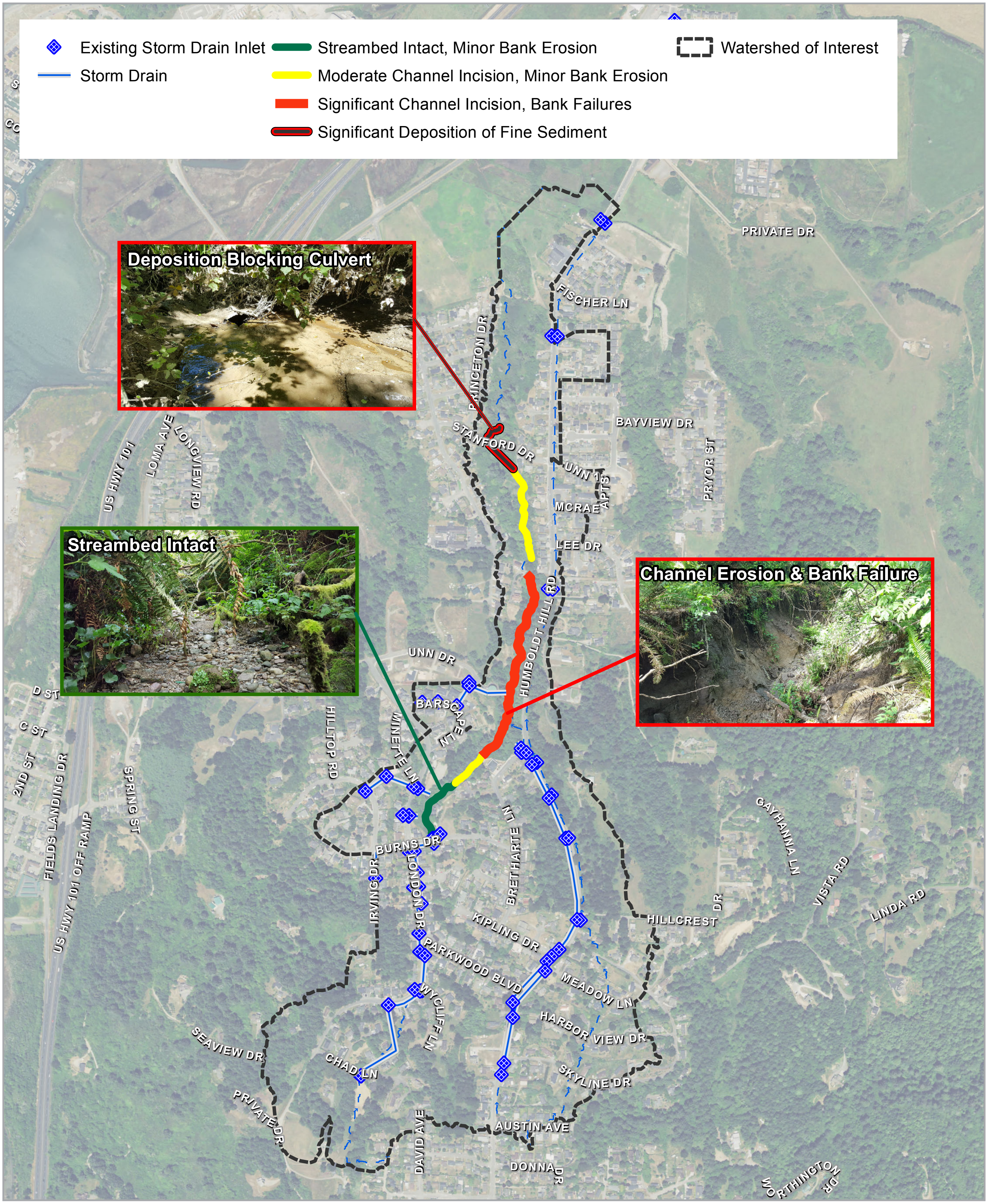
The Humboldt Hill watershed (220 acres) is largely developed with single family residential lots and asphalt roadways. Drainage is primarily conveyed through a storm drain system along London Drive and Humboldt Hill Road with multiple outfalls to the unnamed riparian drainage course. The developed watershed landscape has resulted in high intensity hydrographs that contribute to channel incision and bank failure in the upper drainage course and deposition of eroded sediment and reduction of culvert conveyance capacity in the lower watershed at Stanford Road. Field observations are summarized in Figure 2. Soils in the watershed are largely Hookton-Tablebluff complex and Tablebluff-Cannonball complex that are generally characterized as soils with slow infiltration and water transmission rates when thoroughly wet (NRCS Soil Survey, Date). These soils consist of a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.

1.4 Program Information

During field observations and data collection, it was noted that a conventional storm drain system with roadway drop inlets and storm drain pipes are the primary means of collecting and conveying storm water. This type of system results in high intensity hydrographs that exceed the natural hydrographs and contribute to channel incision and streambank erosion in the receiving upper drainage course. Projects within the Humboldt Hill watershed focus on methods to reduce the intensity of the hydrographs and stabilize or reduce erosion and channel incision.

1.4.1 Hydrographs Intensity Reduction Projects (Upper Watershed Projects)

The following projects aim to reduce the intensity of storm water flow into the receiving natural drainage course through retention of runoff in the upper watershed. Potential project areas for upper watershed projects are shown in Figure 3.



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City of Eureka
Stormwater Resource Plan
Humboldt Hill

Stormdrain & Drainage Course
May 7th-11th Field Assessment

Project No. **11110741**
Revision No. **-**
Date **06/04/2018**

FIGURE 2

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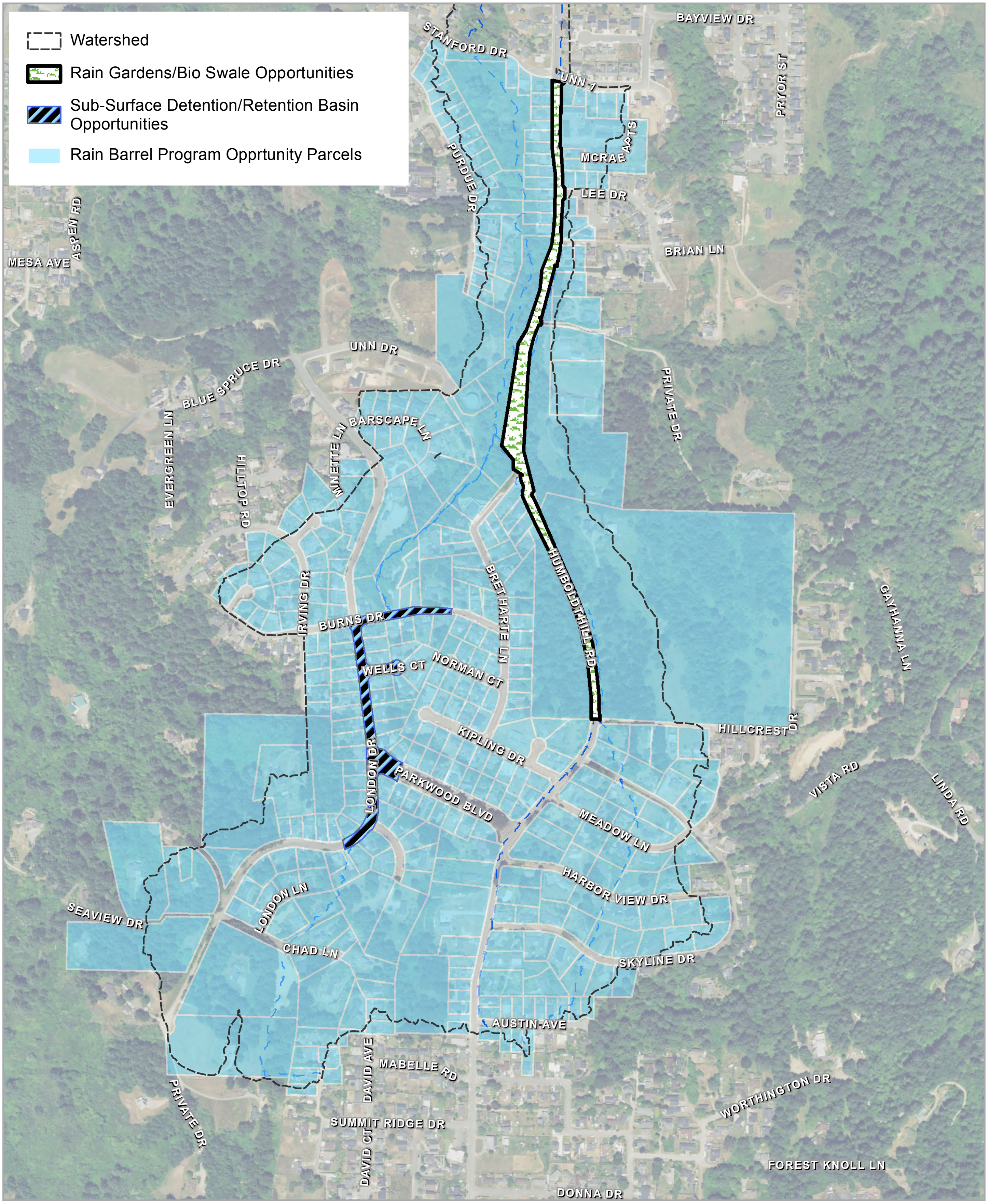
Data source: GHD, Stormwater Resource Plan Project Recommendations, 2018; GHD, Stormdrain Infrastructure Field Data, 2018; GHD, Watershed Delineation, 2018 . Created by: bvivyan



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Map Projection: Lambert Conformal Conic
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City of Eureka
Stormwater Resource Plan
Humboldt Hill

Hydrograph Intensity Reduction Projects

Project No. 11110741
Revision No. -
Date 06/04/2018

FIGURE 3

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Print date: 04 Jun 2018 - 14:30

Data source: Humboldt County, Parcels, 2018; GHD, Stormwater Projects, 2018 . Created by: bvivyan

Image 1. Example Rain Barrel at Downspout

Rain Barrels

Rain barrels can be used to collect rainwater from rooftops or other hard surfaces and store it for later use (Image 1). This low-cost system can be used to supplement non-potable water supply and help preserve the local watershed by storing rainfall. While rain barrels are commonly used in drought prone areas to supplement water demand, they can also help reduce the amount of runoff that is collected and sent into the storm water system, reducing peak flows and thereby reducing erosion and downstream deposition that impact public infrastructure.

Public agencies in northern California have provided rebate programs as incentives for homeowners to implement rain barrels. Examples include Bay Area Water Supply & Conservation Agency (BAWSCA) Rain Barrel Rebate, City of Santa Rosa Rainwater Harvesting Rebate, Sonoma County Sanitation District Rain Barrel Rebate, North Marin Water District Rainwater Harvesting Rebate, Marin Municipal Water District Conservation Rebates for Rain Barrels, City of Sacramento Rain Barrel Rebate, and City of Woodland Rain Barrel Rebate. Programs typically provide \$50 to \$200 in rebates, depending on the quantity of water stored.

Rain Gardens/Bio Swales/Porous Pavers

Rain gardens/bio swales are simple landscaping features that can be implemented to slow, collect, infiltrate, and filter storm water before it enters the storm drain system. The Multi-criteria Analysis (MCA) identified potential locations for these features. Ideal locations for rain gardens and bio swales are within the County right-of-way, outside the travel lane, where on-street parking does not significantly impact property owners and accessibility for maintenance (Image 2 and Image 3). The eastern edge of Humboldt Hill Road, between Hillcrest Drive and Carron Drive, provides potential opportunities to incorporate this type of project, utilizing the existing valley gutter and drain inlet locations. These opportunities could address a 14-acre drainage area. Rain gardens could be implemented immediately upstream of existing drain inlets, storing and treating a portion of the runoff and allowing overflow to enter the existing storm drain system.

Image 2. Example Rain Garden/Bioswale at Roadway Shoulder

Image 3. Example Rain Garden

Image 4. Example Porous or Permeable Pavers

In areas where on-street parking cannot be impacted, porous or permeable paving methods may be incorporated (Image 4).

Subject to property owner permissions, grades and appropriate drainage easements, a series of rain gardens may extend beyond the County right-of-way onto private property that could also capture, detain and treat a portion of the storm water that has already entered the existing storm drain system along the western edge of Humboldt Hill Road (Image 5). Rain gardens may incorporate concrete (Image 6) or be integrated into the existing landscape (Image 7). An additional 22 acres of run-off area could be addressed using this project approach.

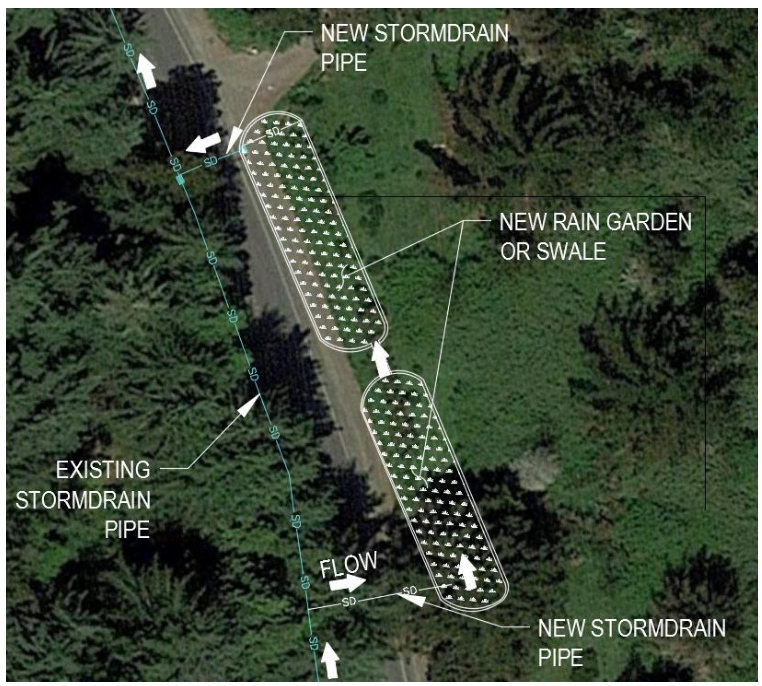


Image 5. Example Rain Garden/Bioswale Location Extending onto Private Property.

Image 6. Example Rain Gardens in Series.

Image 7. Example Rain Garden Integrated into Landscape.

Sub-Surface Detention/Retention Systems

Due to the project area soils having low infiltration rates and limited County right-of-way in the developed areas, such as along London Drive, storm water storage or retention is recommended over infiltration methods. Sub-surface retention systems provide opportunities to reduce storm water runoff by temporarily storing the storm water underneath the roadway, then slowly releasing similar to the undeveloped hydrograph (Image 8). However, this approach would require replacement of the roadway to implement this project. This project could also be implemented in areas of new development, under proposed roadways or other areas.

Image 8. Example Sub-surface Detention System

1.4.2 Drainage Course Stabilization Projects

Image 9. Observed Channel Incision and Bank Failures

Observations of the natural drainage course within the riparian areas indicated that decades of increased runoff have resulted in significant erosion, evidenced by the down-cutting of the channel multiple feet into the clay sub-soil layer and bank failures throughout the reach. This eroded sediment has been deposited downslope reducing culvert capacity under Stanford Drive.

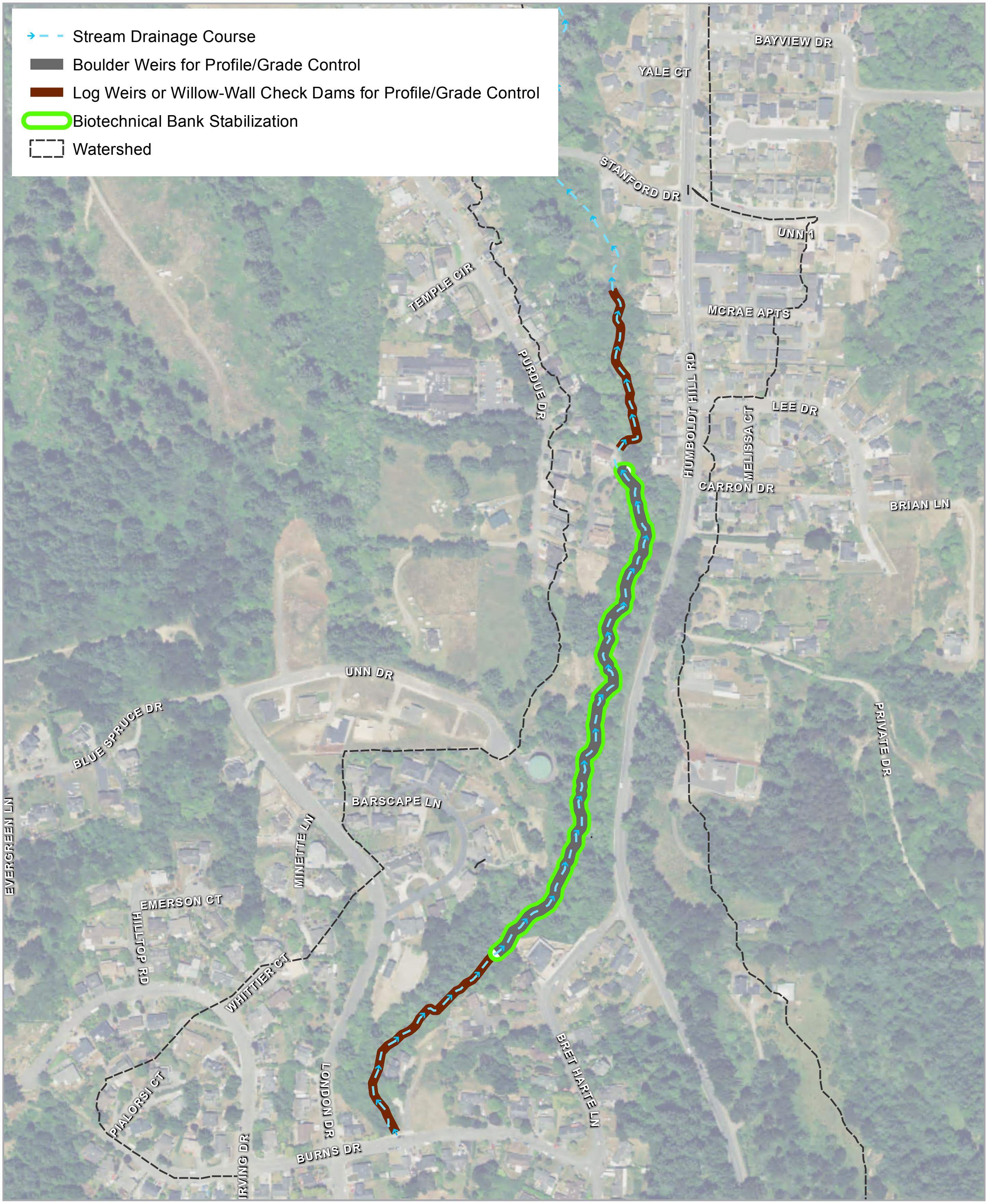
Image 10. Observed Low Gradient Reach with Gravel Deposition.

Short reaches, immediately upstream of grade control features, such as debris jams, demonstrate lower gradient channel profiles and settlement of gravel, more representative of the original natural drainage course.

Bank and channel stabilization can be achieved through various means depending on constraints, such as access, proximity to structures, severity of erosion and future sediment sources. Access throughout the drainage reach, from Burns Drive to Stanford Drive requires access through private property and many areas are very steep, severely limiting access with heavy equipment such as excavators and dump trucks. Select areas may be accessed by heavy equipment but require additional investigation to determine feasibility of these locations. The following projects identify structural and bioengineering stabilization methods for the natural drainage course and present site conditions that support these methods. Potential project areas for drainage course stabilization projects are shown in Figure 4.

Drainage Course Channel Grade Control

Stabilization of the drainage course profile, known as grade control, is a primary step to arrest head-cutting or channel incision and recruit eroded sediment from upstream sources. Grade control may be achieved by a single high-drop structure or multiple low-drop structures. Multiple low-drop structures typically have the advantages of lower cost for design and construction, lower environmental impacts, lower potential for morphological impacts, and no significant alteration of flows and sediment transport. Disadvantages include: bank stability (addressed by other means), difficulty siting of a series of structures, larger temporary impacts due to the larger footprint, and challenges to reconnect the channel and floodplain. Due to the lower morphological impacts and reduction in alteration to flows, multiple low-drop structures are recommended in reaches where access is provided.



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City of Eureka
Stormwater Resource Plan
Humboldt Hill

Drainage Course Grade Control & Bank Stability Projects

Project No. **11110741**
Revision No. **-**
Date **06/04/2018**

FIGURE 4

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Print date: 04 Jun 2018 - 14:35

Data source: GHD, Stormwater Projects, 2018; GHD, Watershed Delineation, 2018 . Created by: bvivyan

Grade control structures would likely need to be implemented using heavy equipment such as, large rock, sheet pile or large logs that will remain stable during high flows. Grade control options are as follows:

Boulder Weirs:

Boulder weirs are commonly used to stabilize the channel bed/creek profile. They may be used in series, creating a step pool system where sediment is captured in the pools and further down-cutting is reduced. Photos and a typical detail are presented below (Images 11 and 12).

Image 11. Example Boulder Weirs Implemented to Arrest Channel Incision.

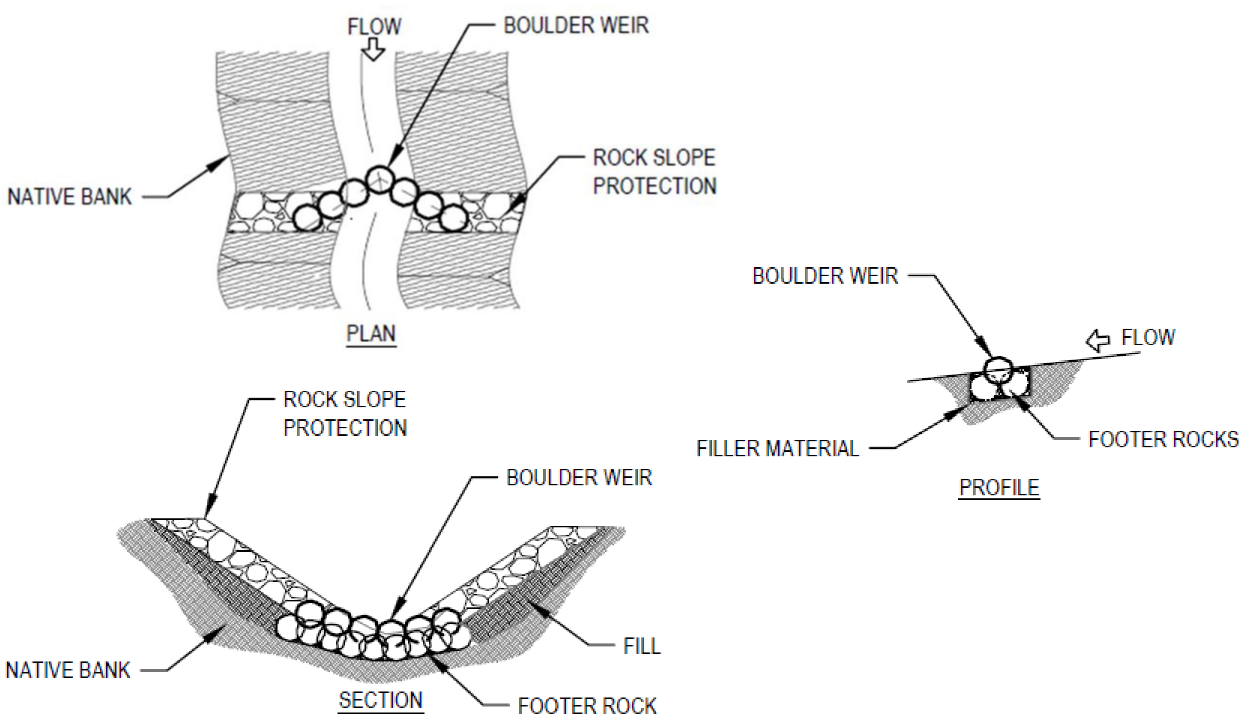


Image 12. Conceptual Plan, Section and Profile of Boulder Weirs.

Sheet Pile Cut-Off Wall with Rock Cap:

To prevent sub-surface piping and scour under the boulder weirs, cutoff walls may be proposed under each boulder weir (Image 13).

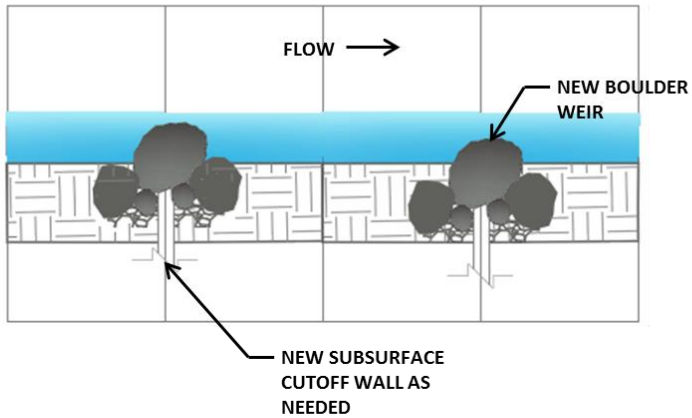


Image 13. Example Boulder Weir with Cut-off Wall to Prevent Piping.

Log Structures:

Log structures may also be used to stabilize the channel bed/creek profile. Similar to boulder weirs, they may be used in series, creating a step pool system where sediment is captured in the pools and further down-cutting is reduced. Photos and a typical detail are presented below (Image 14).

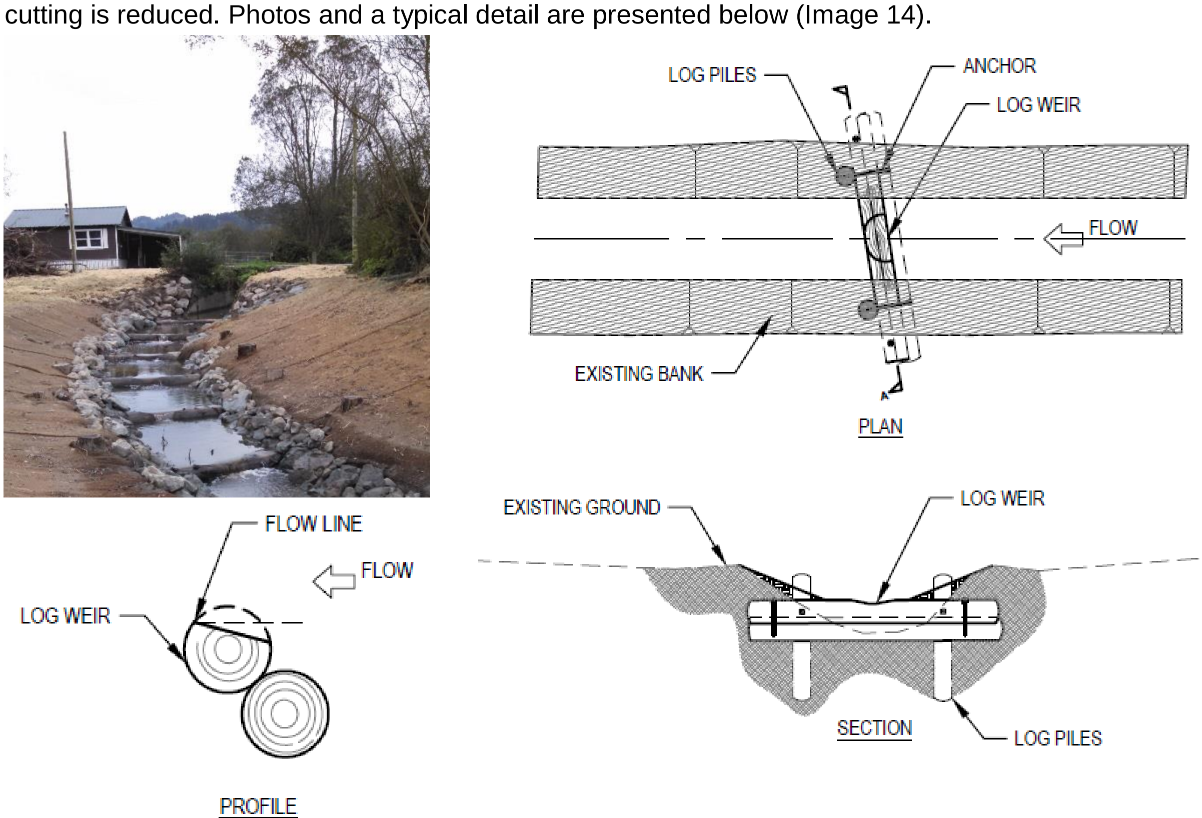


Image 14. Example Log Weir Photograph and Details.

Willow Wall:

An alternative to rock and log weirs, that does not require the use of heavy equipment, is a willow-wall check dam. Willow-wall check dams can be constructed with a mix of live and dead brush, wire, and willow posts. This method is recommended for reaches where access is limited to hand crews and less channel incision has occurred.

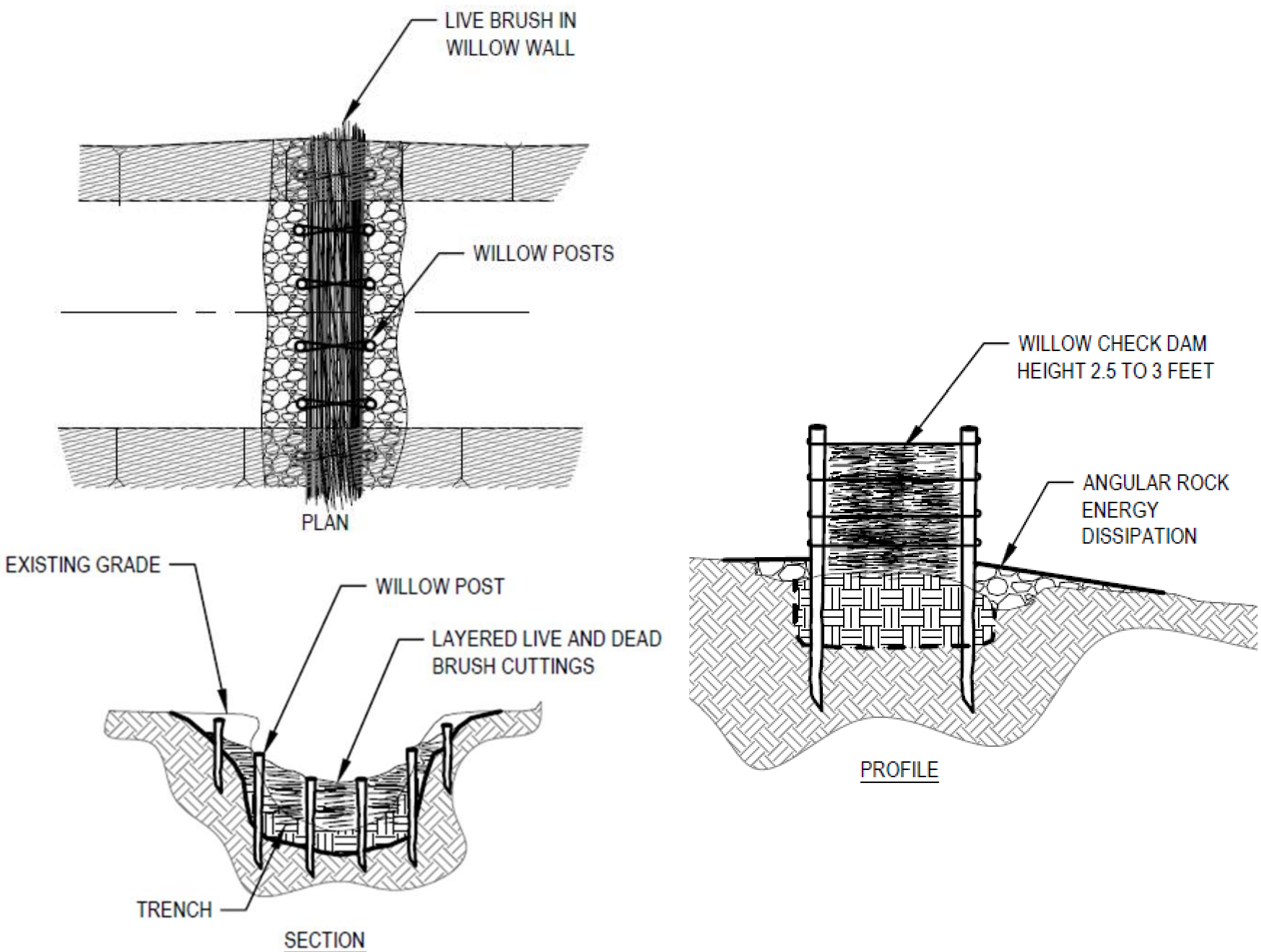


Image 15. Example Willow Check Dam for Profile Stabilization by Hand Crews.

Drainage Course Bank Stabilization

The following bank stabilization techniques are grouped by hard armored and biotechnical methods.

Hard Armored Methods

Hard armored methods include the use of rock, logs and or concrete. Due to the weight of materials, heavy equipment is usually required. These methods typically provide long-term protection and minimal maintenance, but require short term impacts to the stream corridor during construction.

Vegetated Rock Slope Protection

Along the Humboldt Hill drainage course, rock slope protection could be used immediately upstream and downstream of the grade control structures to provide additional protection of the grade control and reduce the risk of flow flanking and localized erosion around the grade control structure (Image 16). Rock slope protection typically extend up the bank, 1 foot above the design storm water surface elevation or bank full flow (1.5 to 2 year recurrence interval); however, sometimes further, depending upon the slope stabilization needs and the infrastructure at the top of bank.

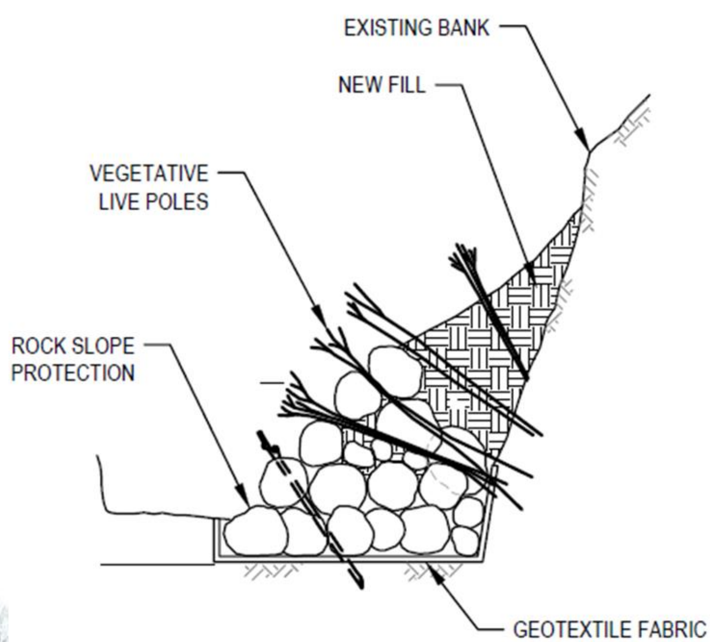


Image 16. Example Rock Slope Protection and Detail.

Log Cribbing

Log retaining structures may be implemented to protect streambanks from erosion (Image 17). Log cribbing is typically located on the outside of stream bends to protect the streambank from the impinging flow of the stream. Log cribbing can have live riparian species stakes planted between the logs, behind the structure and immediately adjacent to the cribbing.

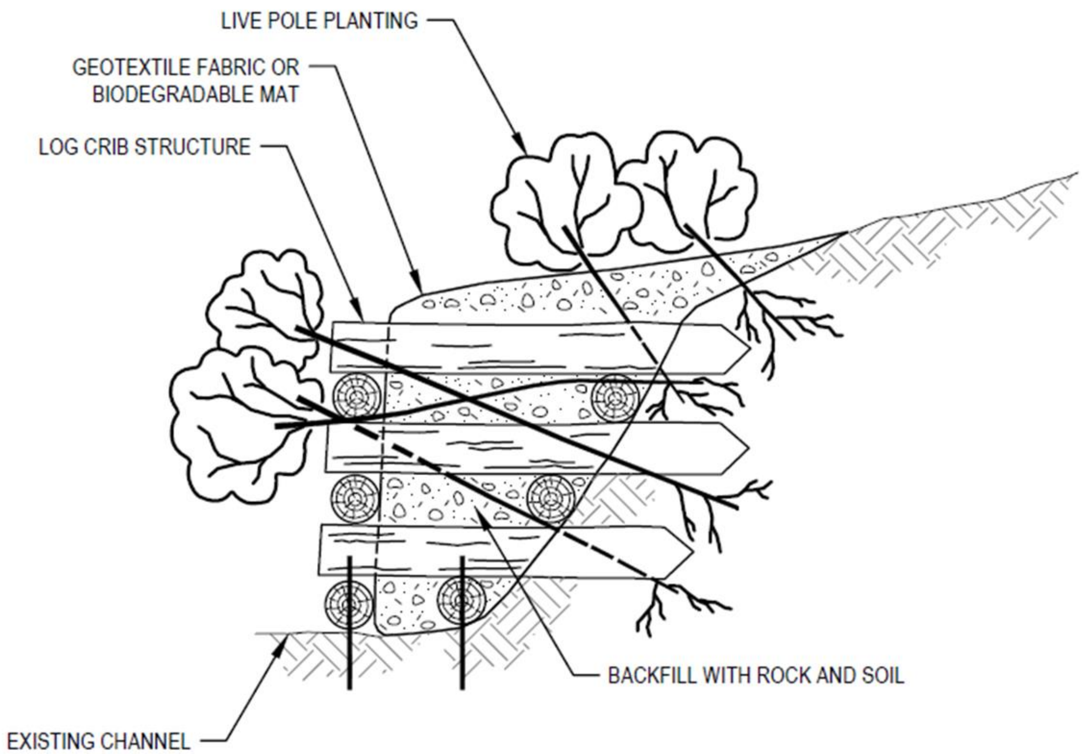


Image17. Example Log Cribbing Detail.

Biotechnical Methods

Biotechnical methods include the use of vegetation to provide the erosion protection structure and can typically be completed without the use of heavy equipment.

Brush-layering with Soil Wrap

Brush-layering consists of live cut branches placed between layers of soil wrapped in natural or synthetic geotextile materials. Additional toe protection is recommended as geotextile soil wraps are used to protect slopes that are subject to periodic scour, such as drainage channels or upper portions of streambanks. A challenge is that vegetation must be implemented during the vegetation dormancy period.

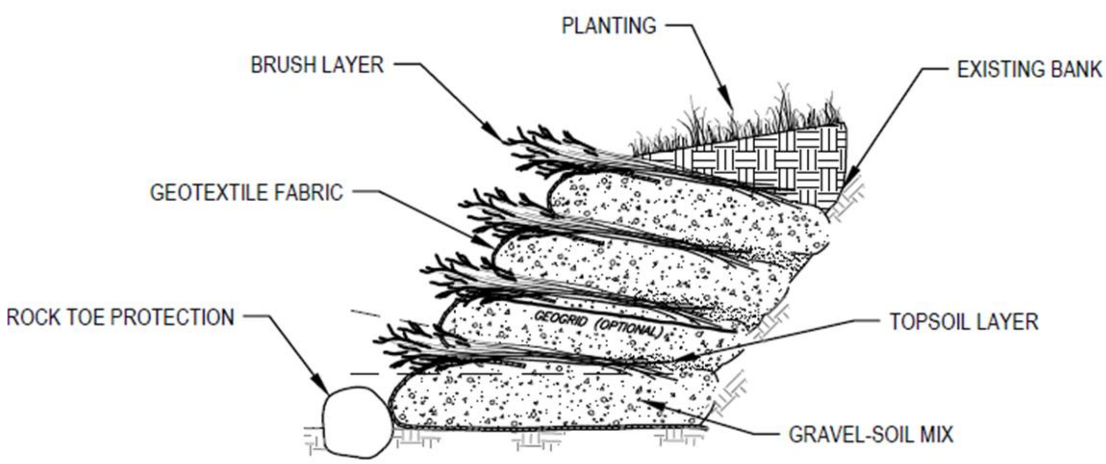


Image 18. Example Brush-layering with Soil Wrap Detail.

Fiberschine

This technique uses a natural fiber roll product to stabilize the toe of the slope and trap sediment that sloughs off the bank. Cuttings and herbaceous riparian plants are planted into the fiberschine and behind it. The riparian vegetation takes root to stabilize the streambank. This technique can be applied in tiers to provide additional bank slope protection.

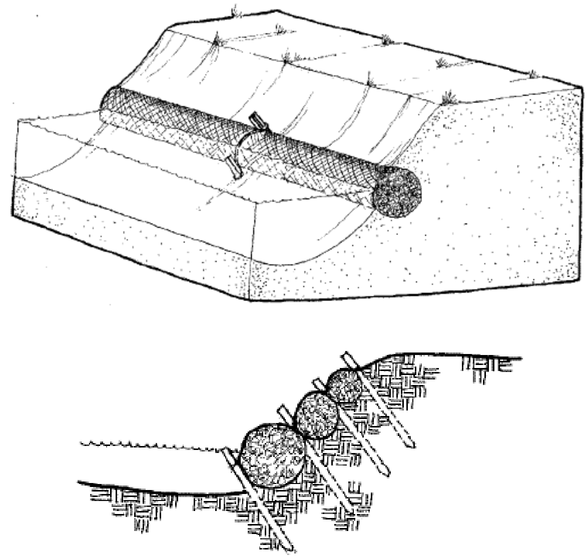


Image 19. Example Fibershine Detail.

Brush or Tree Revetment

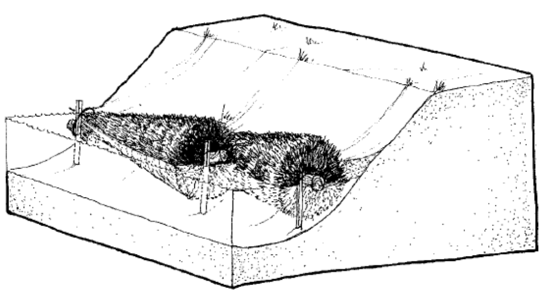


Image 20. Example Tree Revetment along Toe of Bank.

Brush or trees are secured to the streambanks reduce excessive erosion. Similar to the Fiberschine, the revetment traps sediment and also provides overhead cover for fish habitat. The revetment material does not need to sprout.

1.5 Implementation Phasing and Next Steps

- We understand the culvert on Standford Drive is programmed for replacement and therefore not described in this document, however consideration to restoring the channel profile immediately up- and downstream of crossing should be addressed to reduce the potential of an unintended geomorphic response such has initiating a release of the stored sediment and triggering an addition head-cut.
- Conduct site specific survey, geotechnical, engineering and right-of-way to support the feasibility and phasing of the concepts presented herein.
- Plan, design and implement projects in coordination with other County road and/or utility projects and as funding becomes available. Prioritize projects that address immediate concerns to public infrastructure and private property.

1.6 Opinion of Probable Construction Cost

The following opinion of probable construction cost has been developed based on previous contractor bids received and estimated project costs for similar work.

Item	Units	Cost
Hydrograph Intensity Reduction Projects		
Rain Barrels	Rebate	$50-200
Rain Gardens/Bioswales with Concrete Curbs	Square Foot	$25
Rain Gardens/Bioswales Integrated into Existing Landscape	Square Foot	$15
Porous/Permeable Paving	Square Foot	$20
Sub-Surface Detention	Cubic Foot	$15
In-Stream Projects		
Boulder Weirs	Each	$5,000
Log Weirs	Each	$8,000
Willow Check Dams	Each	$1,000
Vegetated Rock Slope Protection	Cubic Yard	$150
Log Cribbing	Square Foot Face	$25
Brush Layering with Soil Wrap	Square Foot Face	$25
Fiberschine	Linear Foot	$20
Brush or Tree Revetment	Linear Foot	$20

King Salmon Drainage Enhancement and Adaptation Project

Addresses, flooding, trash capture, water quality, and sea level rise. The Project includes evaluation of area outfalls that may be impacted by sea level rise and adaptation alternatives, evaluation of causes of flooding and adaptation alternatives. The Project potentially includes installation of LID BMPs with trash capture and installation of new storm water pipes and culverts to increase storage capacity in the system between tidal cycles, and new tide gates to address sea level rise.

Estimated Cost: $800,000

Lewis Avenue Drainage Improvement Project

Addresses Flooding, water quality, LID/BMPs, trash capture. The project include rehabilitation of existing culverts, environmental enhancement, LID/ BMPS, and trash capture devices.

Estimated Cost: $120,000

Lower Pine Hill and Elk River Road Flood Reduction and Environmental Protection Project

Addresses flooding, water quality, and environmental degradation. This project includes improvements to reduce flooding surrounding the HCSD sewer lift station off Pine Hill Road and other flooding along the roadway that contributes to water quality issues with runoff.

Estimated Cost: $500,000

McCullens Avenue Storm Water Enhancement Project

Project includes new trash capture device with water quality treatment, replace 36" CMP/RCP with new 42" RCP from bay discharge to foot of McCullens Avenue including a new tide gate, 30" RCP in R/W from start of existing 18" to Iowa Street. 21" RCP from Glen Street to Iowa Street on McCullens Avenue, Replace 12" pipe with new 21" RCP on South Broadway - east side from Allard Avenue south, and Replace 12" pipe with new 21" RCP on Glen Street from McCullens Avenue to Allard Avenue.

Estimated Cost: $742,900

Railroad Avenue Drainage Enhancement Project

Addresses trash capture, water quality, flooding, sea level rise, and environmental enhancement. The project includes restoration of the ditch from Del Norte Street and Railroad Avenue to Humboldt Bay, a new trash capture device with pollutant removal features, replacement of three existing 30" CMP crossings at Del Norte and Railroad Street with 60" CMP crossings, replacement of the 42" RCP on Railroad Avenue between Del Norte and Wabash Avenue and on Wabash Avenue between Railroad Avenue and Short Street with a 60" RCP, and replacement of the 36" RCP on Wabash Avenue between Short Street and Broadway with a new 42" RCP.

Estimated Cost: $650,000

Second Street Storm Water Improvement and Adaptation Project

Addresses trash capture, water quality, environmental enhancement and sea level rise. Project includes: the addition of trash capture with water quality device, a new tide gate at the out fall on Second Street to address future sea level rise, and improvement to the outfall ditch between Second Street and the Eureka Slough.

Estimated Cost: $949,600

Second Slough Enhancement and Adaptation Project

Addresses water quality, flooding, trash capture, habitat enhancement, climate adaptation. This project incorporates: trash capture with water quality devices at the lower end of the basin, LID BMPs where feasible, habitat restoration, and storm water capacity improvements.

The Second Slough channel has been filled with a roadway prism at Myrtle Avenue, placed in a 36-inch corrugated metal culvert, with a trash rack on the inlet and a tide gate at the outlet. The fill prism and culvert is approximately 100 feet long. The tide gate does not appear to allow fish passage.

A stream inventory of Second Slough was also conducted in 2009 by CDFW (CDFW, 2009). The report recommended that the slough be managed as an anadromous natural production stream, that further assessment of culverts be conducted and improvements made to culverts that act as potential barriers to migrating salmonids, potential creek daylighting be explored with willing landowners, long-term water quality monitoring be conducted to better assess the condition of 2nd Slough, establish more complete and meaningful temperature regime information, and increase canopy.

Data gaps and actions specifically recommended in the CDFW stream inventory reports consisting of feasible fish barrier remediation options, summer water temperature monitoring and biological sampling need to be completed to better manage the sloughs and streams as anadromous natural production waterways.

Estimated Cost: $1,277,300

Spring Street Storm Drain Realignment

Addresses flooding and water quality. Reroute new 36" RCP from Wabash Avenue and Broadway east on Wabash Avenue to Spring Street and south on Spring Street to Hawthorn Street. Continue new 30" RCP on Spring Street to Buhne Street and west on Buhne Street to Garland Street. Install LID BMPs at several drainage inlets to slow flow and treat water quality.

Estimated Cost: $720,600

Waterfront Drive Storm Water and Climate Change Adaptation Project

Addresses trash capture, water quality, sea level rise adaptation, and minor flooding. Project includes: the evaluation of tide gate options for the six outfalls along Waterfront Drive, trash capture with water quality devices, evaluation of potential environmental enhancements, and stormwater storage capacity increases, including a new 15-inch RCP on "L" Street between Sixth Ave and Seventh St, a new 18-inch RCP on "M" Street between Fourth Ave and Fifth St, and a new parallel 21-inch RCP outfall from Waterfront Drive to the bay at the boat launch. Portions of RCP in Caltrans Right-of-Way would be Caltrans Projects.

Estimated Cost: $94,100

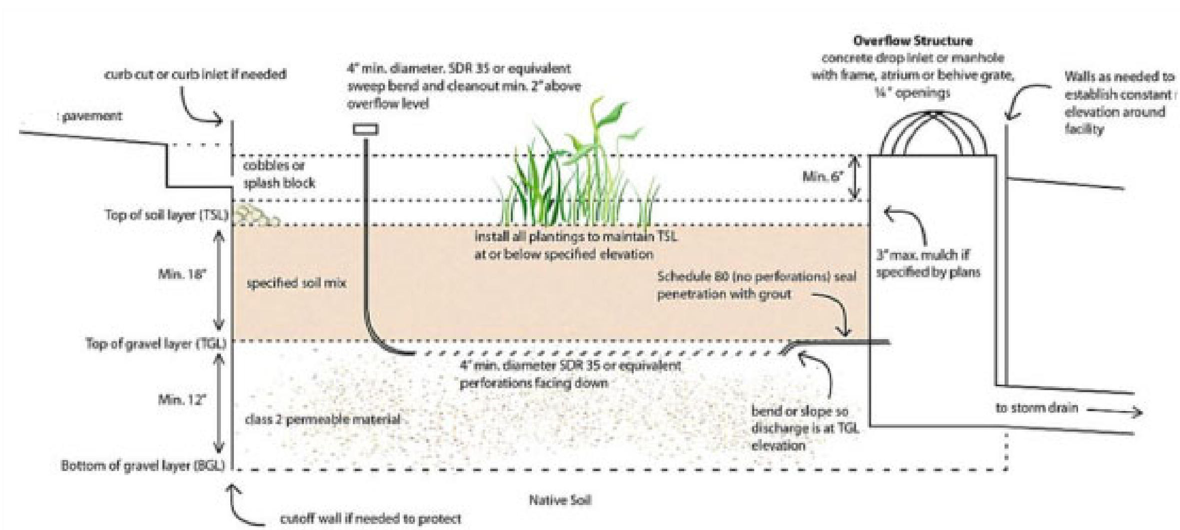
West Side Eureka Sub-basin Flood Reduction and Climate Adaptation Program

The City of Eureka developed a program of improvements to address flooding and sea level rise throughout the West Side Basin of the City’s stormwater drainage system. A programmatic approach was taken for this project as improvements can be implemented in phases over time to address the greatest areas of flooding first and add components over time to increase the basin resiliency to severe storm events and sea level rise.

Project addresses flooding, trash capture, water quality, and climate change. The project includes pollutant removal devices that will be retrofitted with trash capture devices. The project includes a series of infrastructure improvements to alleviate flooding and inundation. The proposed upsized storm drain system will increase capacity and ability to attenuate storm water within the system during tidal surges and projected long-term sea level rise. The improvements will alleviate overflow from the undersized system and directly reduce flood risks while reducing vulnerability to sea level rise. The project will improve water quality in combination with addressing required trash capture regulations with the addition of new treatment units.

All of the watersheds for the City of Eureka are located within the Eureka Plain Hydrological Unit. Within that unit, this project is located in the Eureka’s “West Side Eureka” sub-watershed basin. The sub basin delineation is outlined in the City of Eureka Drainage Plan (Winzler & Kelly 1996) and in Appendix B Figure A4 in this EAWSWRP. The West Side Eureka sub-watershed basin is primarily a commercially-zoned district for the City of Eureka and located within close proximity to Humboldt Bay, which is vulnerable to impacts from tidal surge and sea level rise as identified in the Humboldt Bay Sea Level Rise Adaptation Planning Project Report (Laird 2015). The West Side Eureka Basin is the largest storm water basin in Eureka. The significance of the basin size, associated flow rates, low gradient of storm water infrastructure, low outfall elevations and tide gates combined with the low elevation of the surrounding properties creates flooding issues and property damage. Humboldt Bay tidal surges compound the rainfall events and back-up the tide gate controlled storm drainage system causing flooding to surrounding commercial properties. This area is bisected by a critical transportation corridor, residential and commercial structures that are highly vulnerable to flood inundation.

The first phase of the project includes flood reduction and water quality improvements. The project consists of upsizing approximately 3,150 LF of existing storm drains and installing 3,675 LF of new storm drain. New and upsized storm drains would be connected to existing manholes and drop inlets where feasible. All other pipes would have manholes and drop inlets placed approximately every 300 LF and 200 LF, respectively. Up to 12 low impact development (LID) features would be integrated along, or upstream of storm drain improvements. A typical cross section is shown below. A flap gate is included in the storm drain pipe on Koster Avenue between Washington and 14th Streets, to prevent flow from travelling to Washington Street from 14th Street. The improved storm drain system will connect to two existing storm drain outfalls on Del Norte Street that will be rehabilitated. Figure 5 shows the proposed project improvements included in phase 1.



The later phases of the project include additional storm drain pipe modifications, LID implementation, trash capture, and restoration. The future upsized storm drains will increase capacity and ability to attenuate storm water within the system during tidal surges and projected long-term sea level rise. Improvements will alleviate overflow from the undersized system and directly reduce flood risks. LID implementation will focus on improvements to water quality and slowing flow prior to discharge to the storm drain. Restoration may include the development of overflow basins that act as tidal wetlands to attenuate flows and improve water quality as well as integration of natural wetlands into the treatment of stormwater.

Estimated Cost: $3,943,900

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Horizontal Datum: North American Datum 1983
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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Project No. **11159210**
Revision No. **-**
Date **August 2018**

Design Plan Index Map

FIGURE 5

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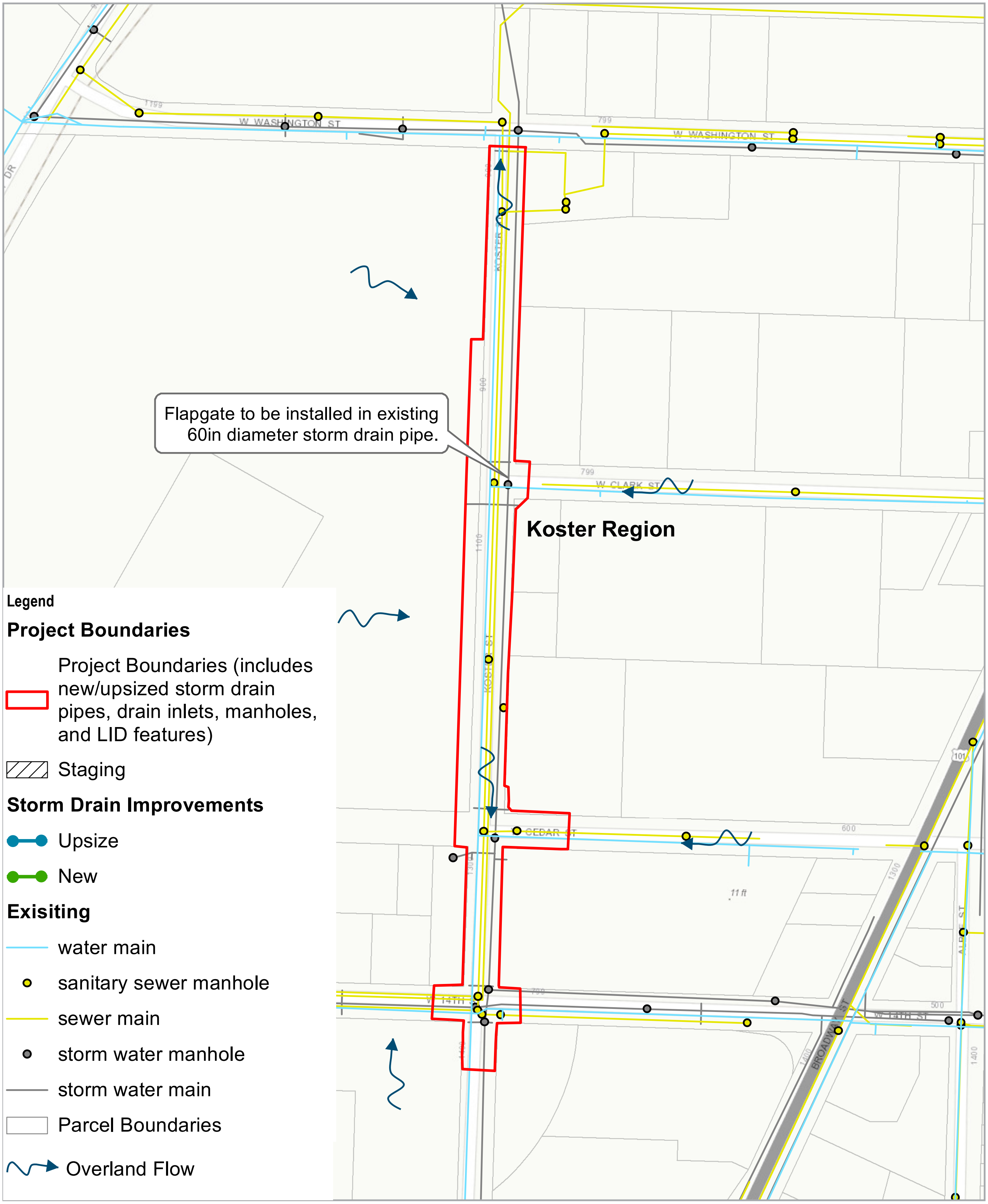
Data source: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community. Created by: bvivyan



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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Koster Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.1

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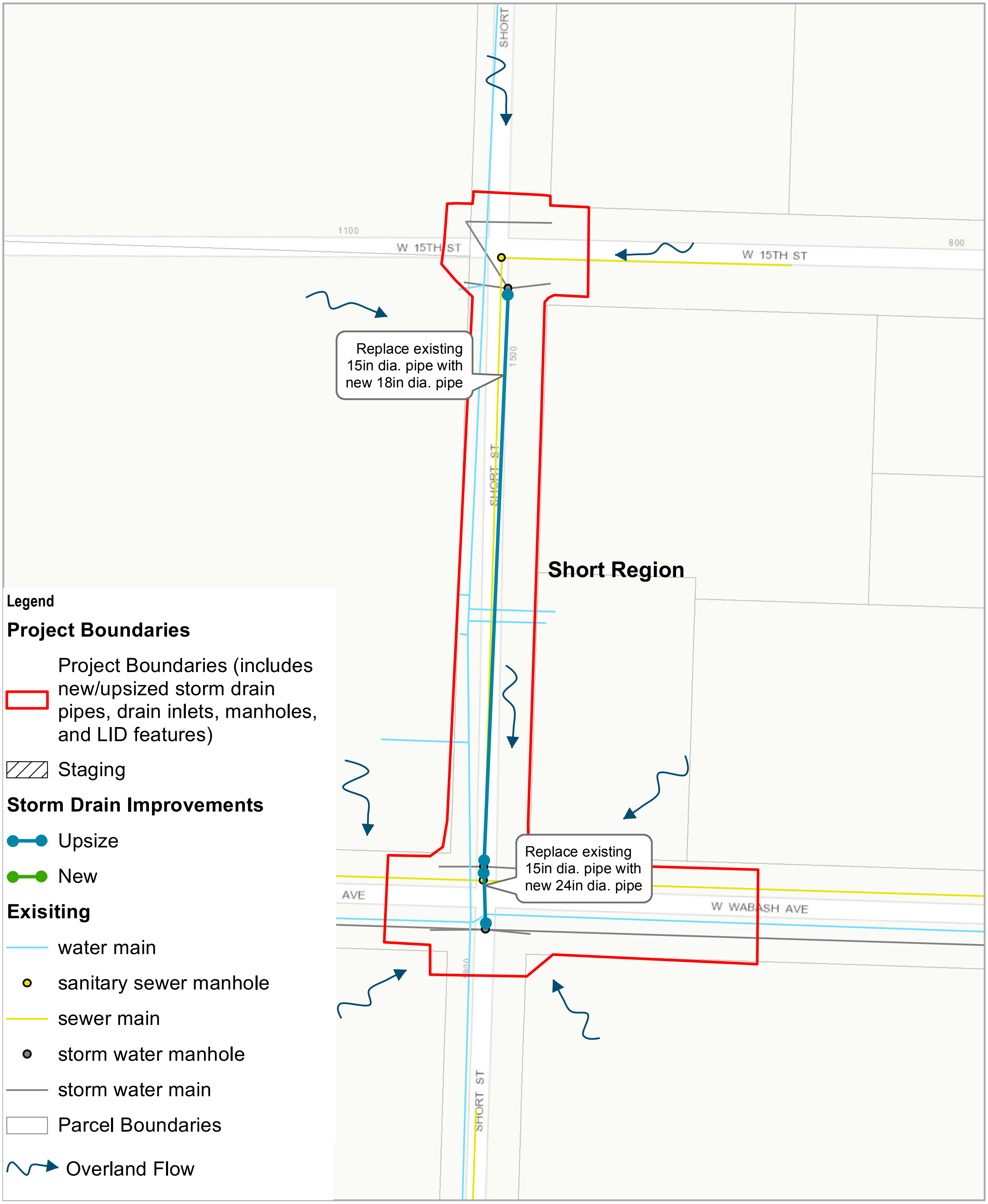

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Short Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.2

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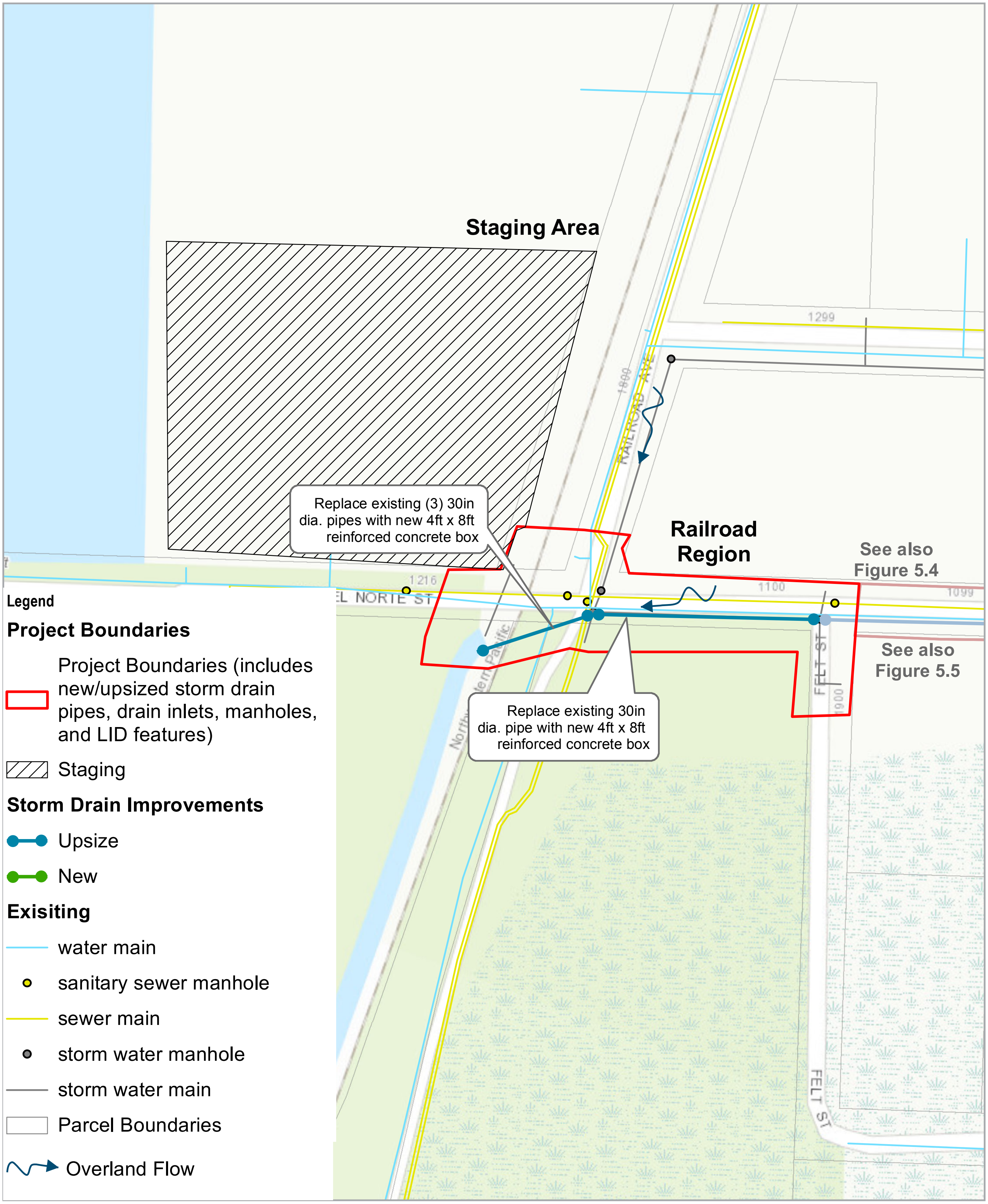

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Railroad Region & Staging Area

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.3

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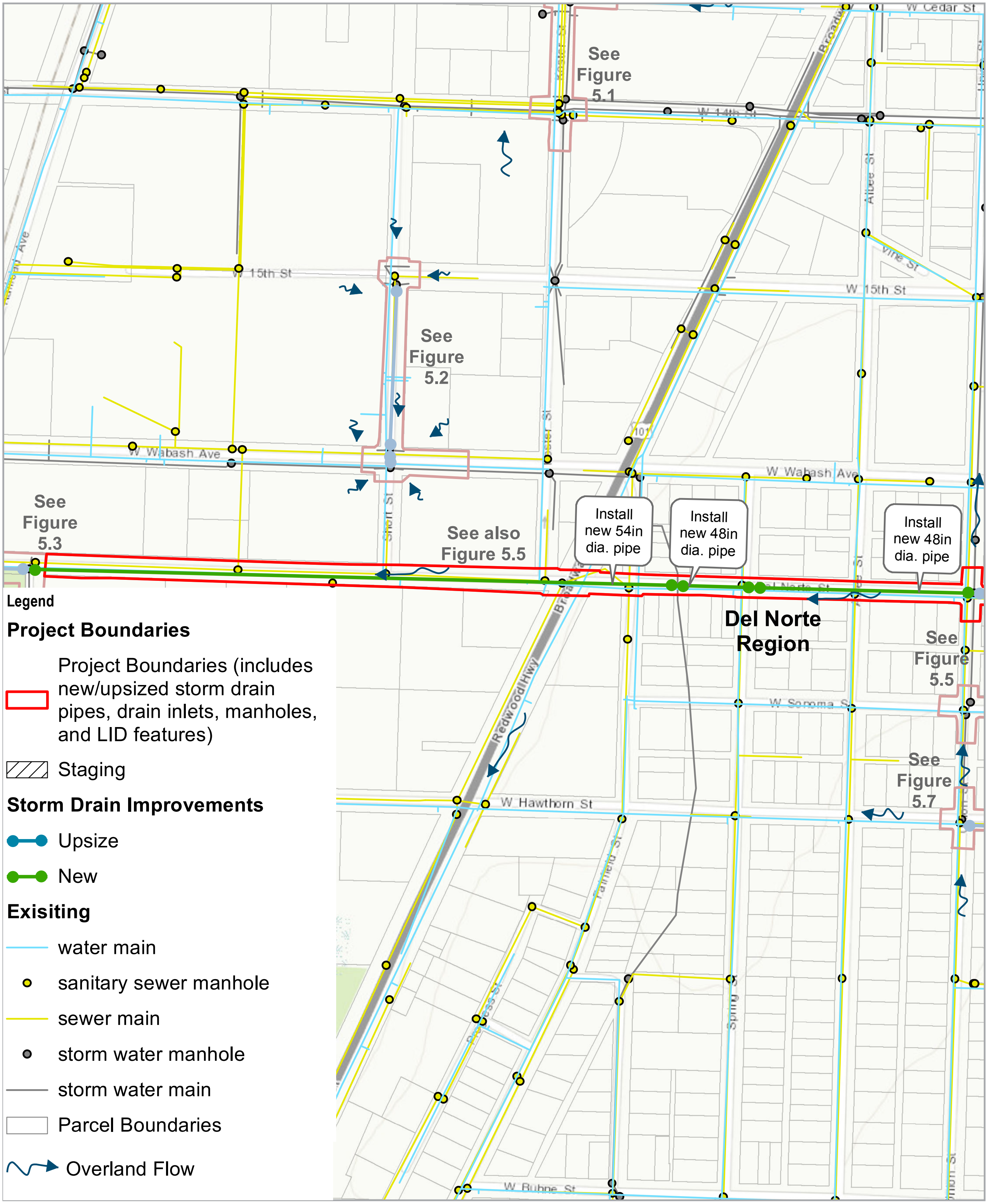

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Del Norte Region - West

Project No.	**11159210**
Revision No.	**-**
Date	**August 2018**

FIGURE 5.4

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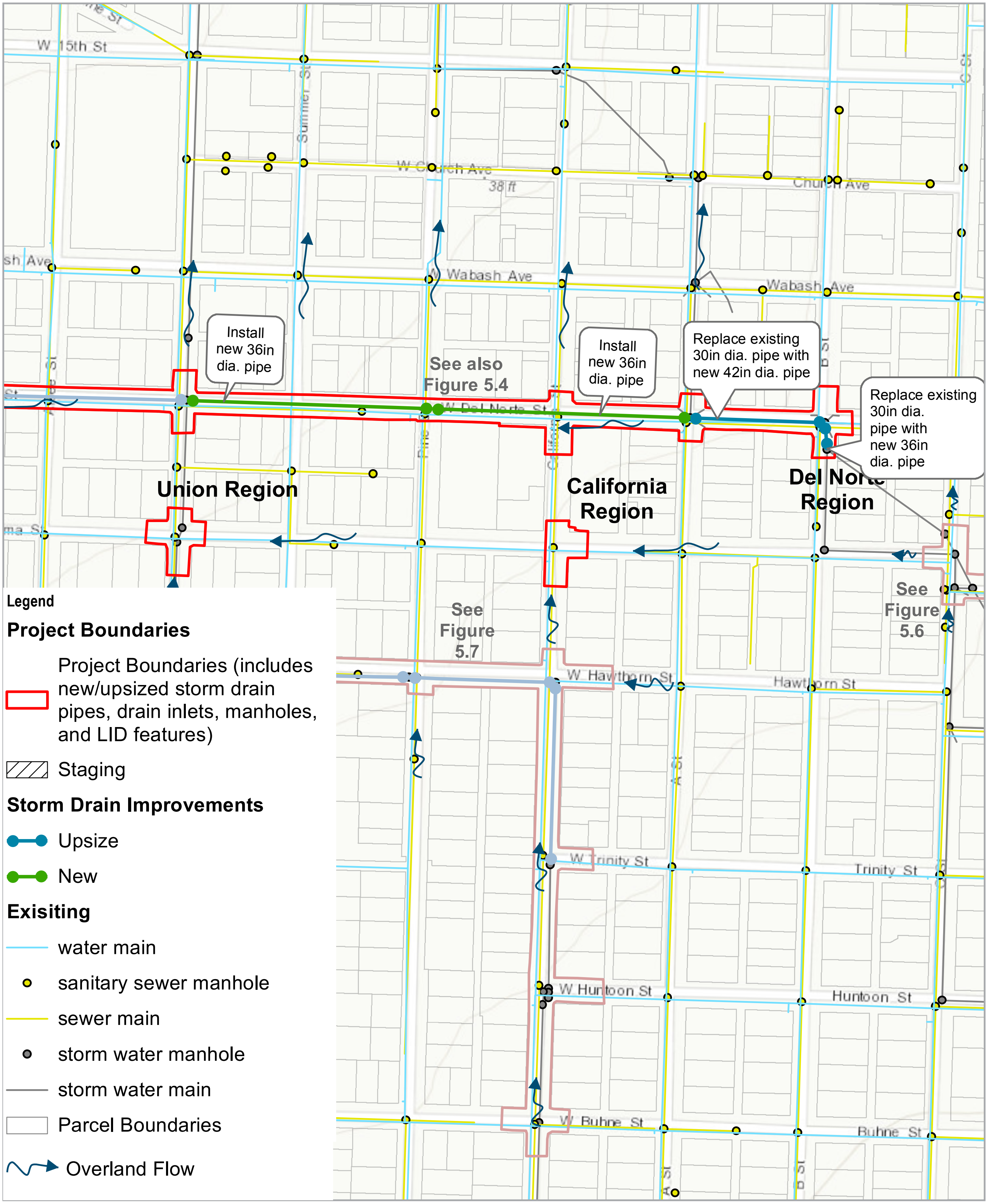

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Union, California, Del Norte Region - East

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.5

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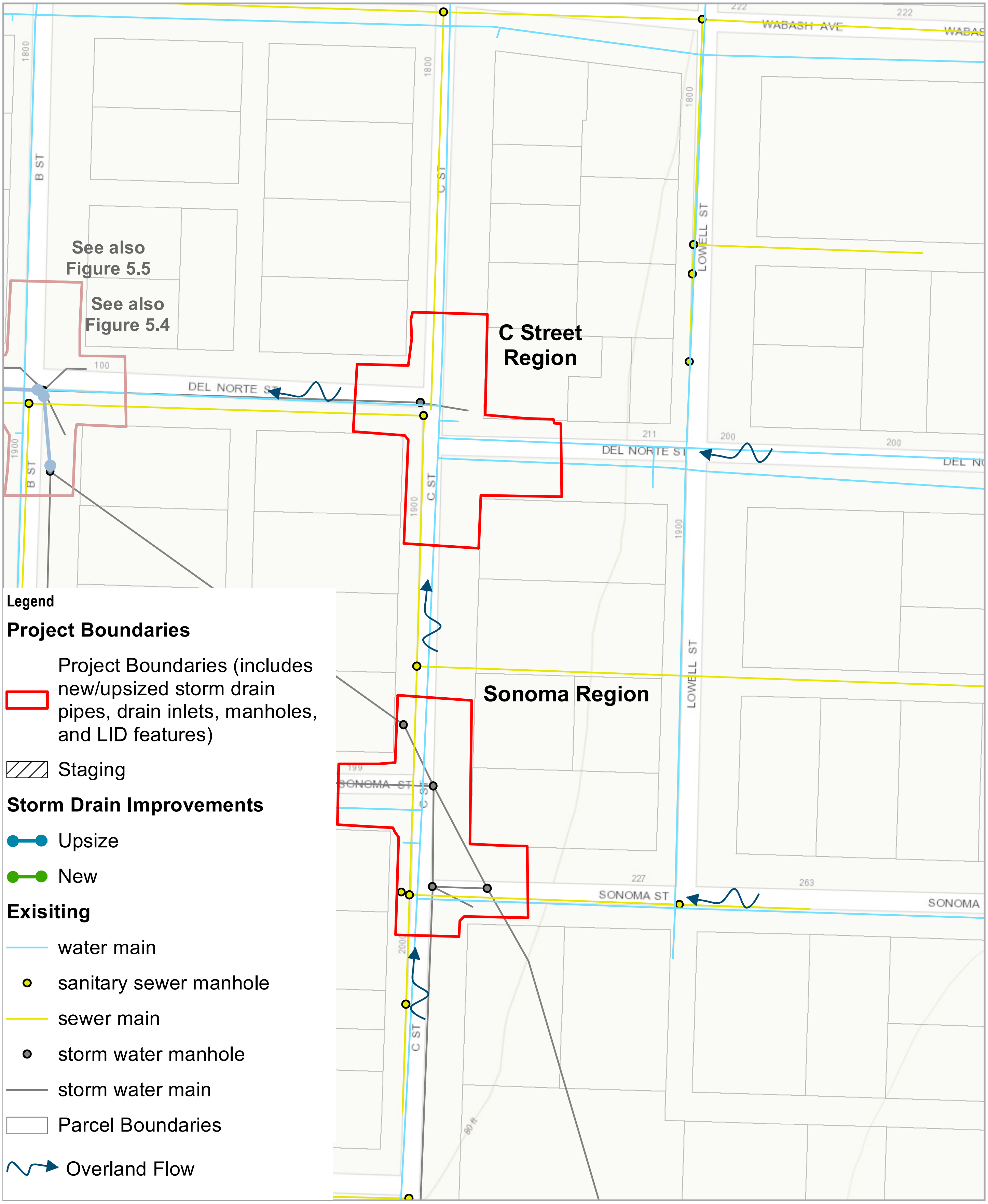

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Project No. **11159210**
Revision No. **-**
Date **August 2018**

Design Plans
C Street & Sonoma Regions

FIGURE 5.6

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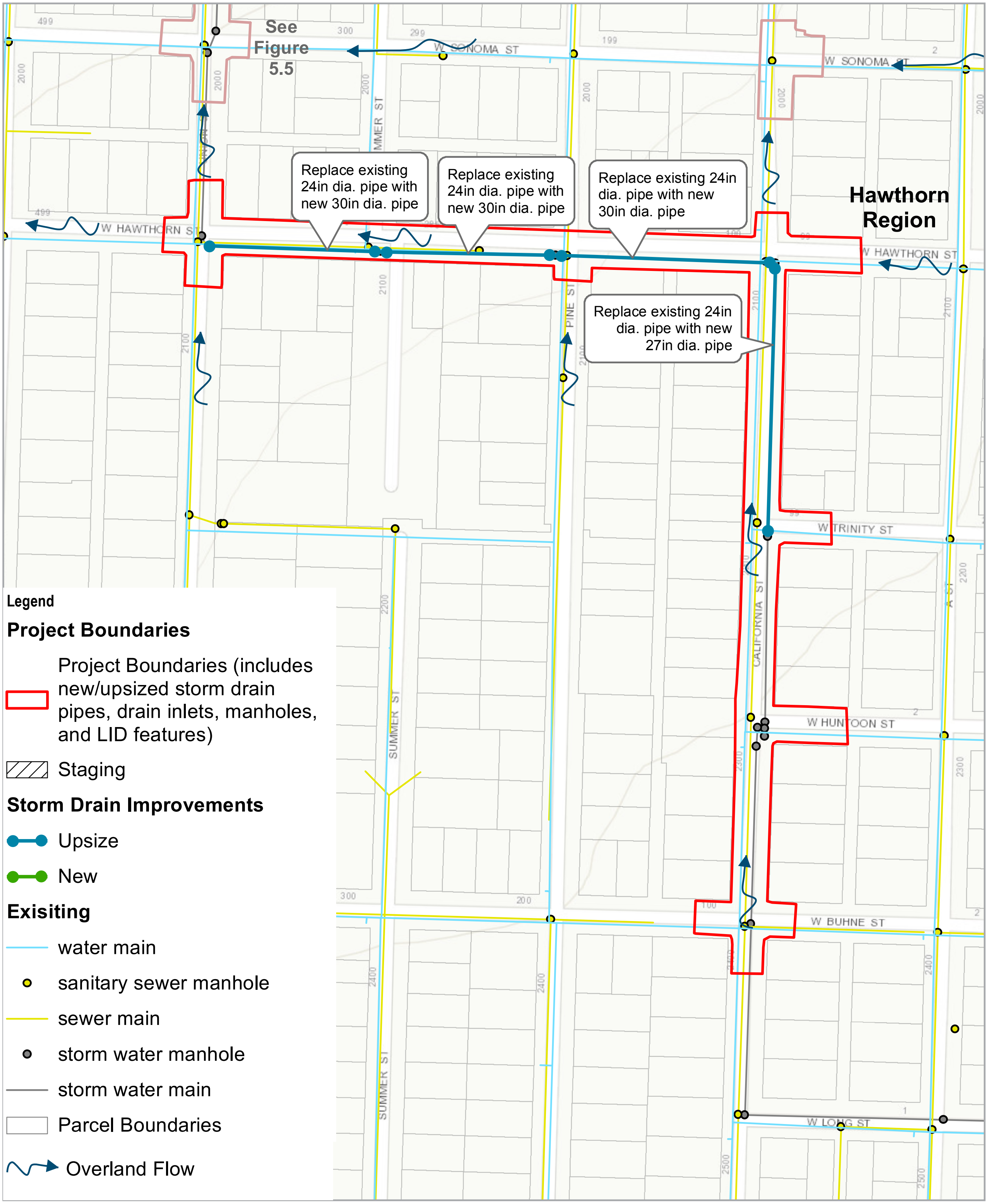

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Hawthorn Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.7

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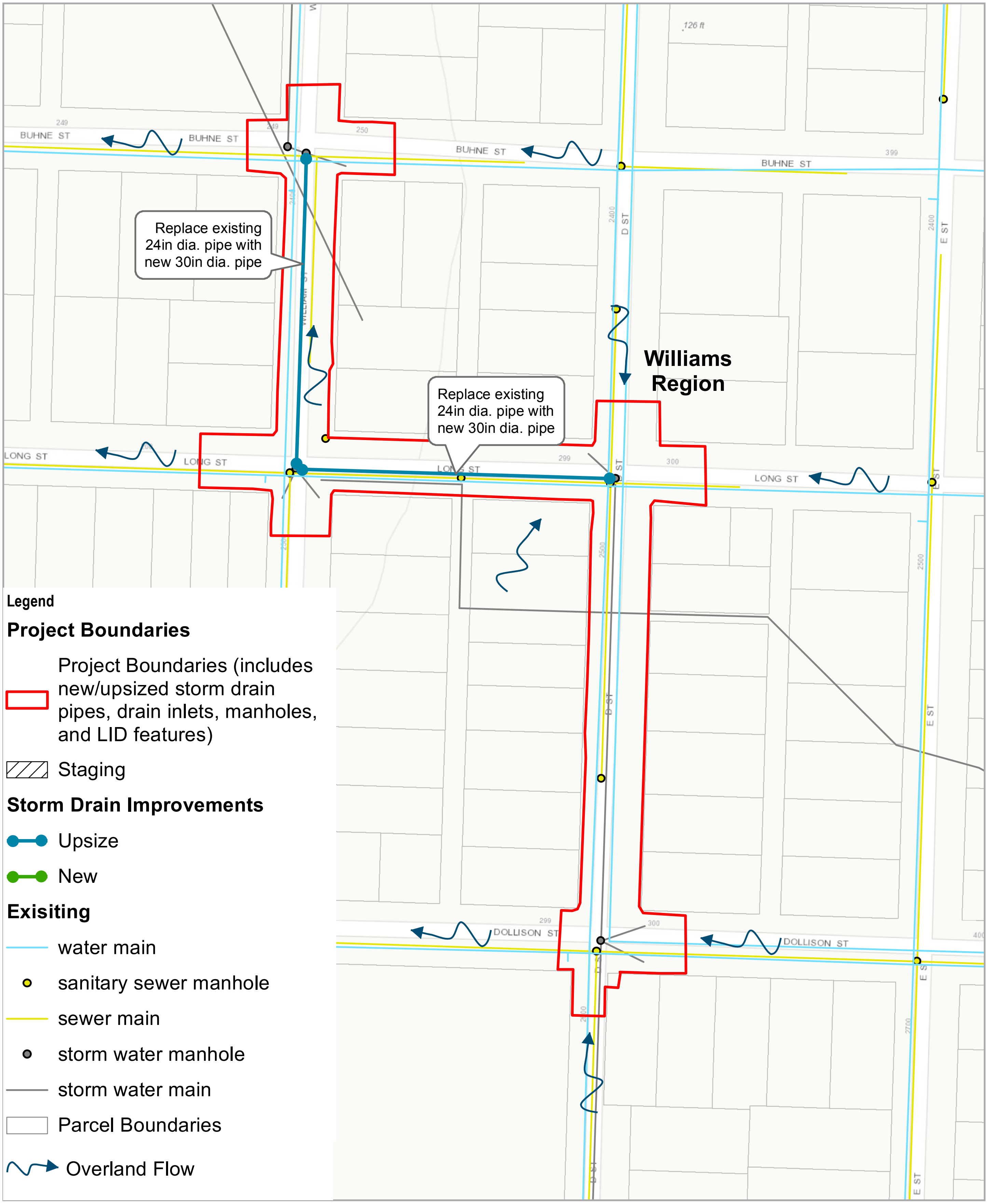

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City of Eureka
Flood Reduction and Sea Level Rise Mitigation Project

Design Plans
Williams Region

Project No. **11159210**
Revision No. **-**
Date **August 2018**

FIGURE 5.8

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Zane Middle School LID Project

Project addresses surfacing groundwater at several locations around the school that create dry weather runoff issues. Project would include diversion of flow to LID features at the school as well as education and outreach.

Estimated Cost: $300,000

Zanes Road Flood Reduction Project

Addresses flooding, water quality, environmental enhancement. Project includes implementation of natural systems to redirect drainage to reduce flooding and provide water quality and habitat enhancements.

Estimated Cost: $450,000

Appendix M Prioritized Projects

	Benefit	Fields Landing Boatyard Storm Water Improvement Project			Humboldt Hill Storm Water Enhancement Program			C Street Storm Water Enhancement Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	3	Increases treatment of runoff by 50% or more for the contributing drainage area for the 85th percentile of the 24-hr storm event	12	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	1	Provides partial trash removal	4	0	N/A	0	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides minimal secondary priority pollutant removal	4	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	3	Implements BMPs that cover more than 10 acres of land	9	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	1	Captures and stores storm water that offsets potable water use with storage less than 100 gallons	1	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	1	Makes use of less than 100 gallons of storm water or dry weather runoff that would otherwise be conveyed directly to a surface water body	2	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	1	Includes a project component known to reduce flood risk	5	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	1	Includes a project component known to reduce flood risk	5
	Increased sea level resiliency	0	N/A	0	0	N/A	0	3	Includes sea level rise resiliency measures	12
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	2	Provides peak flow attenuation	4	2	Provides peak flow attenuation	4	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	3	Creates more than 0.5 acres of riparian habitat	6	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**45**			**54**			**53**

	Benefit	Commercial Street Storm Water Enhancement Project			McCullens Avenue Storm Water Enhancement Project			Spring Street Storm Drain Realignment		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4	3	Increases treatment of runoff by 50% or more for the contributing drainage area for the 85th percentile of the 24-hr storm event	12
	Trash Capture	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	1	Provides partial trash removal	4
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides minimal secondary priority pollutant removal	4
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	1	Converts between 1000 SF (or 10 parking spaces) from impervious to pervious	2
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	1	Includes a project component known to reduce flood risk	5	0	N/A	0	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	3	Includes sea level rise resiliency measures	12	3	Includes sea level rise resiliency measures	12	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	2	Provides peak flow attenuation	4
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	1	Creates less than 0.25 acre of urban green space	2
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**53**			**48**			**55**

	Benefit	Henderson Avenue/Mauer Marsh Storm Water Enhancement Project			Railroad Avenue Drainage Enhancement Project			Highland Avenue Area Storm Water Enhancement Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	2	Increases treatment of runoff by 25-50% for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	1	Provides partial trash removal	4
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides minimal secondary priority pollutant removal	4
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	1	Converts between 1000 SF (or 10 parking spaces) from impervious to pervious	2	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	1	Includes a project component known to reduce flood risk	5	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	3	Includes sea level rise resiliency measures	12	3	Includes sea level rise resiliency measures	12	3	Includes sea level rise resiliency measures	12
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	2	Provides peak flow attenuation	4	0	N/A	0	2	Provides peak flow attenuation	4
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	1	Creates less than 0.25 acre of urban green space	2	1	Creates less than 0.25 acre of urban green space	2	1	Creates less than 0.25 acre of urban green space	2
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**65**			**65**			**57**

	Benefit	Zane Middle School LID Project			West Side Eureka Sub-basin Flood Reduction and Climate Adaptation Program			Second Street Storm Water Improvement and Adaptation Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	2	Increases treatment of runoff by 25-50% for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	0	N/A	0	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12
	EAWSWRP priority pollutant removal	1	Provides minimal secondary priority pollutant removal	4	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	1	Includes visual inspection of water quality assessments	2	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	3	Makes use of more than 500 gallons of storm water or dry weather runoff that would otherwise be conveyed directly to a surface water body	6	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	0	N/A	0	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	0	N/A	0	3	Includes sea level rise resiliency measures	12	3	Includes sea level rise resiliency measures	12
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	1	Creates less than 0.25 acre of urban green space	2	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	0	N/A	0	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	1	Includes public education	1	0	N/A	0	0	N/A	0
	Public use area enhancement	1	Enhances public use area	2	1	Enhances public use area	2	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**22**			**71**			**63**

	Benefit	E Street Drainage Enhancement Project			G Street Drainage Improvement Project			Waterfront Drive Storm Water and Climate Change Adaptation Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	0	N/A	0
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	0	N/A	0	0	N/A	0	3	Includes sea level rise resiliency measures	12
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**51**			**51**			**60**

	Benefit	Cooper Gulch Drainage, Environmental, and Community Enhancement Project			Buhne Street Drainage Enhancement Project			Fifteenth Street Drainage Enhancement Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	0	N/A	0	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
Water Quality	Trash Capture	0	N/A	0	0	N/A	0	0	N/A	0
Water Quality	EAWSWRP priority pollutant removal	0	N/A	0	1	Provides minimal secondary priority pollutant removal	4	1	Provides minimal secondary priority pollutant removal	4
Water Quality	Nonpoint source pollution control	0	N/A	0	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
Water Quality	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
Water Quality	Water quality monitoring and assessment	2	Includes regular water quality monitoring	4	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Decreased flood risk by reducing runoff rate and/or volume	0	N/A	0	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
Flood Management	Increased sea level resiliency	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Re-establishment of the natural hydrograph	0	N/A	0	2	Provides peak flow attenuation	4	2	Provides peak flow attenuation	4
Environmental	Water temperature improvement	2	Decreases water temperature	2	0	N/A	0	0	N/A	0
Environmental	Wetland/ Riparian Enhancement	3	Enhances more than 1 acre of riparian habitat	6	0	N/A	0	0	N/A	0
Environmental	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Fish passage improvement	2	Improves fish passage	8	0	N/A	0	0	N/A	0
Environmental	Urban green space enhancement	1	Enhances less than 0.5 acres of urban green space	1	0	N/A	0	0	N/A	0
Environmental	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
Community	Disadvantaged community	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9	3	Provides benefit for disadvantaged community	9
Community	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
Community	Public use area enhancement	1	Enhances public use area	2	0	N/A	0	0	N/A	0
Community	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**32**			**39**			**39**

	Benefit	Second Slough Enhancement and Adaptation Project			Everding South Drainage Improvement Project			H and Madrone Ave Drainage Improvement Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	0	N/A	0	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	0	N/A	0	0	N/A	0	0	N/A	0
	EAWSWRP priority pollutant removal	0	N/A	0	0	Provides minimal secondary	0	0	N/A	0
	Nonpoint source pollution control	0	N/A	0	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	2	Includes regular water quality monitoring	4	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	0	N/A	0	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	2	Decreases water temperature	2	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	3	Enhances more than 1 acre of riparian habitat	6	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	2	Improves fish passage	8	0	N/A	0	0	N/A	0
	Urban green space enhancement	1	Enhances less than 0.5 acres of urban green space	1	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	0	N/A	0	0	N/A	0
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	1	Enhances public use area	2	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**32**			**22**			**22**

	Benefit	Harris and Ingly Drainage Improvement Project			Duck and O Street Drainage Improvement Project			Lewis Avenue Drainage Improvement Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	0	N/A	0	0	N/A	0	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12
	EAWSWRP priority pollutant removal	0	N/A	0	0	N/A	0	1	Provides minimal secondary priority pollutant removal	4
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	0	N/A	0	0	N/A	0	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	2	Enhances between 0.5 and 1 acre of riparian habitat	4	2	Enhances between 0.5 and 1 acre of riparian habitat	4	2	Enhances between 0.5 and 1 acre of riparian habitat	4
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	0	N/A	0	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**35**			**26**			**51**

	Benefit	Fields Landing Drainage Enhancement and Adaptation Project			Lower Pine Hill and Elk River Road Flood Reduction and Environmental Protection Project			Zanes Road Flood Reduction Project		
		Allocated Score		Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	0	N/A	0	0	N/A	0
	EAWSWRP priority pollutant removal	1	Provides minimal secondary priority pollutant removal	4	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	1	Provides minimal secondary	4
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	3	Eliminates an existing sanitary sewer overflow issue within 10 to 20 feet of a storm drain inlet for the 85th percentile of the 24-hr storm event	6	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	1	Includes a project component known to reduce flood risk	5	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	3	Includes sea level rise resiliency measures	12	3	Includes sea level rise resiliency measures	12	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	2	Enhances between 0.5 and 1 acre of riparian habitat	4	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9	0	N/A	0	0	N/A	0
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**63**			**38**			**26**

	Benefit	Elk River Road at Wrigley Drainage Improvement Project			Berta Road Flood Reduction Project			King Salmon Drainage Enhancement and Adaptation Project		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4	1	Provides treatment for less than 0.25 acres	4
	Trash Capture	0	N/A	0	0	N/A	0	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12
	EAWSWRP priority pollutant removal	1	Provides minimal secondary priority pollutant removal	4	1	Provides minimal secondary priority pollutant removal	4	1	Provides minimal secondary priority pollutant removal	4
	Nonpoint source pollution control	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	0	N/A	0	0	N/A	0	0	N/A	0
	Water quality monitoring and assessment	0	N/A	0	0	N/A	0	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15	3	The primary purpose of the project is to reduce flooding that poses a risk to public safety	15
	Increased sea level resiliency	0	N/A	0	0	N/A	0	3	Includes sea level rise resiliency measures	12
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	0	N/A	0	0	N/A	0	0	N/A	0
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	2	Enhances between 0.5 and 1 acre of wetland	4
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space creation	0	N/A	0	0	N/A	0	0	N/A	0
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	0	N/A	0	0	N/A	0	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**26**			**26**			**63**

	Benefit	College of the Redwoods Storm Water Improvement Project			City and County Outfall Monitoring and Protection Program			City of Eureka Red Curb Program		
		Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score	Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	3	Increases treatment of runoff by 50% or more for the contributing drainage area for the 85th percentile of the 24-hr storm event	12	0	N/A	0	3	Increases treatment of runoff by 50% or more for the contributing drainage area for the 85th percentile of the 24-hr storm event	12
	Trash Capture	0	N/A	0	3	Provides full trash capture for the one-year, one-hr storm event of the contributing drainage area using a SWRCB-approved device	12	1	Provides partial trash removal	4
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Nonpoint source pollution control	3	Implements BMPs that cover more than 10 acres of land	9	0	N/A	0	1	Implements BMPs that cover fewer than 5 acres of land	3
	Conversion of pervious to impervious surface	2	Converts between 1000 SF (or 10 parking spaces) and 1700 SF (or 30 parking spaces) from impervious to pervious	4	0	N/A	0	2	Converts between 1000 SF (or 10 parking spaces) and 1700 SF (or 30 parking spaces) from impervious to pervious	4
	Water quality monitoring and assessment	0	N/A	0	3	Includes a water quality monitoring and assessment plan	6	0	N/A	0
Water Supply	Water conservation	0	N/A	0	0	N/A	0	0	N/A	0
	Water supply reliability	0	N/A	0	0	N/A	0	0	N/A	0
	Conjunctive use	0	N/A	0	0	N/A	0	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0	0	N/A	0	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0	0	N/A	0	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	1	Includes a project component known to reduce flood risk	5	0	N/A	0	1	Includes a project component known to reduce flood risk	5
	Increased sea level resiliency	0	N/A	0	3	Includes sea level rise resiliency measures	12	0	N/A	0
Environmental	Reduced energy use	0	N/A	0	0	N/A	0	0	N/A	0
	Reduced greenhouse gas emissions	0	N/A	0	0	N/A	0	0	N/A	0
	Provides carbon sink	0	N/A	0	0	N/A	0	0	N/A	0
	Re-establishment of the natural hydrograph	2	Provides peak flow attenuation	4	0	N/A	0	2	Provides peak flow attenuation	4
	Water temperature improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0	0	N/A	0	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0	0	N/A	0	0	N/A	0
	Fish passage improvement	0	N/A	0	0	N/A	0	0	N/A	0
	Urban green space enhancement	3	Enhances more than 1 acre of urban green space	3	0	N/A	0	3	Enhances more than 1 acre of urban green space	3
	Urban green space creation	0	N/A	0	0	N/A	0	3	Creates more than 0.5 acres of urban green space	6
Community	Employment opportunities provided	0	N/A	0	0	N/A	0	0	N/A	0
	Disadvantaged community	0	N/A	0	0	N/A	0	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0	0	N/A	0	1	Includes outreach and involvement	1
	Public use area enhancement	1	Enhances public use area	2	0	N/A	0	1	Enhances public use area	2
	Public use area creation	0	N/A	0	0	N/A	0	0	N/A	0
	Total Weighted Score			**47**			**38**			**61**

	Benefit	Eureka Waterfront Drive Revitalization Project		
		Allocated Score	Justification	Weighted Score
Water Quality	Increased filtration and/or treatment of runoff	2	Increases treatment of runoff by 25-50% for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Trash Capture	1	Provides partial trash removal	4
	EAWSWRP priority pollutant removal	2	Includes treatment techniques known to remove one priority pollutant for the contributing drainage area for the 85th percentile of the 24-hr storm event	8
	Nonpoint source pollution control	2	Implements BMPs that cover between 5 and 10 acres of land	6
	Conversion of pervious to impervious surface	2	Converts between 1000 SF (or 10 parking spaces) and 1700 SF (or 30 parking spaces) from impervious to pervious	4
	Water quality monitoring and assessment	0	N/A	0
Water Supply	Water conservation	0	N/A	0
	Water supply reliability	0	N/A	0
	Conjunctive use	0	N/A	0
	Stormwater and dry weather runoff reuse	0	N/A	0
Flood Management	Reduced sanitary sewer overflows	0	N/A	0
	Decreased flood risk by reducing runoff rate and/or volume	1	Includes a project component known to reduce flood risk	5
	Increased sea level resiliency	0	N/A	0
Environmental	Reduced energy use	0	N/A	0
	Reduced greenhouse gas emissions	2		2
	Provides carbon sink	0	N/A	0
	Re-establishment of the natural hydrograph	2	Provides peak flow attenuation	4
	Water temperature improvement	0	N/A	0
	Wetland/ Riparian Enhancement	0	N/A	0
	Wetland/ Riparian Creation	0	N/A	0
	Fish passage improvement	0	N/A	0
	Urban green space enhancement	3	Enhances more than 1 acre of urban green space	3
	Urban green space creation	3	Creates more than 0.5 acres of urban green space	6
Community	Employment opportunities provided	0	N/A	0
	Disadvantaged community	3	Provides benefit for disadvantaged community	9
	Public education, outreach, and involvement	0	N/A	0
	Public use area enhancement	1	Enhances public use area	2
	Public use area creation	1	Creates public use area	3
	Total Weighted Score			**64**

Appendix N Funding Matrix

Agency	Program	Funding*	Schedule	Contact	Notes and Links
Caltrans	Environmental Enhancement & Mitigation Program (EEM)	Implementation and Acquisition	Annual Solicitation	eemcoordinator@resources.ca.gov 916.653.2812	http://resources.ca.gov/grants/environmental-enhancement-and-mitigation-eem/
CDFW	Prop 1 – Watershed Restoration Grants Program	Planning, Design and Implementation	Annual solicitation (Summer)	Matt Wells (916) 445-1285	https://www.wildlife.ca.gov/conservation/watersheds/restoration-grants
CDFW	Fisheries Restoration Grant Program (FRGP)	Planning, Design and Implementation	Annual solicitation (Winter/Spring)	See website: https://www.wildlife.ca.gov/Grants/FRGP/Contact	https://www.wildlife.ca.gov/Grants/FRGP
CDFW	Steelhead Report Card Program	Similar PSN as FRGP	No Current Solicitation (Previously it's been annually)		
DWR	Prop 1 - Flood Protection Corridor Program	Planning, Design and Implementation	Solicitation expected in Spring 2018	Patrick Luzuriaga: 916.574.0932 Local Assistance Section A Division of Flood Management Department of Water Resources Patrick.Luzuriaga@water.ca.gov	http://www.water.ca.gov/floodmgmt/fpo/sgb/fpcp/
DWR	Urban Streams Restoration Program	Planning, Design and Implementation	No current solicitation		http://www.water.ca.gov/urbanstreams/
DWR/NCRP	IRWMP – North Coast Resource Partnership	State Proposition Funding	Future North Coast Solicitation likely to be released in 2018	Katherine Gledhill, West Coast Watershed kgledhill@westcoastwatershed.com 707.795.1235	http://www.northcoastresourcepartnership.org/
FEMA/CalOES	Hazard Mitigation Grant Program	Planning, Design and Implementation (must be included)	Regular solicitations through NOI Process	Jennifer Hogan: Office: 916.845.8205 State Hazard Mitigation Officer Email: Jennifer.Hogan@CalOES.ca.gov	http://www.caloes.ca.gov/cal-oes-divisions/recovery/disaster-mitigation-technical-support/404-hazard-mitigation-grant-program
NMFS	Coastal and Marine Habitat Restoration Grants Program	Planning, Design and Implementation	Typically annual solicitation (spring)	Bob Pagliuco: 707.825.5166 1655 Heindon Road Arcata, CA 95521	http://www.habitat.noaa.gov/funding/index.html
NMFS	Coastal Ecosystem Resiliency Grants Program	Planning, Design and Implementation	Typically annual solicitation (spring)	Same as above	http://www.habitat.noaa.gov/funding/index.html
SCC	Proposition 1	Planning, Design and Implementation	Quarterly solicitations	Karyn Gear (Joel Gerwein, Su Corbaley, Michael Bowen)	http://scc.ca.gov/grants/proposition-1-grants/
State Water Board	Storm Water Grant Program	Planning, Design and Implementation (must be included)	Solicitation expected in Summer 2019	Daman Badyal: 916.319.9436 SWRCB Grant Manager damanvir.badyal@waterboards.ca.gov	https://www.waterboards.ca.gov/water_issues/programs/grants_loans/swgp/prop1/
State Water Board	Non-point Source 319(h)	Planning, Design and Implementation (must be included)	Annual Solicitation	Jodi Pontureri Jodi.Pontureri@waterboards.ca.gov (916) 341- 5306	https://www.waterboards.ca.gov/water_issues/programs/nps/319grants.shtml
USFWS	Partners for Fish & Wildlife	Planning, Design and Implementation	Annual Solicitation	Liisa M. Niva Schmoele: 707.825.5182 Habitat Restoration Program Manager Arcata Fish and Wildlife Office	https://www.fws.gov/arcata/restoration/partners/default.htm
USFWS	National Coastal Wetlands Conservation (NCWC)	Planning, Design and Implementation	Annual Solicitation	Becky Miller: 916.414.6457 Region 8 Wildlife and Sport Fish Restoration Program 2800 Cottage Way Room W-1729 Sacramento, CA 95825	https://www.fws.gov/cno/conservation/Coastal.html
USFWS/NFHP	Pacific Marine and Estuarine Fish Habitat Partnership (PMEP)	Planning, Design and Implementation	Annual Solicitation (Fall)	Adrienne Harris: 805.316.0746 PMEP Coordinator Adrienne@adrienne---harris.com	http://www.pacificfishhabitat.org/funding-opportunities/
WCB	Prop 1 - Stream Flow Enhancement Program	Planning, Design and Implementation	Annual solicitation (Summer)	Brian Cary: 916.324.7487 1700 9th St., 4th Flr Sacramento, CA 95811 Brian.Cary@wildlife.ca.gov	https://wcb.ca.gov/Programs/Stream-Flow-Enhancement