Storm Water Utility

Storm Water Management Program

2017-2021

Montana Department of Environmental Quality
General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)
MPDES Permit No. MTR040007

Storm Water Utility Division
Public Works Department
City of Missoula
435 Ryman Street
Missoula, Montana 59802-4297

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ABBREVIATIONS

City	City of Missoula
County	Missoula County
CWA	Clean Water Act
ERP	Enforcement Response Plan
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	minimum control measure
MDT	Montana Department of Transportation
MPDES	Montana Pollutant Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
MDEQ	Montana Department of Environmental Quality
MVWQD	Missoula Valley Water Quality District
NPS	nonpoint source
Parks & Rec	City of Missoula Parks and Recreation Department
PSAs	public service announcements
SARA	Superfund Amendments and Reauthorization Act
SWMP	Storm Water Management Program
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
USEPA	U.S. Environmental Protection Agency

Mission Statement: The Storm Water Utility is committed to protecting public health and safety, natural resources, waterways, and our aquifer, while meeting or exceeding state and federal environmental quality regulations.

INTRODUCTION

Nonpoint source (NPS) pollution, like storm water runoff, is a significant problem in Montana and the single largest cause of impaired waters statewide (Montana Department of Natural Resources and Conservation, 2014). The City of Missoula (City) Storm Water Utility manages the quantity, quality, and routing of storm water runoff through our community. The effectiveness and efficiency of storm water management have a direct impact on public health and safety, surface water quality, wildlife habitat, and future development. Consequently, the federal government amended the Clean Water Act (CWA) of 1972 in 1987 to regulate the management of storm water runoff from municipalities and specific industrial classifications. Federal and state regulations require designated municipalities obtain and maintain coverage under the Montana Pollutant Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit), which is administered by the Montana Department of Environmental Quality (MDEQ) under permit no. MTR040007. The City has prepared this Storm Water Management Program (SWMP) to outline activities for this cycle of the City's MS4 Permit: January 1, 2017 through December 31, 2021. This SWMP is a dynamic document, with periodic updates and additions.

This SWMP covers programmatic elements the City has already implemented, is in the process of developing for implementation, or plans to develop in order to meet new or revised requirements set forth in the latest statewide requirements. Together, these programmatic elements address the six Minimum Control Measures (MCMs) required under the MS4 Permit, each MCM is addressed in the SWMP.

MCM 1 Public Education and Outreach – The City must continue to educate the public in its permitted jurisdiction about the importance of the storm water program and the public's role in that program.
MCM 2 Public Involvement and Participation – The City must continue to comply with all state and local notice requirements when implementing a public involvement/participation program.
MCM 3 Illicit Discharge Detection and Elimination – The City must continue to adopt and enforce

ordinances or take equivalent measures to prohibit illicit discharges. The City must also implement a program to detect illicit discharges.

MCM 4 Construction Site Storm Water Management – The City must continue to develop a program to control the discharge of pollutants from construction sites greater than one acre in size within its permittee jurisdiction.

MCM 5 Post-Construction Site Storm Water Management in New and Redevelopment – The City must continue to require long-term post-construction best management practices (BMPs) that protect water quality and control runoff flow to be incorporated into development and significant redevelopment projects.

MCM 6 Pollution Prevention/Good Housekeeping for Permittee Operations – The City must continue to examine its activities and develop programs to prevent the discharge of pollutants from these activities. The City must also educate staff on pollution prevention practices.

Through these MCMs, the SWMP aims to reduce the discharge of pollutants from the City's storm water system to the maximum extent practicable and to protect water quality.

Background

The Missoula area has a long history of addressing water quality issues and in 1988, the Missoula City-County Health Department applied for and obtained *Sole Source Aquifer* designation from the U.S. Environmental Protection Agency (USEPA). This designation requires that all projects that obtain federal funding be reviewed by the USEPA. In January 1993, the Missoula Board of County Commissioners and the Missoula City Council passed a resolution creating the Missoula Valley Water Quality District (MVWQD), to protect water resources within the Missoula Valley. The MVWQD has since undertaken numerous projects to protect and improve water quality. These projects include removal of auto shop floor drains that discharge through subsurface injection, public education on issues pertaining to water quality, household hazardous waste collection, establishment of a permitting system for facilities that store regulated substances, and regulation of deicer products. In August 1998, the *Clark Fork River Voluntary Nutrient Reduction Program* was finalized and put into place as an agreement among major parties in the Montana portion of the Clark Fork River watershed to significantly reduce nutrient pollution along a 200-mile stretch the river (Tri-State Implementation Council, 1998). The nutrient and algae values established in this plan for the Clark Fork River through the City were accepted as Total Maximum Daily Loads (TMDLs) by the USEPA. More recently, MDEQ published a water quality improvement plan

(including TMDLs for tributaries in the central Clark Fork basin (MDEQ, 2014a and b). TMDLs for Clark Fork River metals loads were defined in a separate document (MDEQ, 2014c). Further, the *Central Clark Fork Watershed Restoration Plan* should be completed and submitted to MDEQ for approval in 2020 (Missoula Current, 2019). The City's Storm Water Utility and the MVWQD work together to ensure water quality is maintained to the highest practicable standards per the current data.

Throughout much of the City's MS4, storm water is discharged into Class V injection wells (commonly referred to as dry wells or sumps), which allow for subsurface infiltration and aquifer recharge. There are approximately 6,380 sumps within the MS4. Where soil type precludes the use of sumps, storm water is discharged into storm drains and pipes that are routed to swales, detention points, or surface water outfalls. There are 59 outfalls within the City's MS4 jurisdiction. They discharge storm water into one of eight surface waters, within the Middle Clark Fork or Bitterroot subbasins (Table 1). Detailed maps of the City's storm water infrastructure are provided in Appendix A.

The areas within the MS4 are characterized as primarily residential, with some commercial and very little industrial. Three of the eight waters that receive storm water runoff within the MS4 are designated as impaired by MDEQ (Table 1). The reasons for impairment vary (Table 2). For example, the main cause of impairment in Grant Creek is due to dewatering and habitat loss, while impairment in the Clark Fork River is primarily due to historical mining activities upstream.

Table 1. City of Missoula MS4[1] assets per subwatershed and surface water

HUC[2] 8 Subbasin	HUC 12 Subwatershed	Waterbody	Outfalls	Pipe (feet)	Dry Wells	Detention Points	Levee (feet)	Flood Wall (feet)l
Middle Clark Fork (17010204)	Butler Creek (170102040201)	—	0	2,841	4	1	—	—
	Grant Creek (170102040103)			61,772	256	7	2,764	—
		Flynn Lowney Ditch	1					
		Grant Creek[IMP]	5					
	La Valle Creek (170102040202)	—	0	0	0	0	—	—
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	13	5,601	291	—	—	—
	Marshall Creek-Clark Fork (170102040104)			88,107	3,910	27	9,205	898
		Clark Fork River[IMP]	27					
		Orchard Homes Ditch Company	6					
		Missoula Irrigation District	1					
	Martin Gulch-Clark Fork (170102040205)	—	0	19,529	0	10	—	—
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)			152,915	1,791	22	6,060	—
		Bitterroot River[IMP]	1					
		Pattee Creek	5					
	Miller Creek (170102051601)	Miller Creek[IMP]	0	1,891	117	—	—	—
Total			**59**	**332,656 (63 mi)**	**6,369**	**67**	**18,029**	**898**

[1]municipal separate storm sewer system
[2]U.S. Geological Survey Hydrologic Unit Code
[IMP]Impaired surface water per *Montana Department of Environmental Quality Water Quality Integrated Report* (MDEQ, 2018a and b).

Table 2. Impaired waters within the City of Missoula's MS4[1] per Montana Department of Environmental Quality *Water Quality Integrated Report* (MDEQ, 2018a and b)

	Waterbody Name (ID)	Cause of Impairment	Source
Bitterroot Subbasin	Bitterroot River, Eightmile Creek to mouth (Clark Fork River) (MT76H001_030)	• Alteration in stream-side or littoral vegetative covers • Lead[TMDL] • Temperature[TMDL]	• Agriculture • Rangeland Grazing • Source Unknown • Wet Weather Discharges (Non-Point Source) • Wet Weather Discharges (Point Source and Combination of Storm Water)
	Miller Creek, headwaters to mouth (Bitterroot River) (MT76H004_130)	• Alteration in stream-side or littoral vegetative covers • Sedimentation/Siltation[TMDL] • Temperature[TMDL]	• Crop Production (Crop Land or Dry Land) • Grazing in Riparian or Shoreline Zones • Loss of Riparian Habitat • Silviculture Activities
Middle Clark Fork Subbasin	Clark Fork River, Blackfoot River to Rattlesnake Creek (MT76M001_030)	• Arsenic[TMDL] • Cadmium[TMDL] • Copper[TMDL] • Eutrophication[TMDL] • Iron[TMDL] • Lead[TMDL] • Zinc[TMDL]	• Dam or Impoundment • Industrial Point Source Discharge • Mill Tailings
	Clark Fork River, Rattlesnake Creek to Fish Creek (MT76M001_020)	• Chlorophyll-a[TMDL] • Copper[TMDL] • Iron[TMDL] • Lead[TMDL] • Nitrogen, Total[TMDL] • Organic Enrichment[TMDL] • Phosphorus, Total[TMDL]	• Industrial Point Source Discharge • Mill Tailings • Municipal Point Source Discharges
	Grant Creek, Rattlesnake Wilderness boundary to mouth (Clark Fork River) (MT76M002_130)	• Algae • Alteration in stream-side or littoral vegetative covers • Flow Regime Modification • Nitrate/Nitrite (Nitrite + Nitrate as N)[TMDL] • Nitrogen, Total[TMDL] • Sedimentation/Siltation[TMDL] • Temperature[TMDL]	• Crop Production (Irrigated) • Loss of Riparian Habitat • Site Clearance (Land Development or Redevelopment) • Streambank Modifications/destabilization • Water Diversions

[1]municipal separate storm sewer system

[TMDL]Total Maximum Daily Load has been established.

Montana Pollutant Discharge Elimination System

The contaminants with approved TMDLs fall under state and federal regulations for water pollutant discharge. In accordance with the CWA, MDEQ administers the MS4 Permit. Per Administrative Rules of Montana (ARM) section 17.30.1105, any entity that discharges storm water from a point source must obtain coverage under an MPDES MS4 Permit. The MS4 Permit provides authorization to discharge storm water (i.e., storm water runoff, snowmelt runoff, and surface runoff and drainage) to state waters (75-5-103, Montana Code Annotated). The MS4 Permit defines effluent limitations; establishes monitoring, recording, and reporting requirements; establishes requirements for the SWMP; and sets standard permit conditions.

The City is working with a goal of achieving the cleanest storm water practicable, utilizing existing knowledge, new and innovative ideas, and available resources from internal staff, MVWQD, and local professionals, non-profit/conservation groups, and citizens.

The MS4 Permit for the urbanized area within and around the City has been divided among four permittees that own and operate separate storm sewer systems. (An urbanized area is defined by the United States Census Bureau as an area that has a population over 50,000 and an average population density of 1,000 people per square mile.)

- City of Missoula: areas within the city limits that are not owned by either the Montana Department of Transportation or the University of Montana, excluding state traffic routes.
- Missoula County: areas outside the city limits, but within the urbanized area, that are not owned by either the Montana Department of Transportation of the University of Montana, excluding state traffic routes.
- Montana Department of Transportation: parcels owned by the department and the numerous state traffic routes within the urbanized area.
- University of Montana: parcels owned by the University of Montana within the urbanized area.

Storm Water Management Program Requirements

Per the MS4 Permit, this SWMP aims to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality and comply with the CWA. The SWMP must include a section

describing how the SWMP will manage discharges of pollutants of concern (Administrative Rules of Montana (ARM) 17.30.1105(5)(b) and ensure storm water discharges will not cause or contribute to instream exceedances of water quality standards. These pollutants are defined as causes of impairment in the *MDEQ Water Quality Integrated Report* (MDEQ 2018a and b) (Table 2). MDEQ has assigned some wasteload allocations (WLAs) to the City's MS4, per TMDLs for the Bitterroot River (MDEQ and USEPA, 2014); Clark Fork River metals (MDEQ, 2014c); Clark Fork River non-metals (Tri-State Implementation Council, 1998); and Grant Creek (MDEQ, 2014a and b) (Table 3).

This SWMP includes management practices, control techniques, systems, designs, and other provisions necessary to control pollutants. Each MCM has requirements to identify how the success of the BMPs will be evaluated, including how the measureable goals for each of the BMPs were selected. In addition to these requirements, permittees are required to maintain documentation describing how and why each of the BMPs and measurable goals for the SWMP was selected.

Table 3. Wasteload allocations (WLAs) for the City of Missoula's MS4[1]

Waterbody Name	Waterbody ID	Pollutant	TMDL[2]	MS4 WLA
Bitterroot River	MT76H001_030	Lead	9.23 to 27.0 lbs/day[3]	0.08 lbs/day
		Temperature	1,853 kcal/sec	*
Miller Creek	MT76H004_130	Sediment	1,538 tons/year	*
		Temperature	2,246 kcal/sec	*
Clark Fork River, Blackfoot River to Rattlesnake Creek	MT76M001_030	Arsenic	136.08 to 626.4 lbs/day	**
		Cadmium	4.24 to 14.47 lbs/day	**
		Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	149.41 to 487.04 lbs/day	0.009 lbs/day
		Iron	13,608 to 62,640 lbs/day	**
		Lead	55.19 to 151.93 lbs/day	0.0045 lbs/day
		Total N	300 µg/L	***
		Total P	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
		Zinc	1,916 to 6,265 lbs/day	0.00004 lbs/day
Clark Fork River, Rattlesnake Creek to Fish Creek	MT76M001_020	Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	219.9 to 747.9 lbs/day[3]	1.1 lbs/day
		Iron	30,915 to 129,600 lbs/day[3]	**
		Lead	65.7 to 201.6 lbs/day[3]	0.51 lbs/day
		Total N	300 µg/L	***
		Total P	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
Grant Creek	MT76M002_130	Total N	31.72 lbs/day	0 lbs/day
		Sediment	1,440.2 tons/year	7.8 tons/year
		Temperature	470 kcal/sec	0 kcal/sec

[1]municipal separate storm sewer system
[2]Total Maximum Daily Load
[3]Low to high flow
*Because there are no point sources, there is no WLA (MDEQ and USEPA, 2014).
**Insufficient data were available to provide numeric load estimates (MDEQ, 2014c).
***The TMDL was established prior to the creation of WLAs (Tri-State Implementation Council, 1998).

City Program Framework

On October 12, 2016, the City Council unanimously passed Ordinance 3580, repealing Chapter 15.65 of the Missoula Municipal Code and establishing Chapter 13.27: Storm Water Utility, Rates, and Regulations. This chapter established the City Storm Water Utility, rates for the same, and outlined existing and new rules and regulations related to storm water pollution prevention and control. Additionally, the City Storm Water Specifications and Design Standards was adopted on August 9, 2016. The ordinance and standards address the protection of water quality, preservation of natural drainage systems, flood mitigation, site grading, and protection of property.

The Storm Water Utility was initially established under an interim rate. This rate provided the necessary funds to research how much money was needed to manage the utility in the long term. A Storm Water Facility and Operations Plan was completed in 2018. This document provided an evaluation of the existing and future staffing needs, operations and management plan, and a preliminary capital improvements plan. Additionally, the City hired a professional consulting company specializing in establishing utility rate schedules. Per their recommendation, the City pursued a storm water rate associated with average daily trips, according to the codes established by the Institute of Transportation Engineers. This rate structure was presented to City Council via resolution; and it was unanimously approved on December 16, 2019. The rate became effective January 1, 2020.

The rate structure is composed of flat regulatory compliance and administrative components. The trip rate varies per property type, according to the average daily trips. An example storm water rate for a single-family home is provided in Table 4.

Table 4. Storm Water Utility rate schedule for a single-family home

Rate Component	Annual Charges	Monthly Charges
Regulatory Compliance	$27.97	$2.33
Administrative	$20.03	$1.67
Trip Rate ($0.27 * 9.45[1])	$2.55	$0.21
Total	**$50.55**	**$4.21**

[1]Average daily trips generated by property type, according to the Institute of Transportation Engineers

It is estimated that the newly established storm water rate structure will provide $1.2 million annually to the Storm Water Utility enterprise fund (Table 5). This money may only to be used for specific purposes related to the Storm Water Utility's mission statement.

Table 5. Storm Water Utility budget

Category	Amount
Salaries and Benefits	$340,000
Operations and Maintenance	$350,000
Capital Improvements	$370,000
Transfers	$140,000
Total	**$1.2 million**

In late 2019 and early 2020, Chapter 13.27 was revised to create a regulatory framework for permitting, inspections, and post-construction performance standards. The revision—renamed Storm Water Management—was presented to the City Council Public Works Committee on February 12, 2020. A public hearing is scheduled for March 9, 2020. Chapter 13.27 also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code.

Storm Water Management Team

The Storm Water Management Team (Team) consists of diverse City and County personnel: Public Works; Streets; Wastewater; Engineering; Planning; Permits and Land Use; GIS; City Attorney; Parks & Recreation; and the Missoula Valley Water Quality District (MVWQD) (Figure 1). Since some agencies involved in the storm water program are funded by both City and County taxes, these agencies have been shown on the chart to illustrate the relationship. When available, responsibilities are noted in the MCM sections.

The team has recently been organized and quarterly meetings are planned: last Monday of each quarter beginning on March 30, 2020. During the first meeting, key responsibilities will be identified per MCM and the organizational chart will be updated.

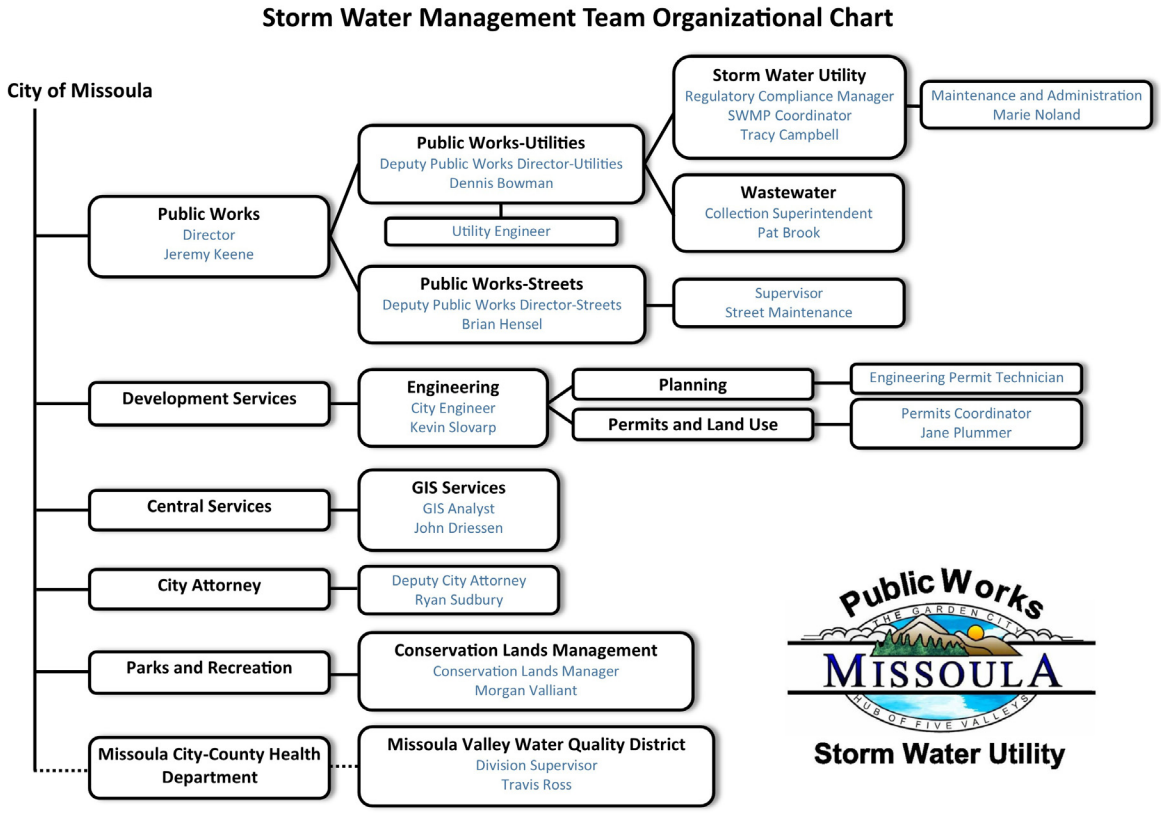

Figure 1. City of Missoula Storm Water Management Program Team Organizational Chart

1 MCM 1 – Public Education and Outreach

The permittee shall implement a storm water public education program to develop or adapt, distribute, and evaluate educational materials and outreach activities to key target audiences in the MS4 that raise awareness about the impacts of storm water discharges on waterbodies, educate audiences about the behaviors and activities that have the potential to pollute storm water discharges, and motivate action to change behaviors to reduce pollutants in storm water runoff.

According to the USEPA, NPS pollution is the largest contributor to water quality degradation in the United States (USEPA, 2016). NPS pollution directly affects Missoula storm water, impairing water quality, aquatic life, and recreational opportunities. NPS pollution can come in the form of common household activities such as pet waste, lawn care, and automobile washing and maintenance or by way of construction work such as sediment runoff or an illicit discharge by way of many different construction site activities. Educating the Missoula community can reduce individual contributions to pollution and improve water quality as a whole.

1.1 Target Audiences

Target audiences include the general public, contractors, and municipal employees. Each group has specific activities contributing to storm water quality degradation and ways in which the City of Missoula can work with them to decrease NPS pollution.

1.1.1 Pollutants and Target Audiences

The general public may produce NPS pollutants such as nitrogen, phosphorus, and organic enrichment and these pollutants may be largely attributed to septic systems, lawn care, and pet waste. Education for the general public includes the website, educational pamphlets, utility stuffers, television and radio public service announcements (PSAs), and printed advertising. Contractor activities have the potential to contribute to soil erosion and sedimentation. Finally, in conjunction with the MCM 6 (Pollution Prevention/Good Housekeeping for Municipal Operations), it is important for municipal employees to be educated about storm water pollution prevention.

The City Storm Water Utility subscribed to ProProfs in 2019 and has created one module to train municipal employees on storm water pollution prevention at https://www.proprofs.com/training/course/?title=pollution-prevention-and-good-housekeeping_5d51bb60247a0.

1.1.1.1 2020 Goals

- General Public: At least one employee from the Storm Water Utility will attend at least four neighborhood council meetings.
    - 2019 – The Storm Water Utility attended three neighborhood council meetings.
- Contractors: Host one storm water pollution prevention and construction BMP training for at least five local contractors in fall/winter 2020.
- Municipal Employees: Educate at least 50 City employees about storm water pollution prevention using ProProfs.
    - 2019 – Five employees completed the training

1.1.2 Website

The City Storm Water Utility maintains a website that provides links to city projects, construction permits, designs and drawings, pollution prevention, flood information, training opportunities, and utility rates: http://www.ci.missoula.mt.us/2138/Storm-Water-Division.

1.1.2.1 2020 Goals

- Update the banner on the website at least once a month

1.2 Outreach Strategy

1.2.1 Media

Television, radio, and newspaper ads are used to encourage participation in Household Hazardous Waste Days, the ads focus on the importance of proper waste disposal. Other PSAs target riparian habitat protection. Through these PSAs, the public receives the knowledge they need to respect and help maintain our parks and open spaces, to help reduce storm water pollution.

1.2.1.1 2020 Goals

- Publish educational banners on Mountain Line buses: pet waste, leaky vehicles, and grass clippings by June 1, 2020

1.2.2 Local Partnerships

The Storm Water Utility provides financial support to the Watershed Education Network to provide classroom and field education to students throughout the Clark Fork Watershed about surface water and groundwater issues. Students learn how to assess surface water quality through macroinvertebrate identification and stream assessments of physical and chemical conditions.

1.2.2.1 2020 Goals

- Establish a partnership with at least two local non-profits by May 1, 2020

2 MCM 2 – Public Involvement and Participation

The permittee shall develop a strategy to involve key target audiences in the development and implementation of the SWMP that complies with state and local public notice requirements.

The City has many active and engaged citizens that are involved in volunteer organizations. These volunteers support many water pollution-related projects: e.g., Household Hazardous Waste Days, River Bank Cleanup, storm drain stenciling, and riparian/wetland planting projects.

2.1 Approaches for Involving Target Audiences

2.1.1 Approaches

Using mass media and social media, the Storm Water Utility aims to reach its target audiences through informational ads and photographs. Additionally, the City collaborates with civic groups to engage concerned community members.

2.1.1.1 2020 Goals

- Support at least two community events with non-profit partners
- With the assistance of the Public Works Communication Specialist, establish a Public Works account on Facebook and Instagram

2.2 Website

2.2.1 Website

The City Storm Water Utility maintains a website that provides links to city projects, construction permits, designs and drawings, pollution prevention, flood information, training opportunities, and utility rates: http://www.ci.missoula.mt.us/2138/Storm-Water-Division. The website also provides a link to submit illicit discharge complaints.

2.2.1.1 2020 Goals

- Implement citizen relationship management software and smartphone app
- Solicit input on SWMP
- Link to partner websites and community events

3 MCM 3 – Illicit Discharge Detection and Elimination

The permittee shall develop, implement and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4.

Illicit discharge is any discharge that is not comprised entirely of rainfall or snowmelt. To effectively control illicit discharges to the storm water sewer system, the City has created an IDDE Program consisting of several components: a storm water sewer system geographic database, ordinances prohibiting illicit discharges, an illicit discharge monitoring program, and an education program. Each serves a critical function in reducing illicit discharges to surface waters. Particular attention is paid to the causes of impairment per the *MDEQ Water Quality Integrated Report* (MDEQ, 2018a and b).

3.1 Frequent Non-Storm Water Illicit Discharges

The City has identified frequent categories of non-storm water discharges (Table 6).

Table 6. Frequent Categories of Non-Storm Water Discharges

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Water line flushing	No	Chlorine Sediment	General Permit for Disinfected Water and Hydrostatic Testing

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Irrigation – Missoula Water	No	Chlorine	None
Irrigation - Ditches	No	Sediment Nitrogen Phosphorus Temperature Chlorophyll-a	Local ditches usually infiltrate the ground prior to reaching a surface water.
Diverted stream flows	No	Sediment	Joint Application and Construction Dewatering General Permit
Rising ground waters	No	None	None
Uncontaminated ground water infiltration	No	None	None
Uncontaminated pumped ground water	No	None	None
Discharges from potable water sources	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Footing/Foundation drains	No	None	None
Air conditioning condensation	No	None	None
Irrigation water	No	Chlorine Sediment Nutrients	None
Springs	No	None	None
Individual residential car washing	No	Sediment Detergent Metals	None
Flows from riparian habitats and wetlands	No	Sediment Nitrogen Phosphorus	None
Dechlorinated swimming pool/splash pad discharges	Yes	Cyanuric acid Algaecide Detergent Salt Variable pH Human waste Disinfection Byproducts	Municipal pools are not prohibited from discharging dechlorinated water into the MS4 (MMC 13.27.200).
Street wash water	Yes	Hydrocarbons Metals Trash Sediment Nitrogen Phosphorus	Wash water has high potential for pollutants and the street cleaning trucks vacuum the water after washing, to prevent the water from entering the MS4.

3.1.1 Evaluate Frequent Non-Storm Water Discharges

Annually, the Team will evaluate and update the frequent categories of non-storm water discharges.

3.1.1.1 2020 Goals

- Review municipal operations for compliance with the *General Permit for Disinfected Water and Hydrostatic Testing*

3.2 Occasional Incidental Non-Storm Water Discharges

The City has identified occasional/incidental non-storm water discharges.

Table 7. Occasional Incidental Non-Storm Water Discharges

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
Charity carwash	No	Hydrocarbons Metals Trash Sediment Nitrogen Phosphorus	A free "Clean Suds' Car Wash Kit" is available from the MVWQD.
Water main break	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Water pressure testing	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Water line flushing	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing
Emergency firefighting activities	No	Chlorine	General Permit for Disinfected Water and Hydrostatic Testing

3.2.1 Evaluate Occasional Incidental Non-Storm Water Discharges

Annually, the Team will evaluate and update the categories of occasional incidental non-storm water discharges. If any of these discharges are determined to be a significant contributor of pollutants, the MVWQD's Enforcement Response Plan (ERP) will be initiated.

3.2.1.1 2020 Goals

- Review municipal operations for compliance with the *General Permit for Disinfected Water and Hydrostatic Testing*

3.3 Infrastructure Inventory

The City uses GIS to map storm water infrastructure: e.g., pipes, sumps, and outfalls. An interactive map is provided on the City's website.

3.3.1 Mapping

As-built drawings are submitted prior to project close-out for projects constructed within the City. Upon receipt of these drawings, the GIS database is updated to reflect the changes made during construction. As we update our inventory with new data, it is also important to reconcile existing data. The City's storm water system is aging and deferred maintenance is a prime issue. It is important to track the condition of existing infrastructure, to prioritize projects and inform management decisions.

3.3.1.1 Goals

- Use an app, such as ArcGIS Collector, to collect field data and update the GIS database

3.4 Ordinance to Prohibit Illicit Discharges

In 2000, the City Council and the Board of County Commissioners amended the Missoula Aquifer Protection Ordinance, originally adopted in 1993. The ordinance is intended to protect the public health, safety, and general welfare of those who depend upon the Missoula Valley Aquifer and surface waters in the Missoula Valley for drinking water, recreation, and other beneficial uses. The provisions of the ordinance (Chapter 13.26, Missoula Municipal Code) are applied to an area within five miles of the City limits.

3.4.1 Chapter 13.26 Missoula Municipal Code

The ordinance establishes prohibitions and/or restrictions on regulated substances and activities that have the potential of causing surface or groundwater contamination. Facilities that store regulated substances above the specific quantities are required to obtain a permit from the MVWQD. This requires facilities to report chemical quantities and steps taken to reduce the likelihood of spills to the MVWQD every two years. Regulated Substances are any substances that may threaten contamination of surface water or the Missoula Valley Aquifer, excluding substances used for personal household use. The Missoula Valley Water Quality Ordinance also gives the MVWQD the authority to perform inspections and enforce the provisions of the ordinance. The Montana Water Quality Act, City-County Health Code, Missoula Municipal Code, and Uniform Plumbing Code all prohibit on-site sewage disposal systems that flow into the storm water system. Accordingly, the City maintains sanitary sewer connection records for all buildings.

3.4.1.1 2020 Goals

- MVWQD will provide quarterly reports on illicit discharges to the Storm Water Utility

3.4.2 Assistance from Neighboring MS4s to Detect and Eliminate Illicit Discharges

The City shares overlapping MS4 responsibilities with MDT, University of Montana, and Missoula County. To date, there are no formal agreements in place between the neighboring MS4s. The City's SWMP Coordinator has engaged the other MS4s in dialogue to improve coordination between the permittees. This includes attending stakeholder meetings and improving communication regarding jurisdictional boundaries, to determine responsibilities and implement appropriate BMPs.

3.4.2.1 2020 Goals

- Draft formal agreement with MDT
- The SWMP Coordinator will be a member of the University of Montana's Team
- The MVWQD Division Supervisor will be a member of the City's Team

3.4.3 Enforcement Response Plan

The MVWQD and City Fire Department have the legal authority to respond to hazardous material spills within the City limits. Both agencies possess the equipment, tools, and supplies as well as training in proper hazardous spill mitigation techniques. The MVWQD tracks and documents illicit discharges, investigations, and corrective actions. The Enforcement Response Plan is provided in Appendix B.

3.4.3.1 2020 Goals

- Review the ERP with the Team on June 29, 2020, per MS4 Permit conditions
- Map enforcement responses and investigations

3.5 Dry-Weather Inspections

The City must conduct dry weather inspections of all outfalls by the end of the current permit cycle (2021).

3.5.1 Outfall Reconnaissance

The Storm Water Utility has drafted an Outfall Reconnaissance report that is provided in Appendix C. There are 59 outfalls within the City's MS4 jurisdiction and 14 were inspected during dry weather in 2019. The Storm Water Utility will continue with proactive, dry-weather screening and intends to complete an inventory of all identified outfalls by the end of 2021.

3.5.1.1 2020 Goals

- Inspect 25 outfalls during dry weather in 2020 and 20 in 2021

3.5.2 High-priority Outfalls

Using the results of the outfall reconnaissance, the Storm Water Utility must identify the high-priority outfalls, per their potential to adversely affect water quality. The City is evaluating the criteria that will be used to designate outfalls as high priorities. When available, the method and the high-priority outfalls that we have identified will be presented in the SWMP. As the outfalls are screened throughout the remainder of this permit cycle, they will be evaluated according to various conditions: e.g., land use in drainage area; presence/absence of flow; odor; color; turbidity; floatables; outfall damage; and proximity to surface water. Once the high-priority outfalls have been identified, they shall be inspected at least once annually.

3.5.2.1 2020 Goals

- Develop screening procedure for identifying high-priority outfalls
- Identify high-priority outfalls by July 1, 2020
- Inspect the high-priority outfalls in 2020

3.6 Investigate Suspected Illicit Discharges and Track Compliance

The WQD has developed an Illicit Discharge Investigation and Corrective Action Plan, to enforce the terms of the Missoula Valley Water Quality Ordinance (§13.26.120, Missoula Municipal Code).

3.6.1 Investigation and Compliance

The MVWQD tracks and documents suspected illicit discharges, investigations, and corrective actions, per their Illicit Discharge Investigation and Corrective Action Plan (Appendix B). A list of illicit discharge

complaints and investigations during 2019 is provided in Appendix D.

3.6.1.1 2020 Goals

- Review the Illicit Discharge Investigation and Corrective Action Plan with the Team on June 29, 2020, per MS4 Permit conditions
- Receive quarterly reports on suspected illicit discharges from the MVWQD
- Map illicit discharges and investigations

4 MCM 4 – Construction Site Storm Water Management

The permittee shall develop, implement, and enforce a program to reduce pollutants in storm water runoff to the permitted Small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. If the Department waives its permitting requirements for storm water discharges associated with construction activity that disturbs less than five acres' total land area in accordance with ARM 17.30.1105(5), the Small MS4 permittee is not required to develop, implement, and / or enforce a program to reduce pollutant discharges from such sites.

Storm water runoff from construction sites can enter the storm water system and has the potential to be discharged into local rivers and streams. Sediment is the main construction pollutant of concern in the Missoula Valley. Sedimentation reduces the amount of sunlight reaching aquatic plants, clogs fish gills, smothers aquatic habitat, covers riffles which oxygenate the water, impedes navigation, and contributes to flooding by reducing capacity. Sediment runoff rates from construction sites are typically 10 to 20 times greater than agricultural lands, and 1,000 to 2,000 times greater than forests. Construction sites have the potential to contribute more sediment to streams over several weeks than would be deposited naturally over several decades. Additionally, construction sites may discharge solid and sanitary waste, phosphorus, nitrogen, pesticides, oil and grease, concrete truck washout, construction chemicals, and construction debris to state waters.

4.1 Ordinance to Regulate Construction Storm Water Controls

On October 12, 2016, the City Council unanimously passed Ordinance 3580, repealing Chapter 15.65 of the Missoula Municipal Code and establishing Chapter 13.27: Storm Water Utility, Rates, and Regulations. This chapter established the City Storm Water Utility and regulations related to storm water pollution prevention and control. Additionally, the City *Storm Water Specifications and Design Standards* was adopted on August 9, 2016 (Appendix E). Standard drawings are provided in Appendix F; they can be accessed via the City website and through a link provided on the Storm Water Utility homepage.

4.1.1 Revisions to Chapter 13.27, Missoula Municipal Code

Chapter 13.27 is being revised and a public hearing is scheduled for March 9, 2020. A draft of the proposed ordinance is provided in Appendix G. The revisions address performance standards, permitting, site plan submittal, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. It also establishes a permit fee structure and penalties for violations. Under the City's proposed regulations, it shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of a lot by 3 feet or more, without first obtaining a City Storm Water Permit (Appendix H). Land disturbance activities related to agricultural practices or improvements are exempt from this requirement, as is any emergency activity that is immediately necessary for the protection of life, property, or natural resources. Activities that disturb one acre or more of land—or less than one acre but are part of a larger common plan of development—are also required to obtain coverage under MDEQ's *General Permit for Storm Water Discharges Associated with Construction Activity*, in addition to the Storm Water Permit.

Additionally the City Public Works and Development Services Departments are working together to draft a City manual for design standards and specifications. The new manual will include updated erosion control standards, to comply with MS4 Permit conditions.

4.1.1.1 2020 Goals

- Implement City Storm Water Permit by June 1, 2020
- Revise and publish City storm water standards and specifications before January 2021

4.1.2 Enforcement Response Plan

The MVWQD implements a formal ERP to investigate suspected illicit discharges (Appendix B).

Construction storm water runoff is a potential source of illicit discharge; however, the ERP does not currently list it as a source. Per the ERP, the MVWQD investigates illicit discharge complaints within 3 business days of receiving them. When possible, the investigation occurs within 24 hours. If necessary, a notice of violations is issued within 1 to 3 business. If compliance is not achieved, the City-County Health Department will pursue compliance through the enforcement procedures outlined in Missoula Municipal Code and City-County Health Code.

4.1.2.1 2020 Goals

- Review and update the MVWQD's ERP with the Team on June 29, 2020, per the conditions in the MS4 Permit
- Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code

4.2 Erosion Control Site Plan

The City requires a Grading, Drainage, and Erosion Permit for projects that proposed to change the grade of a lot by 3 feet or more. Additionally, projects that require a *General Permit for Storm Water Discharges Associated with Construction Activity* must demonstrate coverage under this permit. Site plans and storm water controls are reviewed by Development Services, Public Works, City-County Health Department, and MVWQD, prior to project approval.

4.2.1 Erosion Control Site Plan Review Checklist

The City is proposing updates to Chapter 13.27, to regulate construction site storm water management. The Storm Water Permit will replace the Grading, Drainage, and Erosion Permit. An Erosion Control Site Plan is required as part of the Storm Water Permit package (Appendix H). This plan provides details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage storm water runoff during construction. An Erosion Control Site Plan Review Checklist is available for the applicant, to ensure their plan meets the City's requirements. This checklist will also be used by City personnel to ensure consistent, thorough reviews of these plans.

4.2.1.1 2020 Goals

- Implement Erosion Control Site Plan Review Checklist by June 1, 2020.

4.3 Construction Inspections

The purpose of the proposed Storm Water Permit is to improve the City's process for tracking and documenting compliance with the MS4 Permit. Part of this process includes performing construction inspections, to ensure storm water controls are being installed, operated, and maintained in order to function as designed.

4.3.1 Inspection Form Checklist

The City has drafted a construction site storm water management inspection form (Appendix H). To support these inspections, seven staff members became certified SWPPP Administrators on February 14, 2020. Additionally, to accommodate the increased workload, the City will have to hire two full-time employees.

4.3.1.1 2020 Goals

- Hire two full-time employees for inspections
- Conduct construction inspections using the City's inspection form by June 1, 2020

4.3.2 Inspection Frequency Determination

Per the proposed ordinance revisions, the Storm Water Permit applicant shall complete the Construction Inspection Frequency Determination to identify their project's priority ranking (Appendix H). The priority ranking of their project determines how often the site will be inspected.

4.3.2.1 2020 Goals

- Implement Construction Inspection Frequency Determination by June 1, 2020

5 MCM 5 – Post-Construction Site Storm Water Management in New and Redevelopment

The permittee shall develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre. Including projects less than one acre that are part of a larger common plan of development of sale that discharge into the permitted Small MS4. This program must ensure that controls are in place that would prevent or minimize water quality impacts.

There are generally two forms of substantial impacts of post-construction runoff. The first is caused by an increase in the type and quantity of pollutants in storm water runoff. As runoff flows over areas altered by development, it picks up sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters. The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to waterbodies during storms. Increased impervious surfaces (e.g., parking lots, driveways, and rooftops) interrupt the natural cycle of gradual infiltration of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems, where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include streambank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property. City regulations are BMPs that address these impacts.

5.1 Ordinance to Regulate Post-Construction Storm Water Controls

Various City ordinances address growth and the protection of sensitive areas, riparian resources, and open space, to provide watershed protection. Chapter 20.20 Open Space and Public Districts defines two types of open space that offer watershed protection. Zoning district OP1 is primarily intended to preserve open space and sensitive natural resource areas. Zoning district OP2 is intended to preserve open space and sensitive natural resource areas, while also allowing very low-density residential use, ideally in the form of cluster development.

Chapter 20.25 Overlay Districts defines a Planned Unit Development Overlay, which is intended to accommodate development that may be difficult—if not impossible—to carry out under otherwise applicable zoning district standards. One such example would be developments that offer enhanced protection of natural resources and sensitive environmental features, including streams, water bodies, floodplains, wetlands, steep slopes, woodlands, wildlife habitats, and native plant communities. The developer must provide a written explanation describing the community benefits of the proposed development and how the proposed development provides greater benefits to the City than would a development carried out in accordance with otherwise applicable zoning ordinance standards.

Chapter 20.50 Natural Resource Protection sets requirements for developments and disturbances on average slopes greater than 15% and in areas of riparian resources. The purpose of this chapter, among

other things, is to preserve drainage channels and streams, encourage innovative pollution prevention techniques in environmentally sensitive areas, and mitigate adverse impacts including erosion and the degradation of air and water quality. This chapter is part of the zoning compliance permit process and must be completed before a zoning compliance permit is issued.

Section 20.50.030 Riparian Resource Protection defines areas of riparian resources and restricts development within those areas. Construction is permitted in areas of riparian resource only when a detailed management plan provides for restoration and/or replacement of the riparian area.

5.1.1 Revisions to Chapter 13.27, Missoula Municipal Code

Chapter 13.27 is being revised and a public hearing is scheduled for March 9, 2020. The revisions address performance standards, permitting, site plan submittal, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. It also establishes a permit fee structure and penalties for violations. Under the proposed regulations, it shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of a lot by 3 feet or more, without first obtaining a City Storm Water Permit. The trigger for identifying post-construction storm water management controls is linked with the priority rank of the Erosion Control Site Plan. Medium- to high-priority sites must also submit a post-construction Storm Water Management Site Plan with the Storm Water Permit application (Appendix H).

5.1.1.1 2020 Goals

- Track and document Riparian Resource Management Plans
- Implement the City Storm Water Permit by June 1, 2020

5.1.2 Enforcement Response Plan

The MVWQD implements a formal ERP to investigate suspected illicit discharges (Appendix B). Currently, the ERP does not address post-construction storm water controls. By the end of 2020, the ERP must be updated to ensure compliance with the installation, operation, and maintenance of post-construction storm water management controls.

5.1.2.1 2020 Goals

- Review and update the MVWQD's ERP with the Team on June 29, 2020, per the conditions in the MS4 Permit
- Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code

5.2 Storm Water Management Site Plan

Site plans and storm water controls are reviewed by Development Services, Public Works, City-County Health Department, and MVWQD, prior to project approval.

5.2.1 Storm Water Management Plan Review Checklist

Per the proposed revisions to Chapter 13.27, a Storm Water Management Site Plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction storm water management, including drawings, engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation. A Storm Water Management Plan is required for medium- to high-priority projects, per the Construction Inspection Frequency Determination.

Additionally, the applicant shall use the Storm Water Management Site Plan Review Checklist to ensure their plan meets the City's requirements. This checklist will also be used by City personnel to ensure consistent, thorough reviews of these plans. The Storm Water-Notice of Termination shall include a recorded covenant for maintenance, utility easement, and an accurate post-construction (as-built) plan of the system, signed and sealed by a Montana-licensed professional engineer.

5.2.1.1 2020 Goals

- Implement Storm Water Management Site Plan Review Checklist by June 1, 2020

5.2.2 Performance Standards

The proposed ordinance states that all projects subject to a Storm Water Permit must implement post-construction storm water controls that are designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall, from a 24-hour storm preceded by 48 hours of no measureable precipitation (Appendix G). For projects that cannot meet 100% of the

runoff reduction requirement, the remainder of the runoff must be treated using BMPs expected to remove 80% total suspended solids.

5.2.2.1 2020 Goals

- Create an inventory of projects that utilize off-site treatment by the end of 2020

5.3 Post-Construction Inspections

The purpose of the proposed Storm Water Permit is to improve the City's process for tracking and documenting compliance with the MS4 Permit. Part of this process includes performing post-construction inspections, to ensure storm water controls are being operated and maintained in order to function as designed.

5.3.1 Inspection Form Checklist

The City has drafted a post-construction site storm water management inspection form (Appendix H). To support these inspections, the City will have to hire two new full-time employees.

5.3.1.1 2020 Goals

- Hire two full-time employees to conduct inspections
- Conduct post-construction inspections using the City's inspection form by August 1, 2020

5.3.2 Inventory

The City is working to develop an inventory of all City-owned and private post-construction storm water management controls installed since January 1, 2017. The sites will be determined by reviewing approved development plans from January 1, 2017 through the present date. After digitizing the sites in ArcGIS, they will be visually inspected to ensure that they were installed according to the development plans. The locations will be field-verified with a GPS unit with sub-meter accuracy.

5.3.2.1 2020 Goals

- Review completed developments from January 1, 2017 through the present date
- Digitize and field-reconcile the post-construction storm water control by November 1, 2020

5.3.3 Inspection Frequency Determination

Per the proposed ordinance, the Storm Water Permit applicant shall complete the Post-Construction Inspection Frequency Determination to identify their project's priority ranking, with the City making the final determination of priority ranking (Appendix H). The priority ranking determines how often the site will inspected. Low- to medium-priority sites will be self-inspected annually, with high-priority sites inspected annually by the City. All sites will require a Storm Water Permit renewal every 5 years and the City will conduct a 5-year inspection of these sites.

5.3.3.1 2020 Goals

- Implement Post-Construction Inspection Frequency Determination by June 1, 2020

5.3.4 Inspection Program

The City is working on implementing a post-construction storm water management inspection program, using the Storm Water Permit. Per the Post-Construction Inspection Frequency Determination, low- to medium-priority sites shall be inspected annually by the owners, while the City will annually inspect high-priority sites. All sites require a 5-year inspection and Storm Water Permit renewal. This addresses inspection and reporting of both permittee-owned (public) and high-priority privately owned post-construction storm water controls.

5.3.4.1 2020 Goals

- Conduct post-construction inspections by August 1, 2020

5.4 Low Impact Development

The City has implemented a standard that requires storm water to be retained on site (Appendix E). However, no formal guidelines exist to instruct design engineers and developers on implementing low impact development standards.

5.4.1 Evaluate and Implement Low Impact Development Requirements

The City Public Works and Development Services Departments are working together to draft a manual for design standards and specifications. The new manual will include post-construction design standards, including design storm data for calculating runoff. It will incorporate low impact development and green

infrastructure design methods.

5.4.1.1 2020 Goals

- Revise and publish City storm water standards and specifications before January 2021
- Update standard drawings to incorporate low impact development and green infrastructure methods before January 2021

6 MCM 6 – Pollution Prevention/Good Housekeeping for Permittee Operations

The permittee shall develop and implement an operation and maintenance program which includes a training component, and has the ultimate goal of preventing or reducing pollutant runoff from permittee operations.

6.1 Operation and Maintenance Program

Some City departments and/or divisions have drafted their own Standard Operating Procedures, based on their particular activities and pollutants. However, there are no City-wide SOPs for storm water pollution prevention.

6.1.1 Standard Operating Procedures

The department/division-specific SOPs will be amalgamated to develop comprehensive SOPs that address MCM 6. The City intends to use ProProfs for pollution prevention training. This training will be made available to all staff that are directly involved with implementing the SOPs. Using ProProfs, the City will maintain documentation to track training.

6.1.1.1 2020 Goals

- Compile all department/division-specific SOPs by June 1, 2020
- Draft a City Pollution Prevention/Good Housekeeping Guidance Manual by the end of 2020

7 Training

City personnel participate in various trainings and workshops throughout the year, but these activities have not been tracked or documented.

7.1.1 Tracking Training

The City intends to implement various training modules using ProProfs: Comprehensive Training for the Team; Construction Site Storm Water Management; Post-Construction Storm Water Management in New and Redevelopment; and Pollution Prevention and Good Housekeeping. Using ProProfs, the City will maintain documentation to track training.

7.1.1.1 2020 Goals

- Develop and implement training on the MS4 Permit and SWMP for the Team by June 1, 2020
- Develop and implement construction site storm water management training for plan reviewers and inspectors by June 1, 2020
- Develop and implement post-construction site storm water management training for plan reviewers and inspectors by June 1, 2020
- Using ProProfs, train at least 50 employees in storm water pollution prevention

8 Special Conditions and Monitoring, Reporting, and Recording Requirements

The City Storm Water Utility strives to improve water quality, protect public safety, and comply with its MS4 Permit through a sampling and monitoring program.

8.1.1 Water Sampling Plan

The City submitted a Water Sampling Plan to MDEQ at the end of 2019. MDEQ approved the plan and it is provided in Appendix I. The City has selected self-monitoring Option 2 and the TMDL-related monitoring locations also fulfill the self-monitoring requirements.

8.1.1.1 2020 Goals

- Sample six locations twice annually
- Evaluate existing and potential sampling sites, focus on BMP performance, and include results in the 2021 SWMP

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Appendix A
City of Missoula Storm Water Infrastructure Maps

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

La Valle Creek Subwatershed

HUC 170102040202

City of Missoula

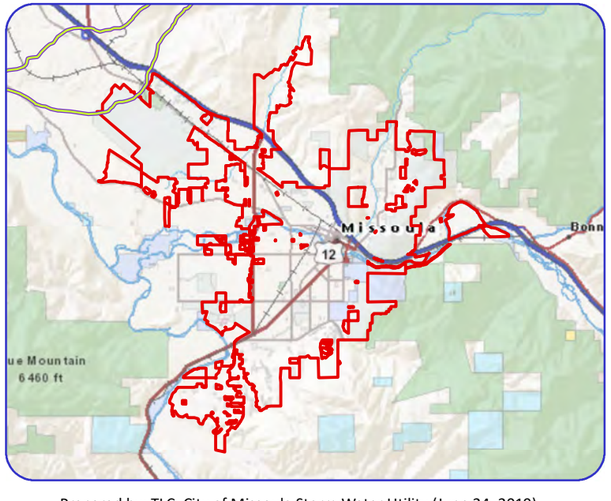
La Valle Creek Subwatershed

National Hydrography Dataset

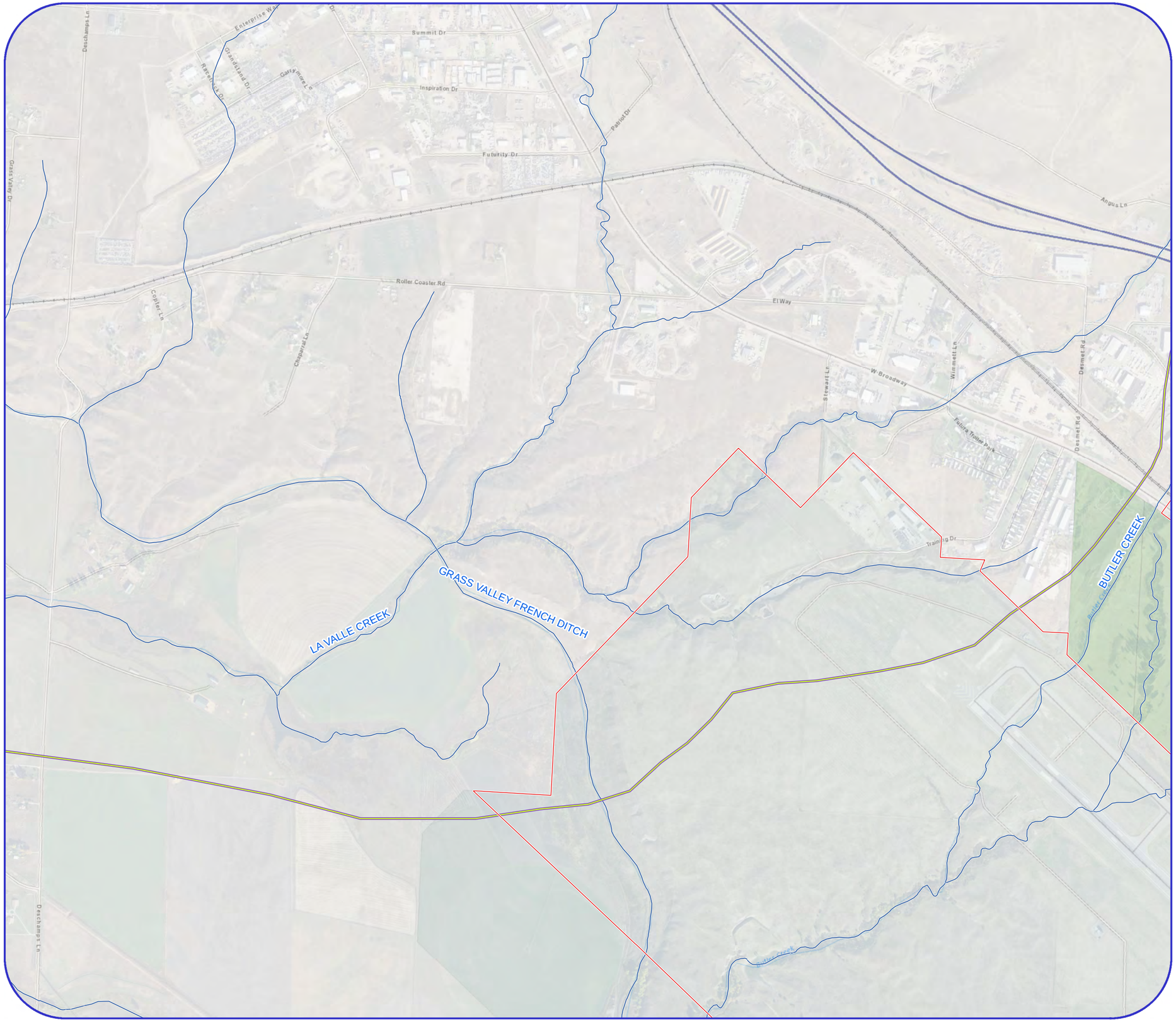
0 500 1,000 2,000

Feet

N



Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)



Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Butler Creek Subwatershed

HUC 170102040201

- City of Missoula
- Butler Creek Subwatershed
- Detention Point
- Pipe Termination
- Sump
- Gravity Main
- National Hydrography Dataset

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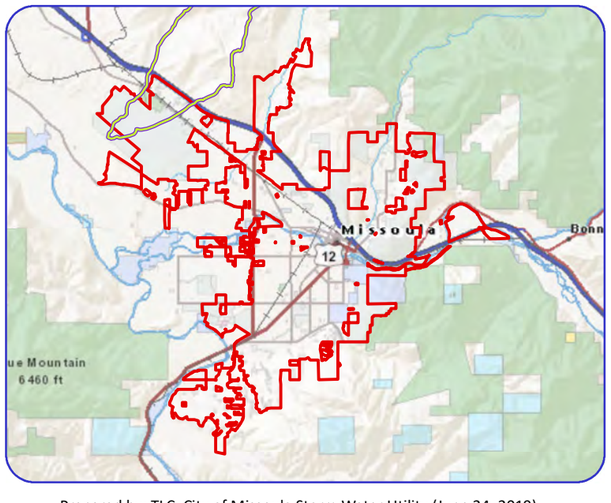

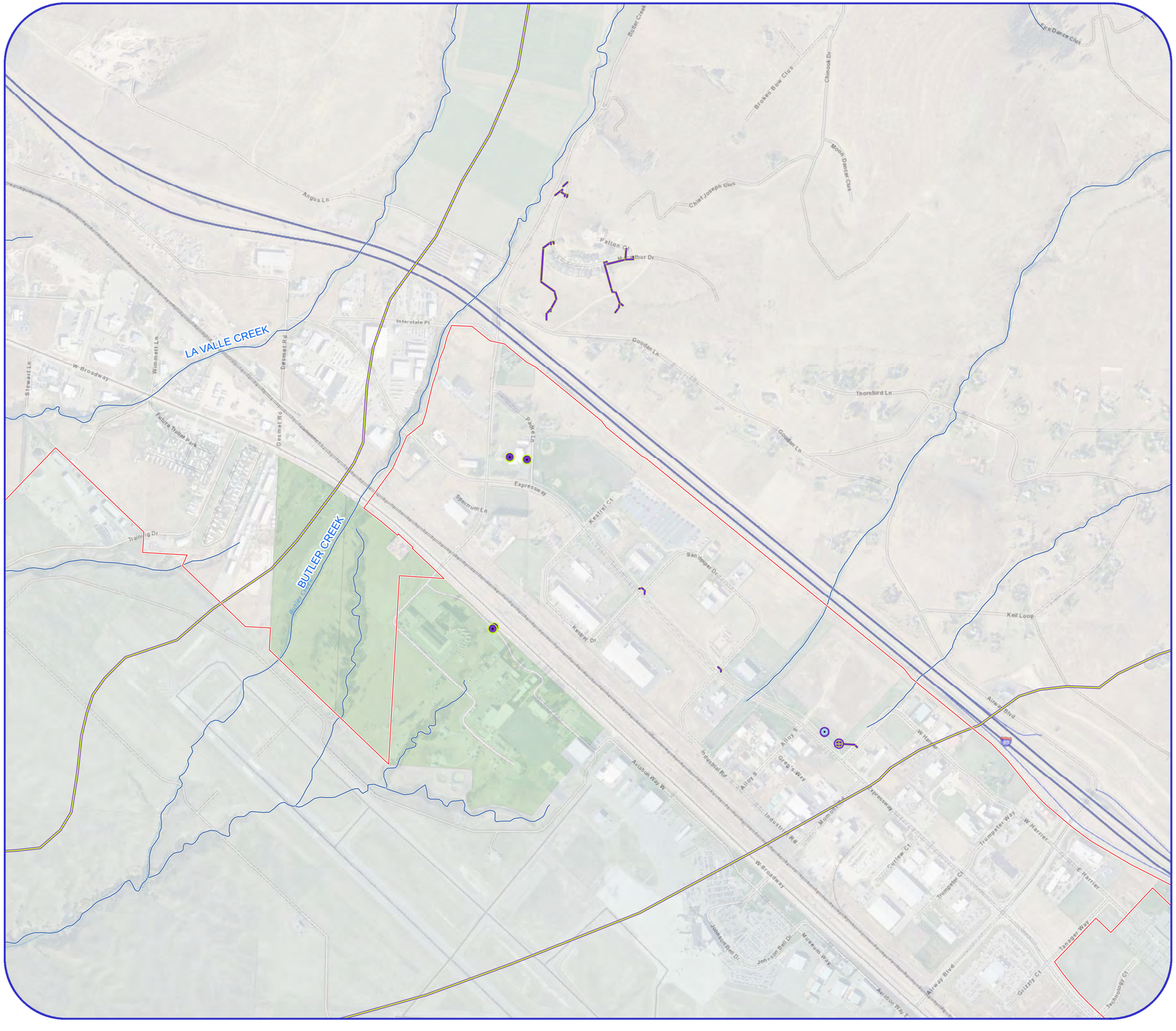

Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Martin Gulch-Clark Fork River Subwatershed

HUC 170102040205

- City of Missoula
- Martin Gulch-Clark Fork Subwatershed
- Detention Point
- Pipe Termination
- Gravity Main
- National Hydrography Dataset

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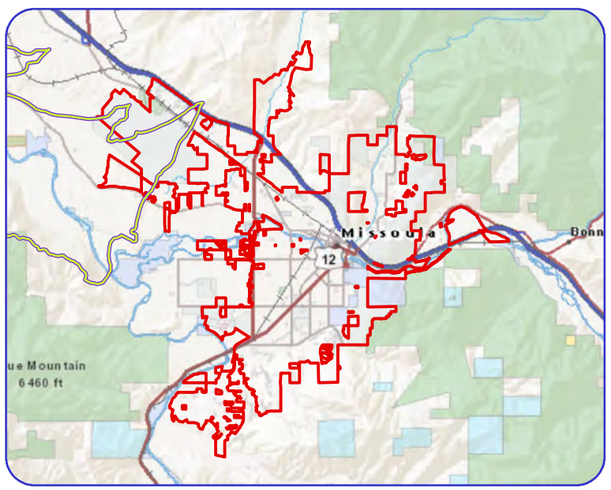
Feet



Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

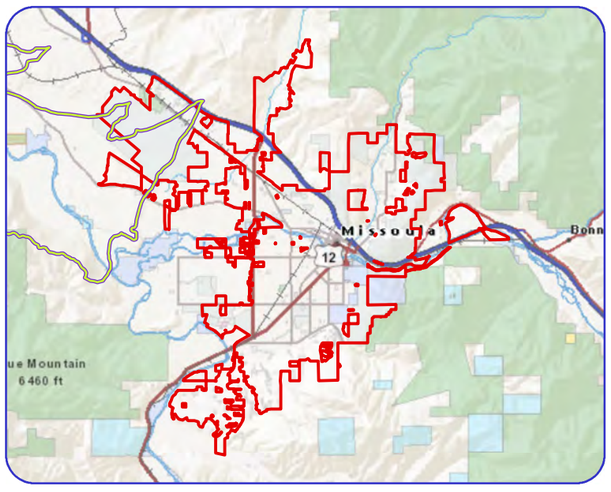
Martin Gulch-Clark Fork River Subwatershed

HUC 170102040205

- City of Missoula
- Martin Gulch-Clark Fork Subwatershed
- Detention Point
- Pipe Termination
- Gravity Main
- National Hydrography Dataset

0 500 1,000 2,000

Feet



Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Grant Creek Subwatershed

HUC 170102040103

- City of Missoula
- Grant Creek Subwatershed
- Detention Point
- Infiltration Device
- Outfall
- Pipe Termination
- Sump
- Gravity Main
- Levee
- National Hydrography Dataset

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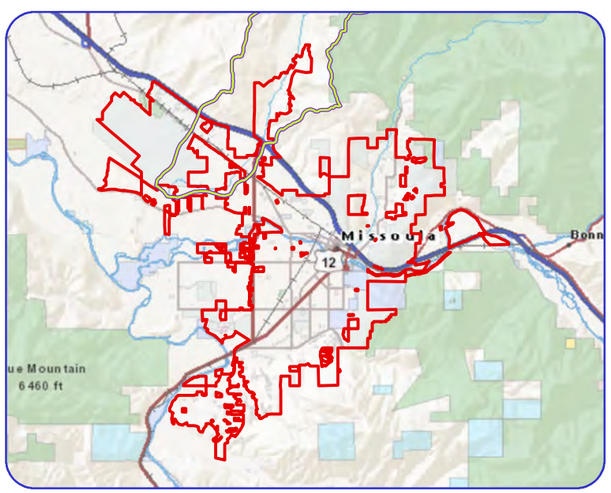

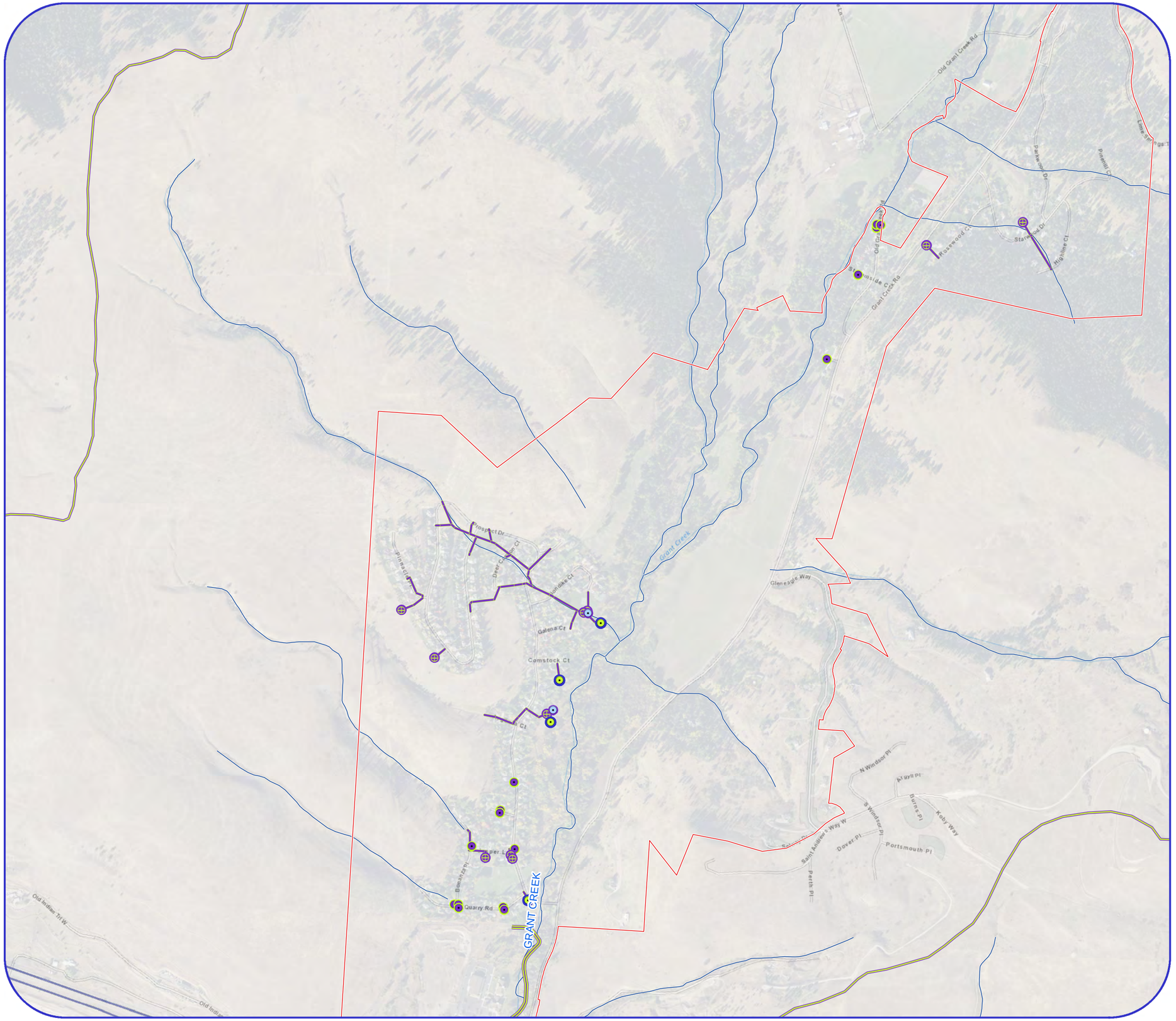

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Grant Creek Subwatershed

HUC 170102040103

City of Missoula

Grant Creek Subwatershed

Detention Point

Infiltration Device

Outfall

Pipe Termination

Sump

Gravity Main

Levee

National Hydrography Dataset

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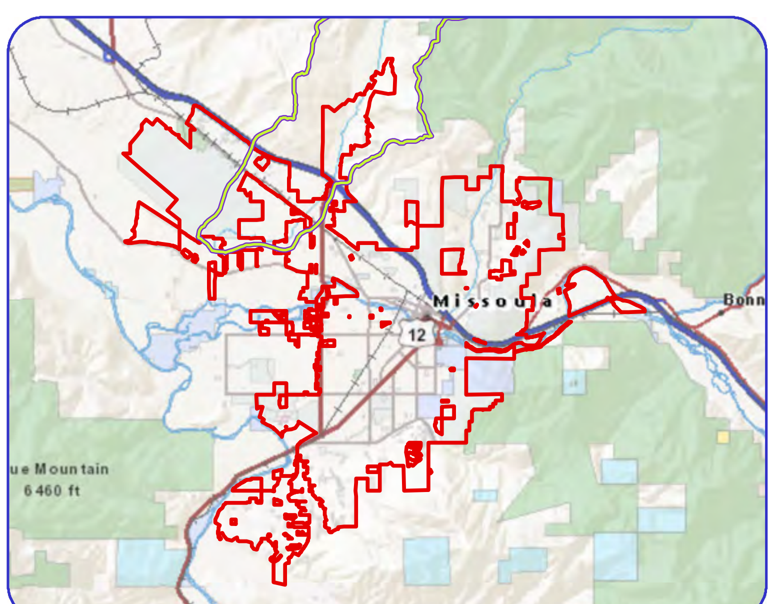
Feet



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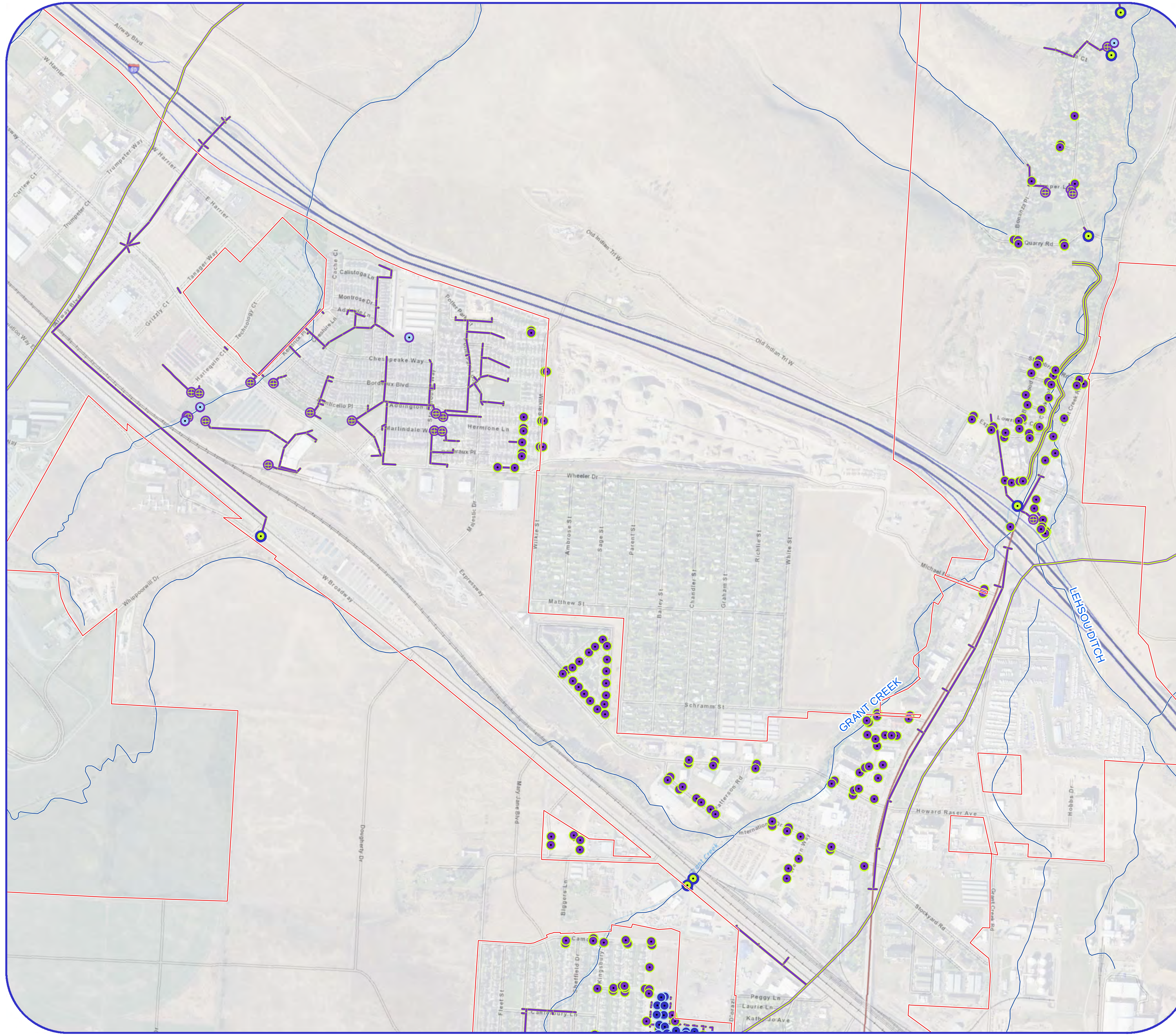

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THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Grant Creek Subwatershed

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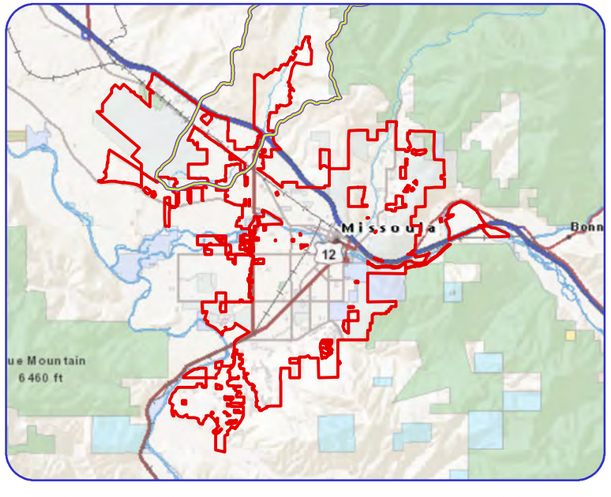

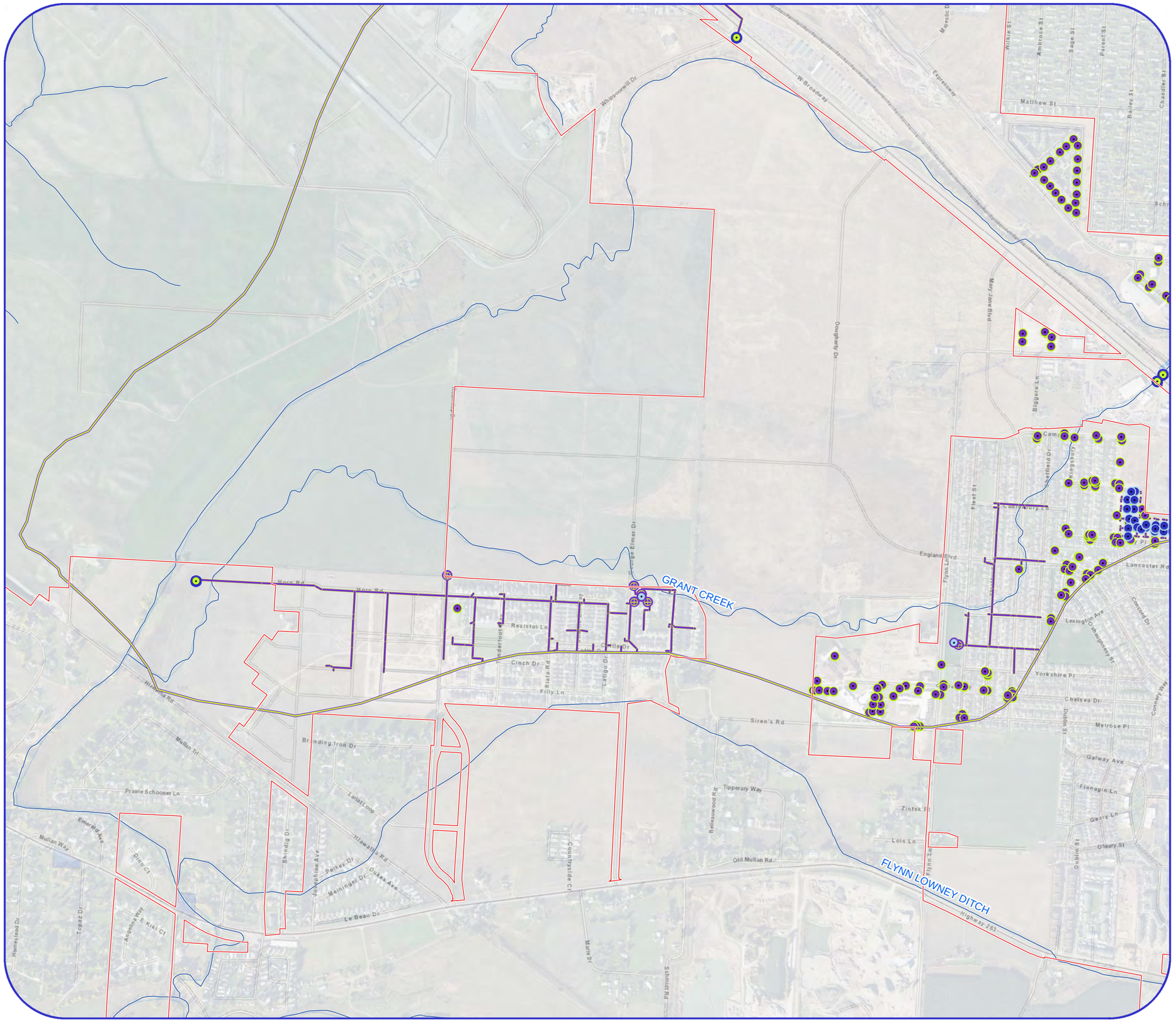

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

HUC 170102040104

- City of Missoula
- Marshall Creek-Clark Fork Subwatershed
- Detention Point
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- Outfall
- Pipe Termination
- Gravity Main
- Flood Wall
- Levee
- National Hydrography Dataset

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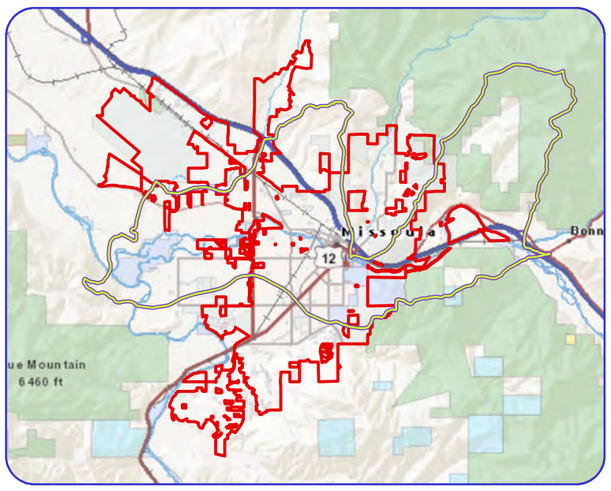
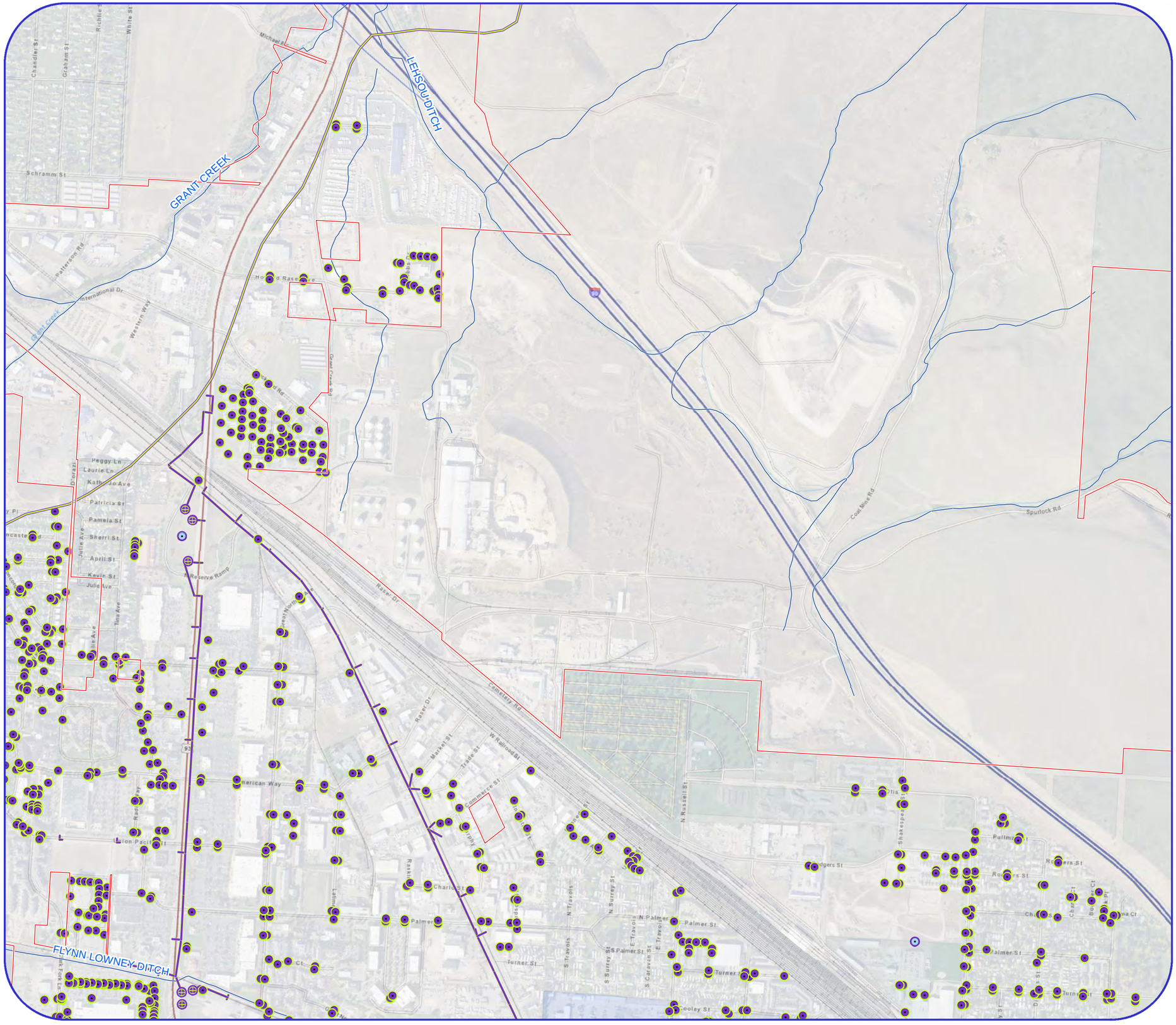


Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)



Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

HUC 170102040104

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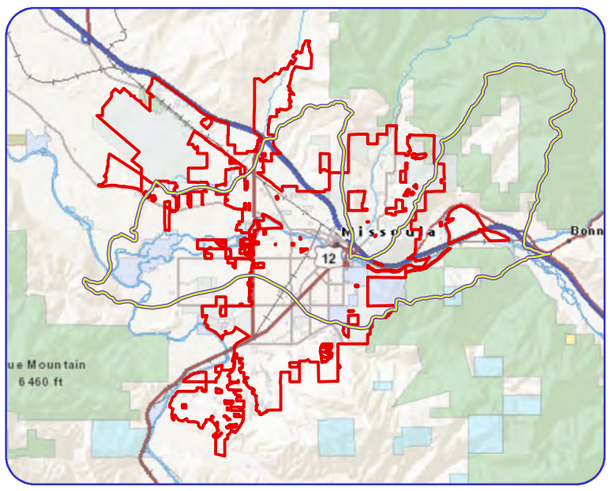

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

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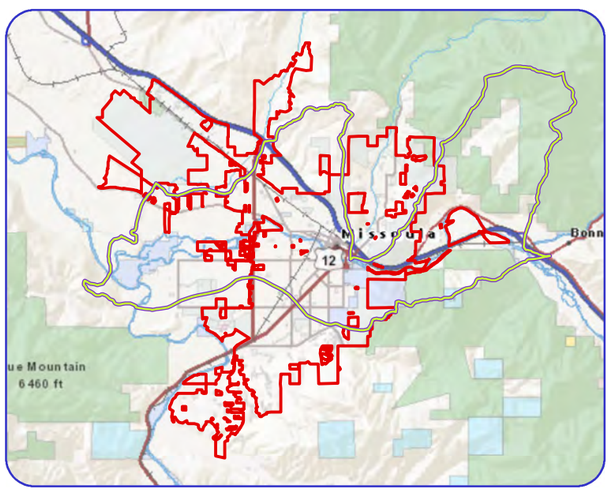
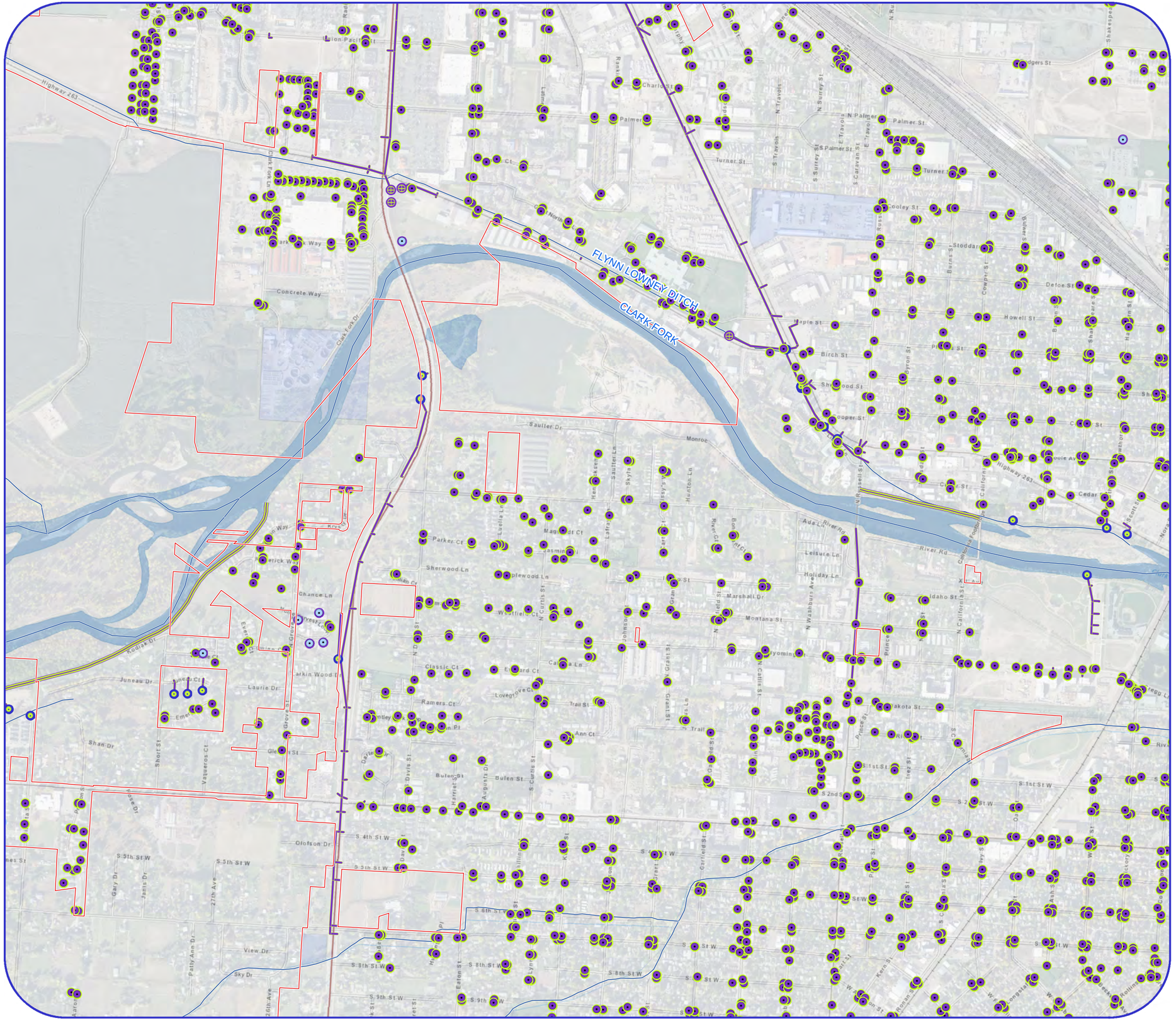


Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)



Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

HUC 170102040104

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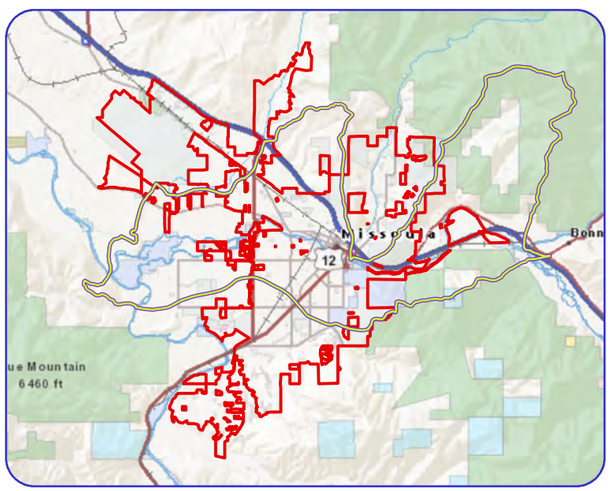

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HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

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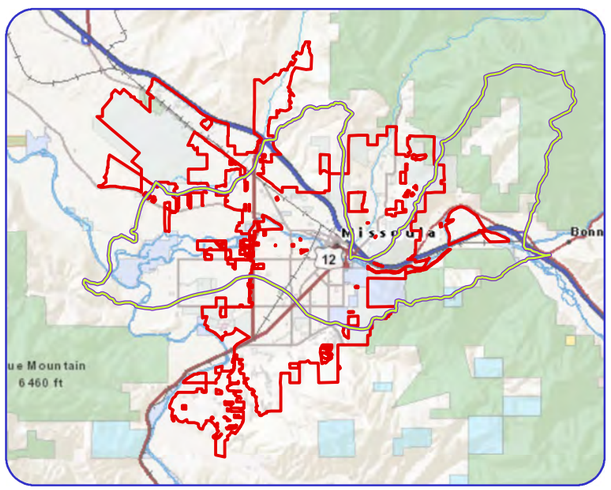
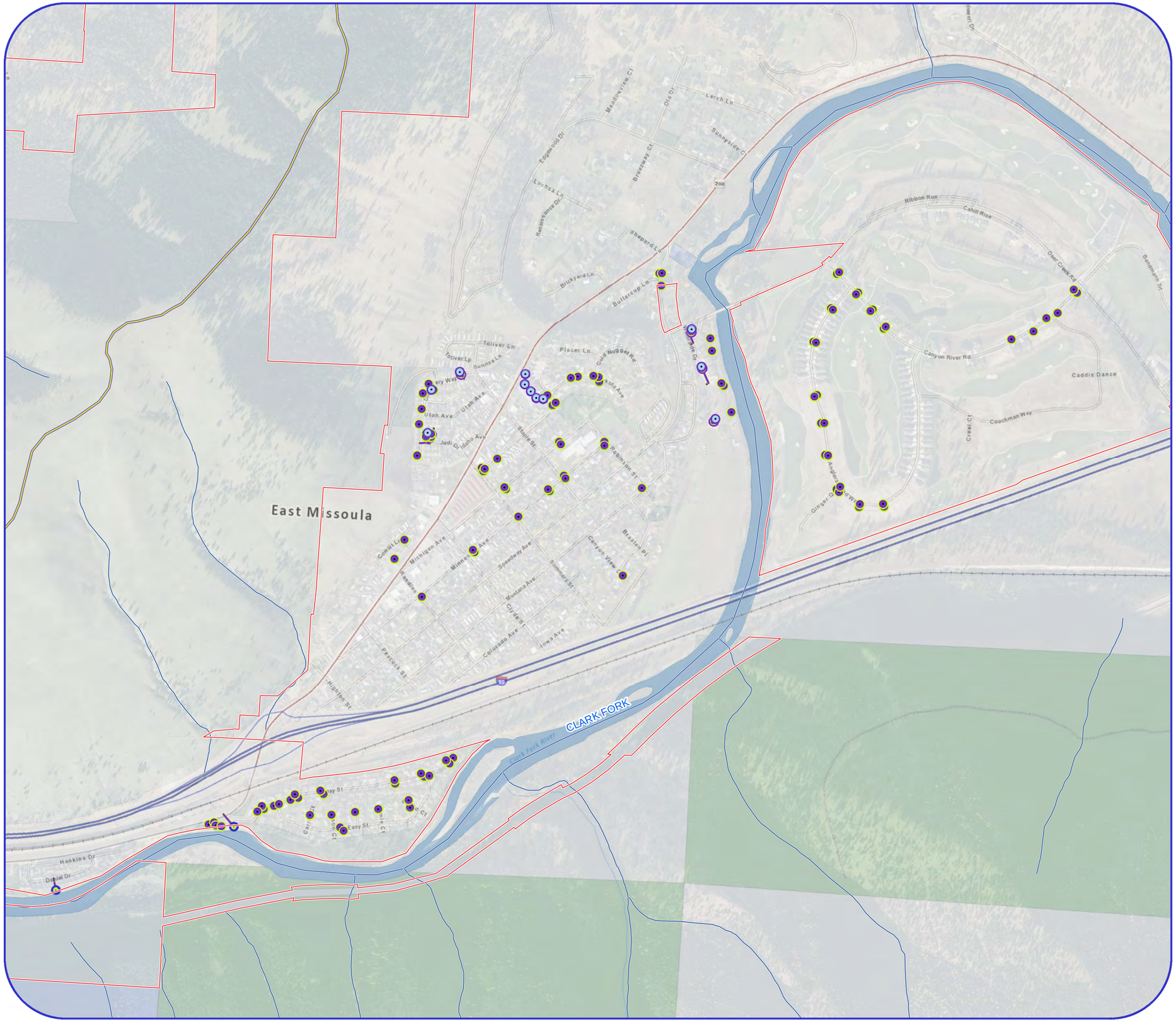
Feet





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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

HUC 170102040104

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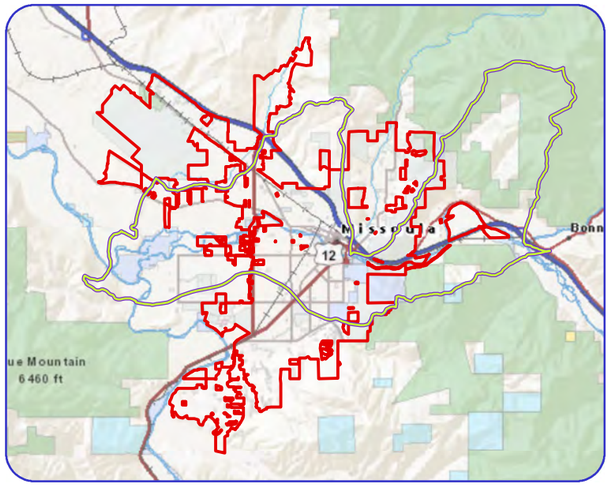
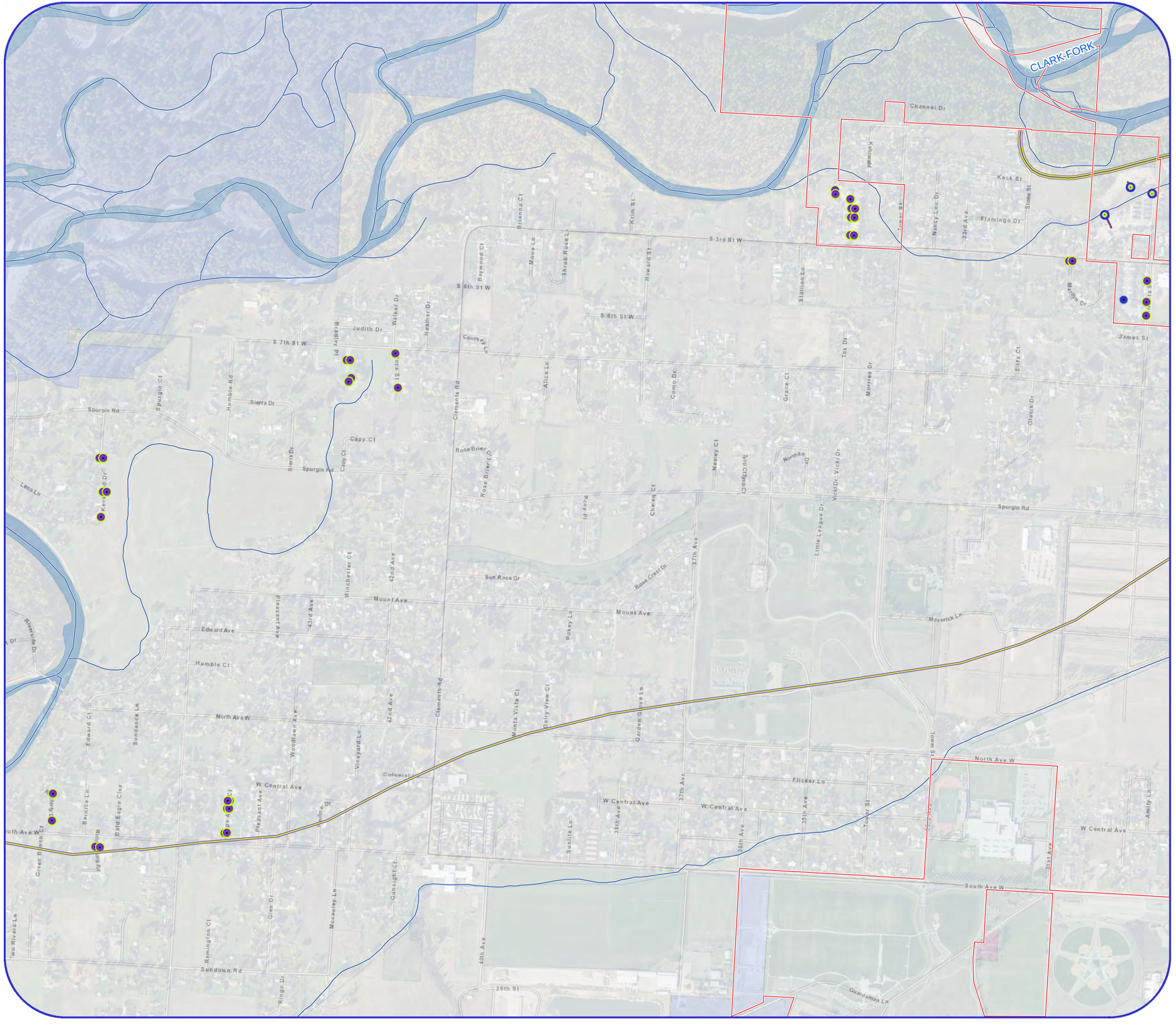
N

0 500 1,000 2,000

Feet





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Public Works
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MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

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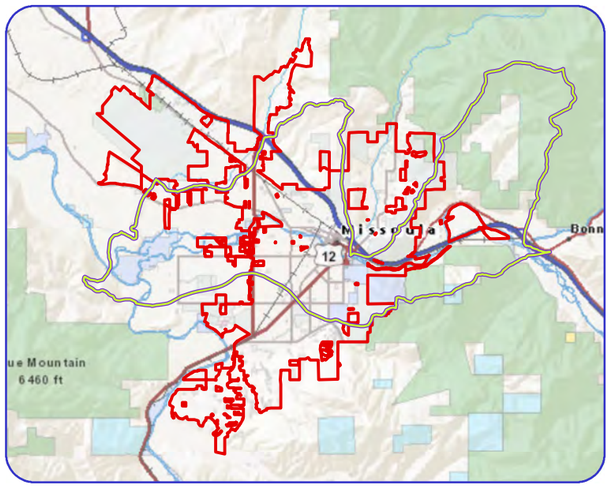

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Marshall Creek-Clark Fork River Subwatershed

HUC 170102040104

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- Sump
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- Gravity Main
- Flood Wall
- Levee
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0 500 1,000 2,000

Feet

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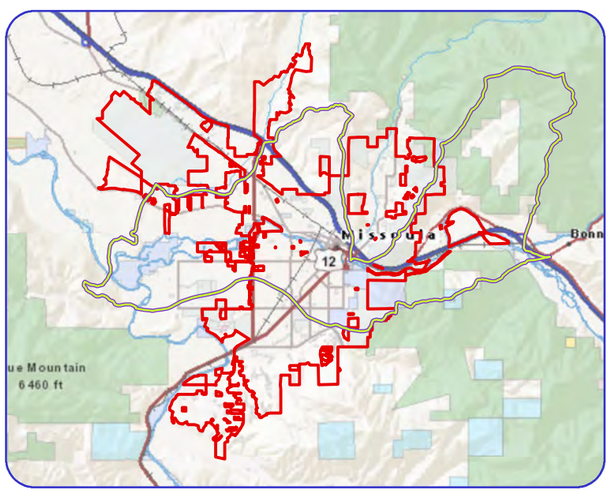

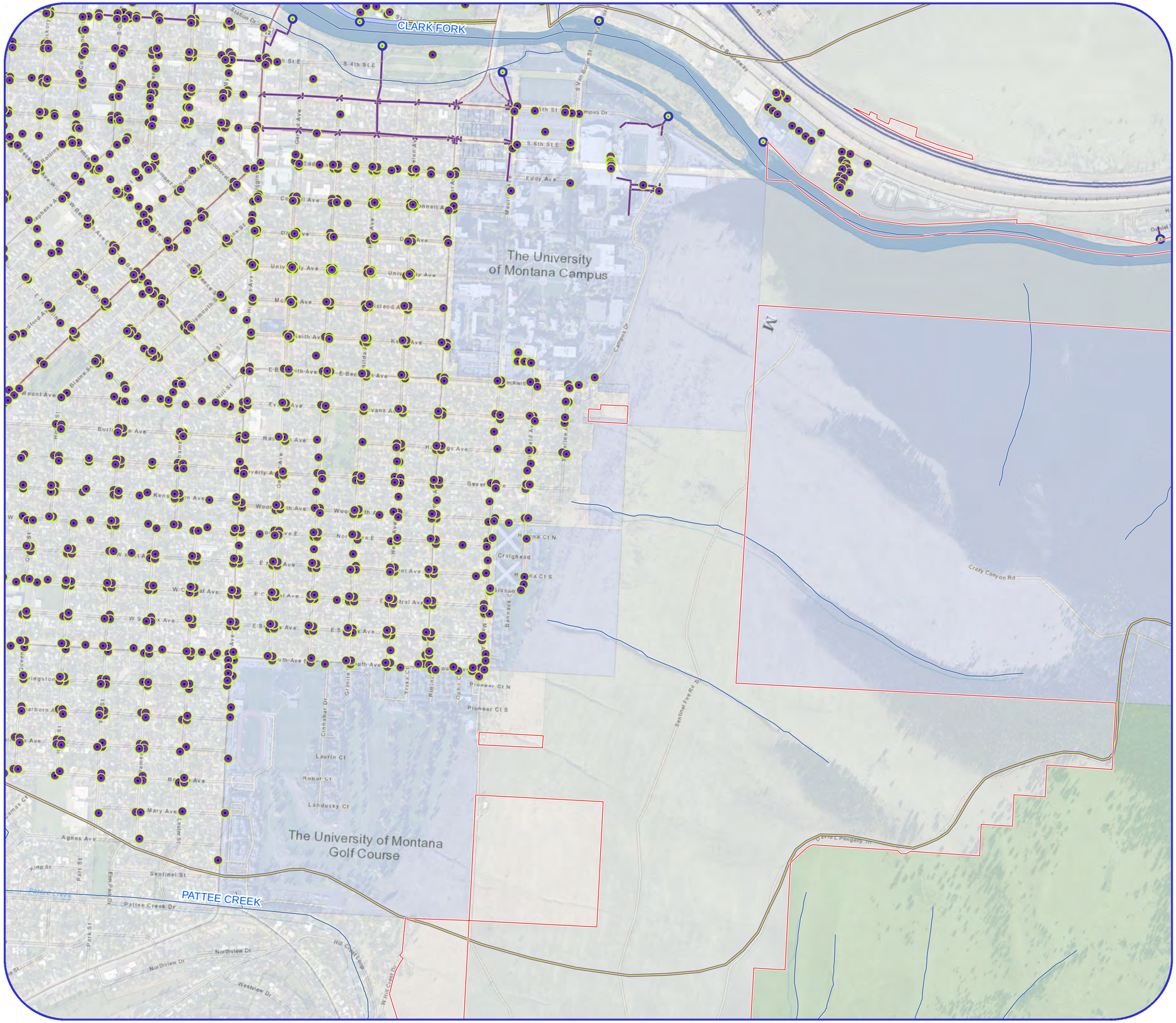

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Lower Rattlesnake Creek Subwatershed

HUC 170102040102

- City of Missoula
- Lower Rattlesnake Creek Subwatershed
- Outfall
- Pipe Termination
- Sump
- Gravity Main
- National Hydrography Dataset

0 500 1,000 2,000

Feet

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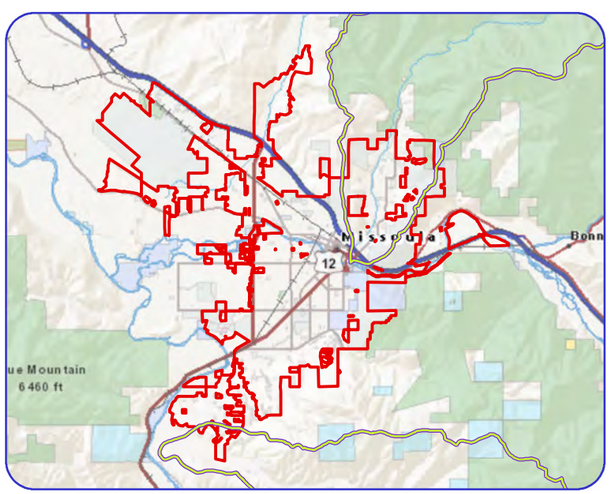

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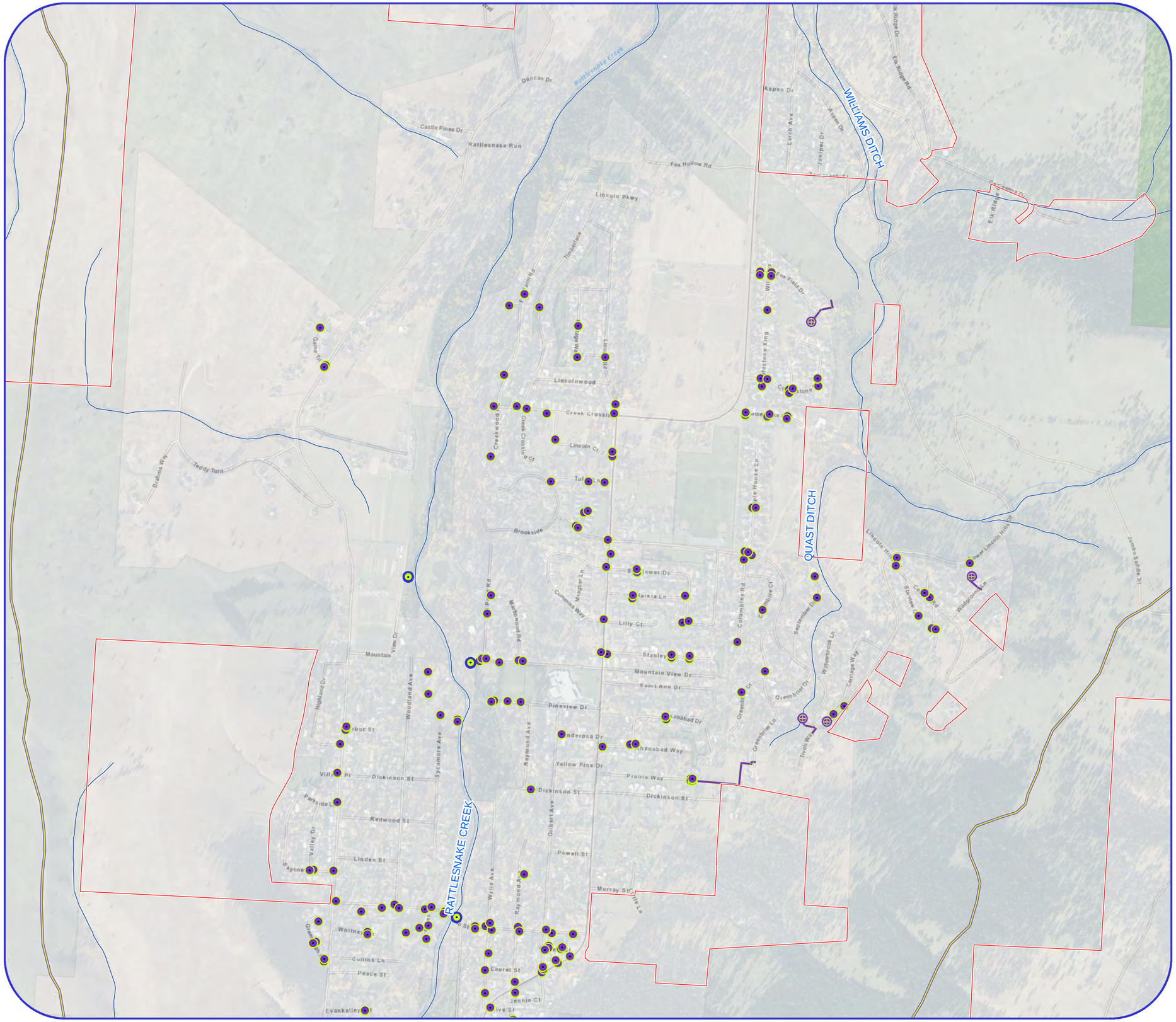

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Lower Rattlesnake Creek Subwatershed

HUC 170102040102

- City of Missoula
- Lower Rattlesnake Creek Subwatershed
- Outfall
- Pipe Termination
- Sump
- Gravity Main
- National Hydrography Dataset

0 500 1,000 2,000
Feet

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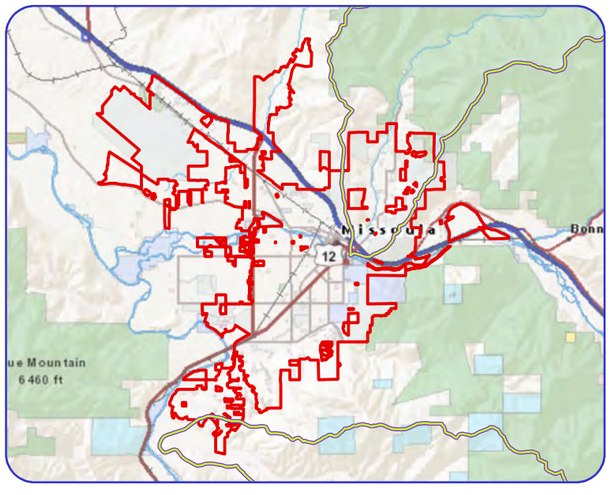

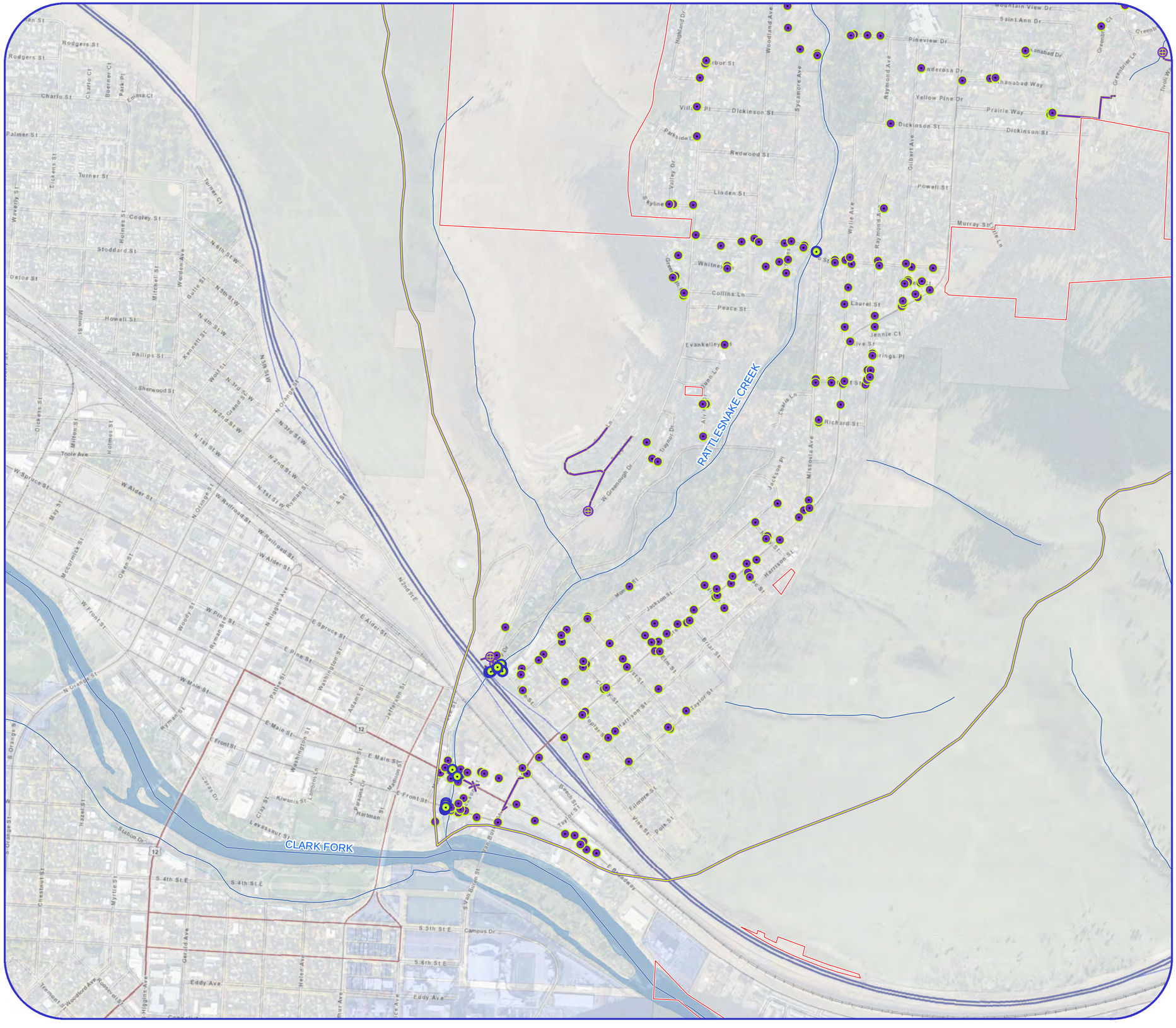

Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed
HUC 170102051603

- City of Missoula
- Hayes Creek-Bitterroot Subwatershed
- Detention Point
- Infiltration Device
- Outfall
- Pipe Termination
- Sump
- Gravity Main
- Levee
- National Hydrography Dataset

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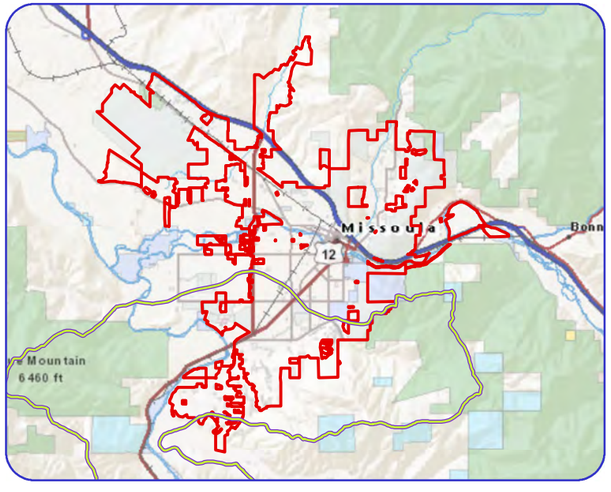

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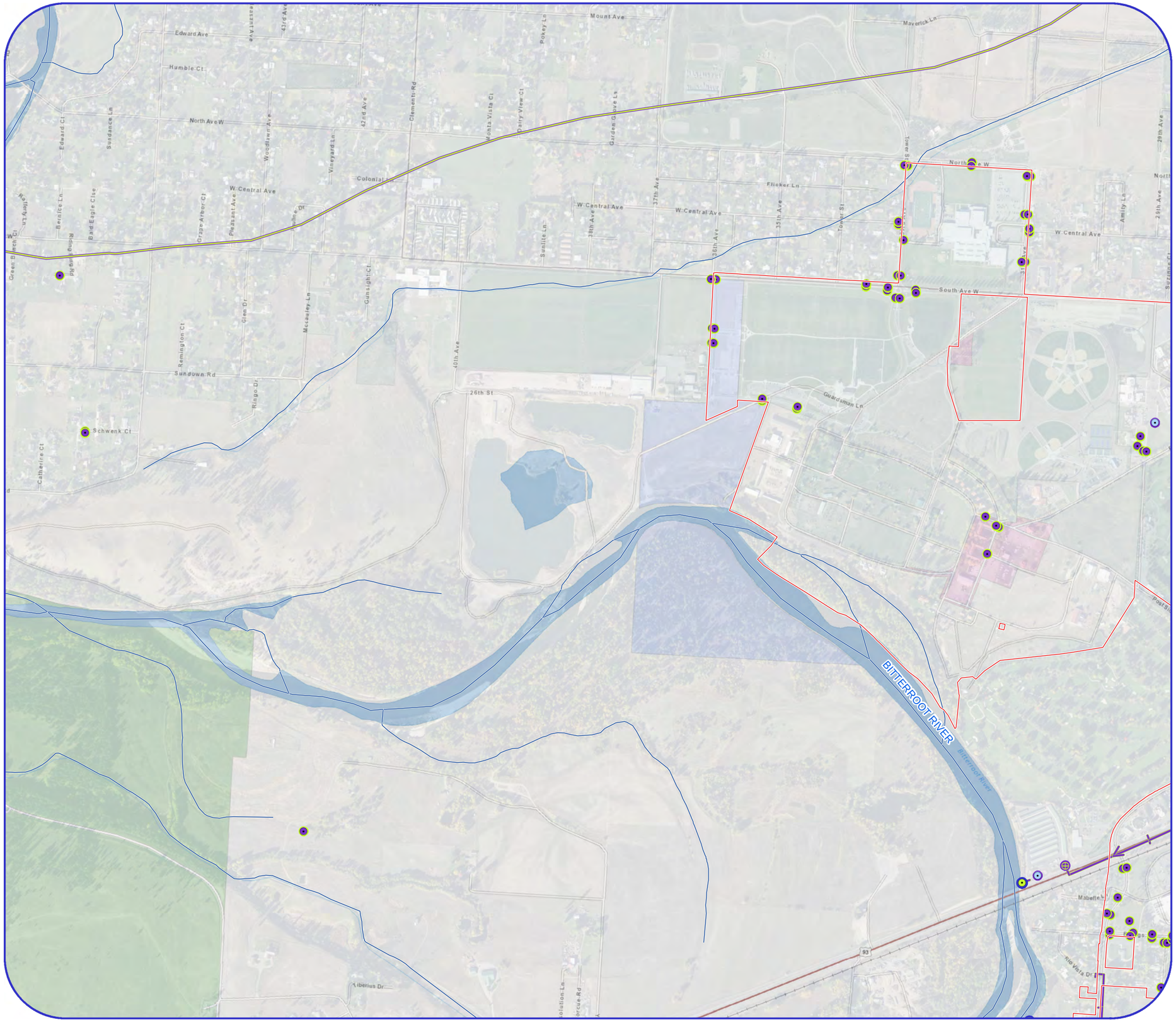

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed

HUC 170102051603

- City of Missoula
- Hayes Creek-Bitterroot Subwatershed
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- Levee
- National Hydrography Dataset

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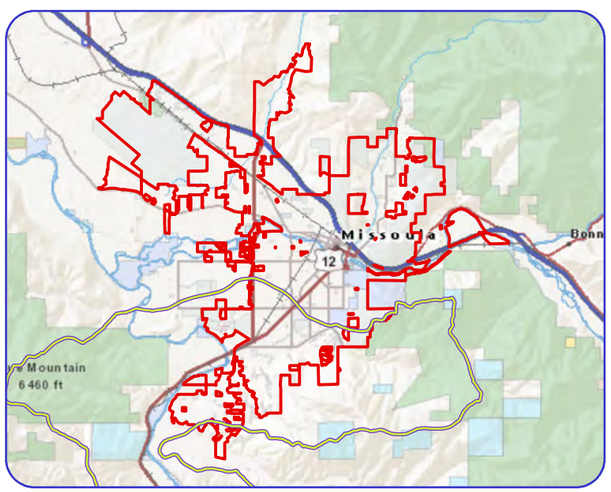

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Public Works
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MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed

HUC 170102051603

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- National Hydrography Dataset

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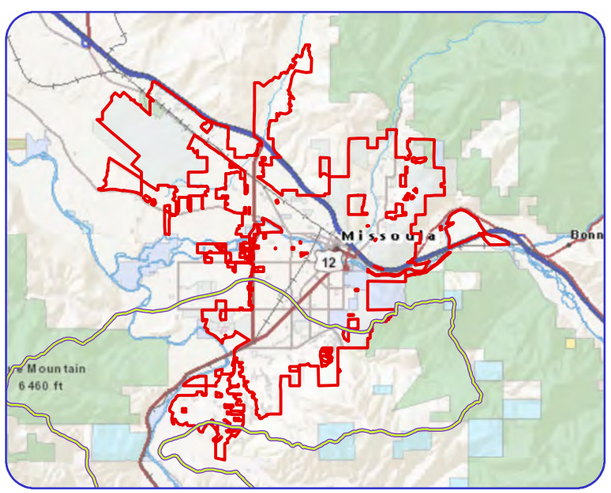
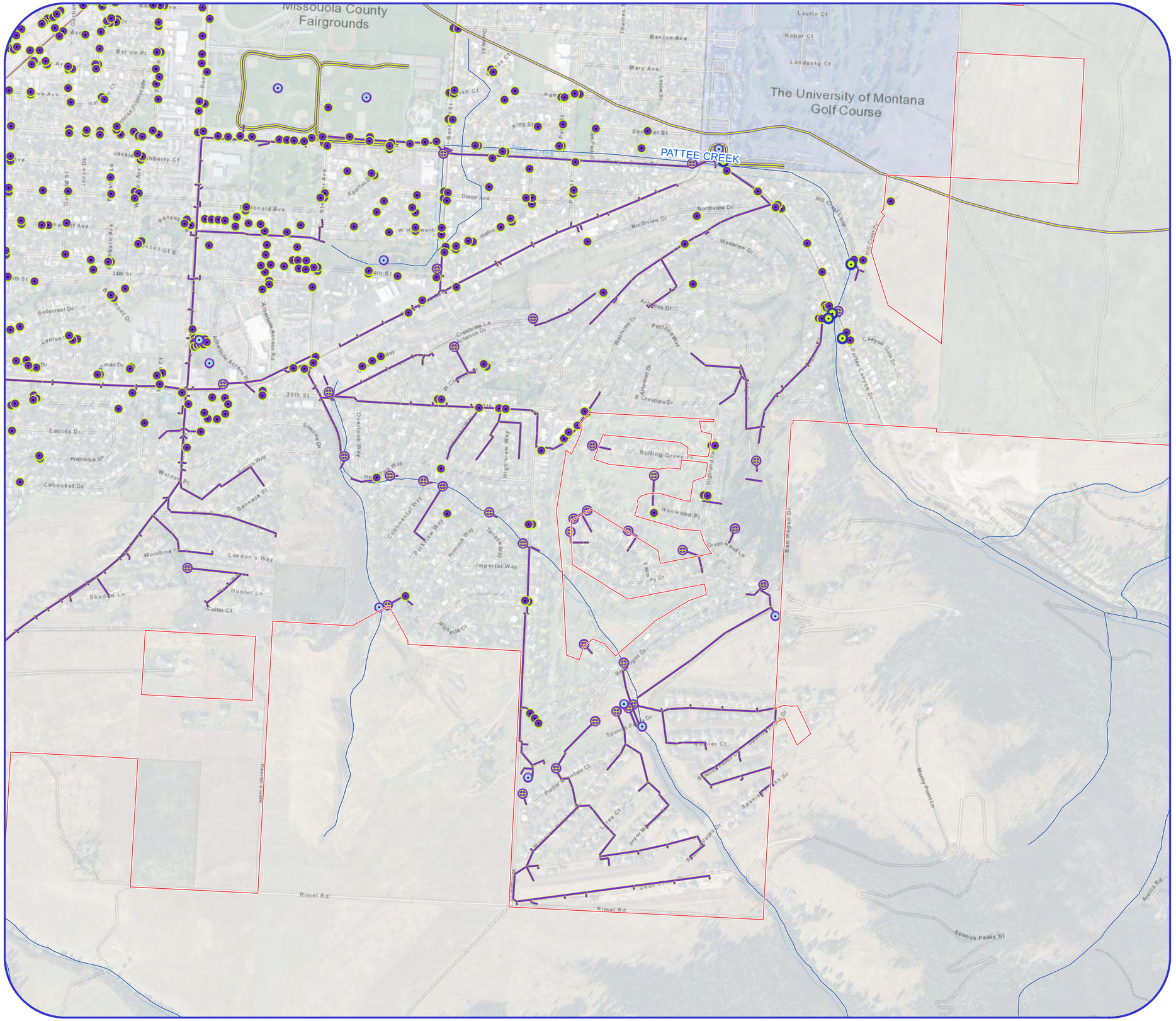
Feet





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Public Works
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MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed

HUC 170102051603

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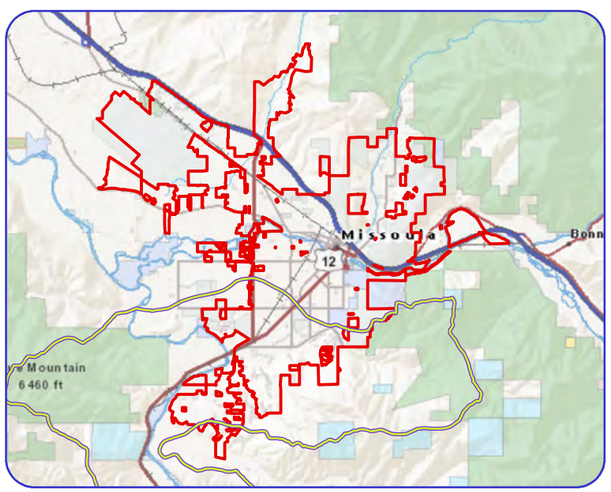

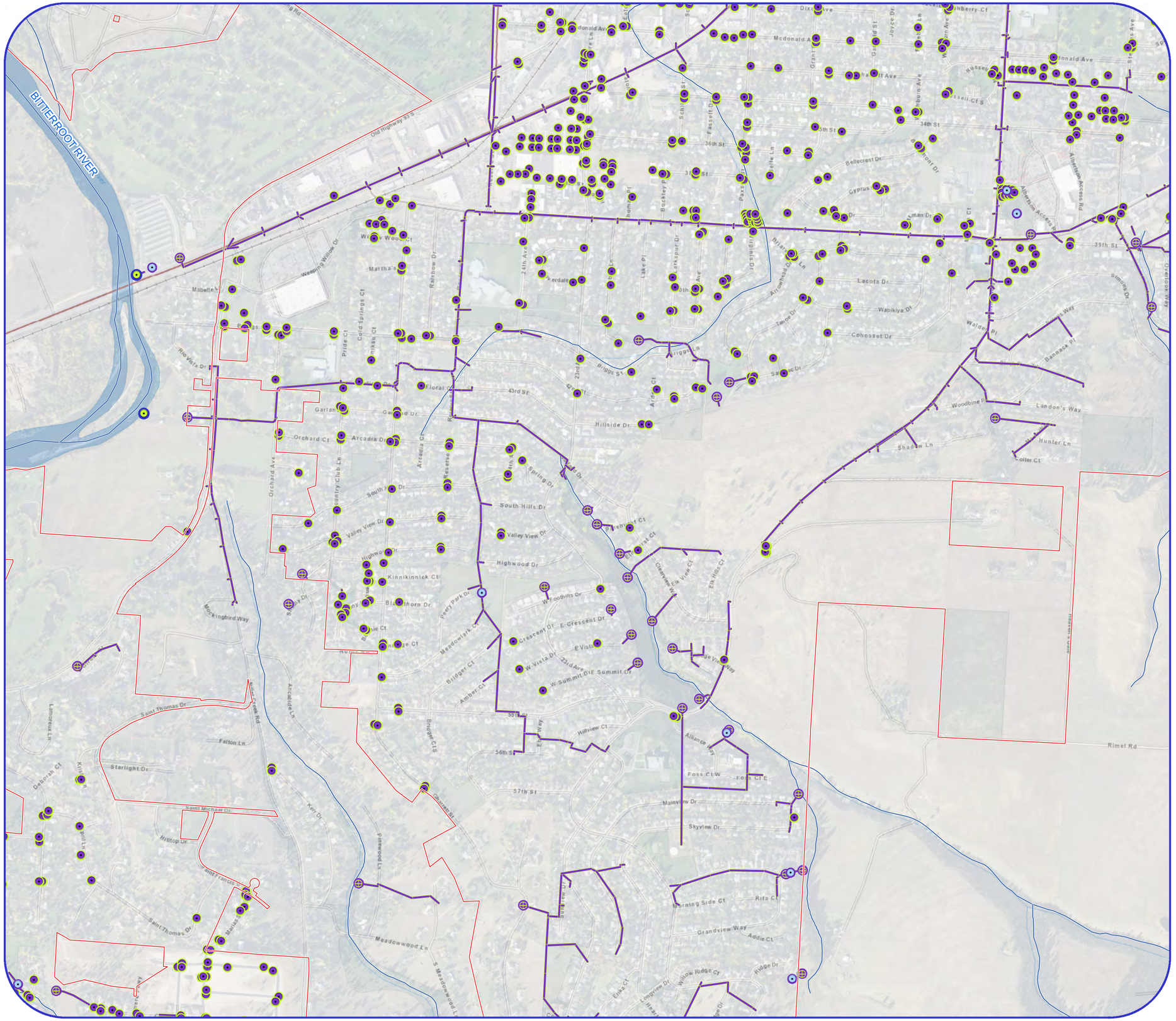

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Public Works
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MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed

HUC 170102051603

- City of Missoula
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0 500 1,000 2,000

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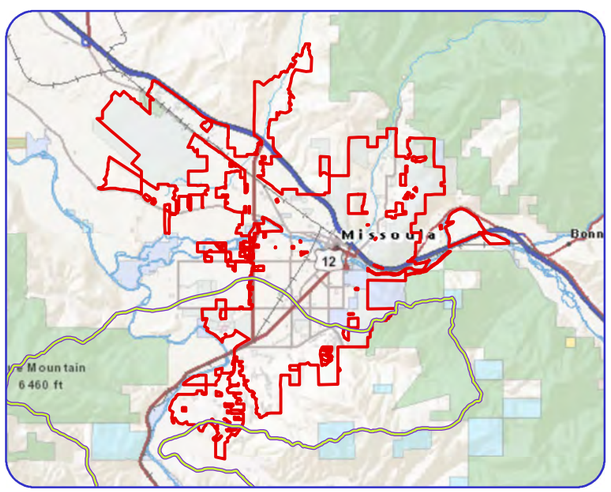

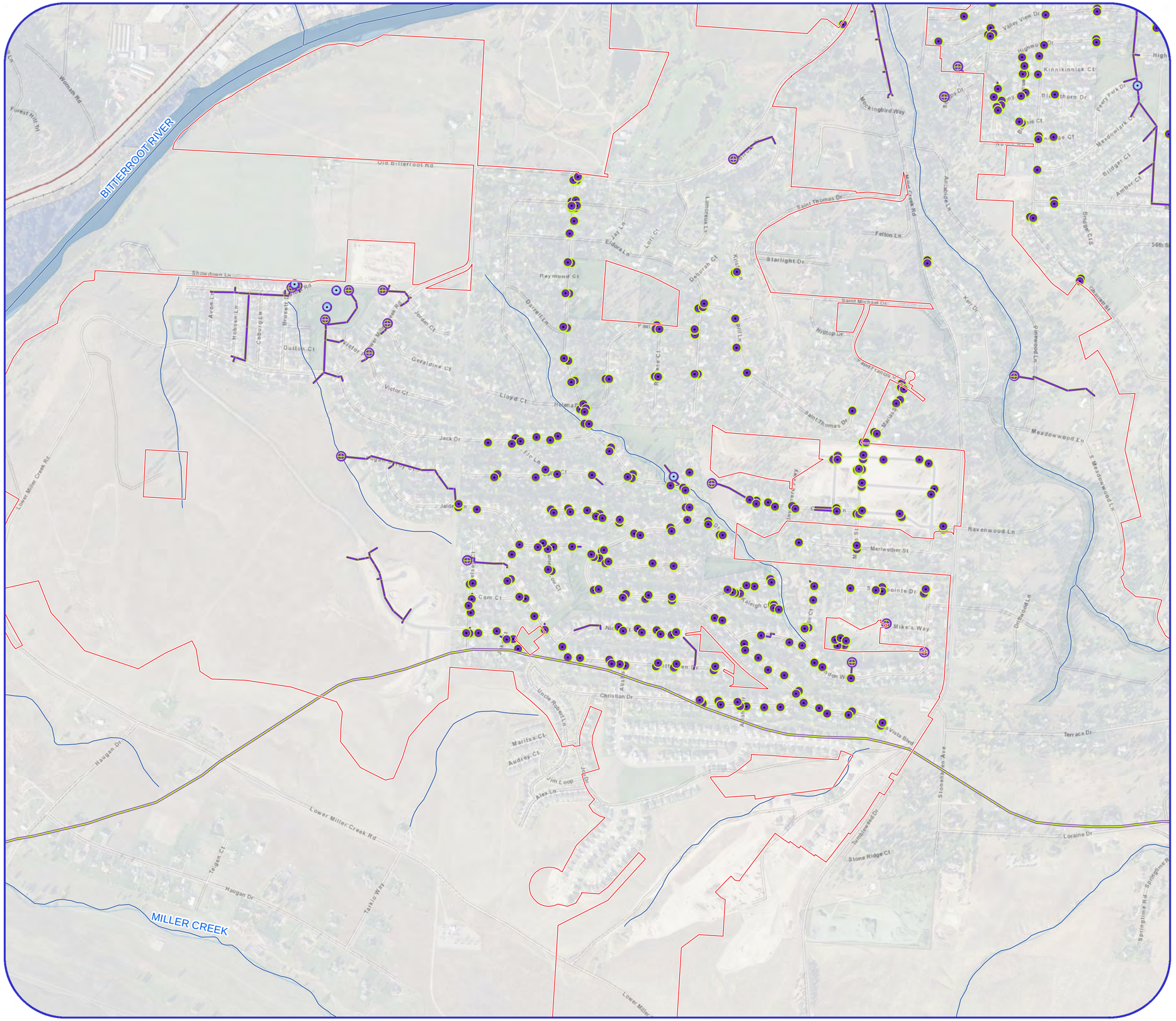

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Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Hayes Creek-Bitterroot River Subwatershed

HUC 170102051603

- City of Missoula
- Hayes Creek-Bitterroot Subwatershed
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- Sump
- Gravity Main
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- National Hydrography Dataset

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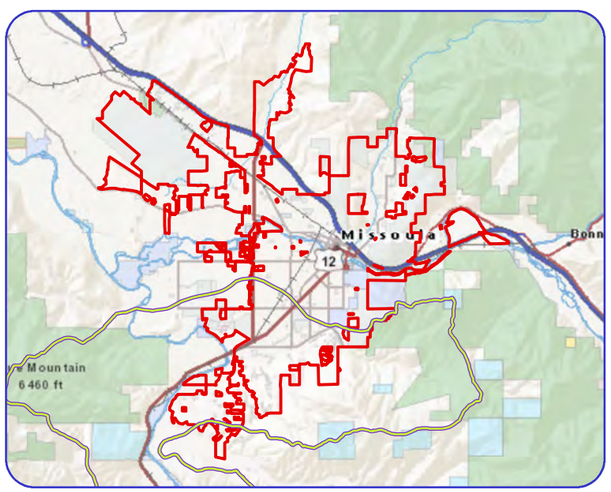
Feet



Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Storm Water Infrastructure

Miller Creek Subwatershed

HUC 170102051601

- City of Missoula
- Miller Creek Subwatershed
- Pipe Termination
- Sump
- Gravity Main
- National Hydrography Dataset

0 500 1,000 2,000

Feet

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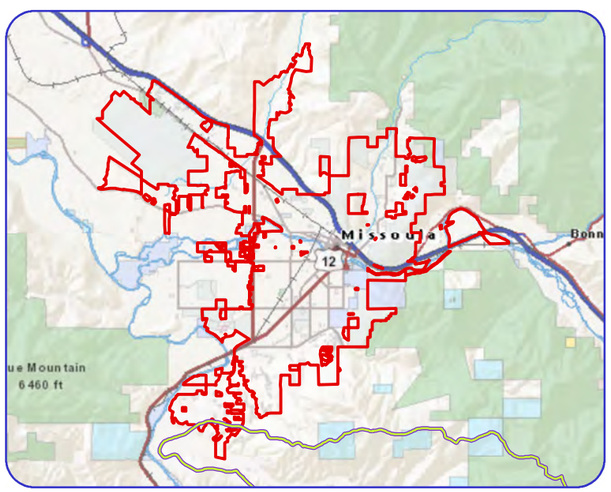

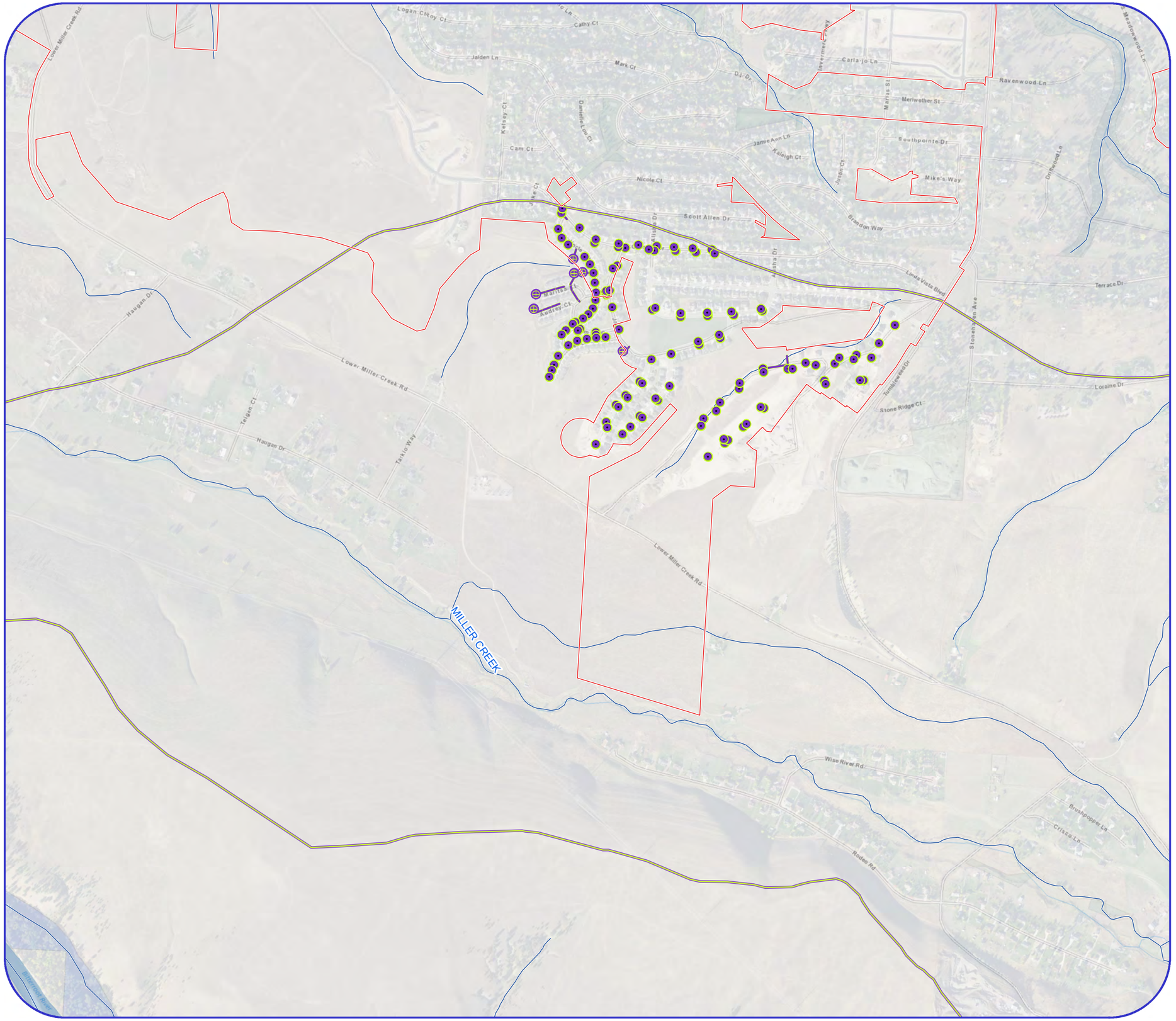

Prepared by: TLC, City of Missoula Storm Water Utility (June 24, 2019)

Appendix B
Missoula Valley Water Quality District
Enforcement Response Plan
Illicit Discharge and Corrective Action Plan
Allowable Non-Stormwater Discharges

Missoula City-County Health Department
WATER QUALITY DISTRICT
301 West Alder Street | Missoula MT 59802-4123
www.co.missoula.mt.us/wq
Phone | 406.258.4890
Fax | 406.258.4781

Missoula Valley Water Quality District – Enforcement Response Plan

Purpose: The Missoula Valley Water Quality District (District) is charged with protection of surface water and groundwater resources within the Missoula Valley. One method of accomplishing this is through Municipal Codes, County Ordinances and State Law.

Application: The District commits to investigating all illicit discharge complaints within 3 business days of receiving them. If possible, the investigation will take place within 24 hours of receipt. Complaints may be filed by calling the District at 258-4890, on the website for the City-County Health Department or by calling 911. 24-7 response of Health Department staff is available if necessary.

Applicable Regulations:

This section of Municipal Code (Water Quality Ordinance) is a Health Ordinance pursuant to §7-4-4306 MCA, and the extraterritorial application of the ordinance has been agreed to in a Resolution of Concurrence by the Missoula Board of County Commissioners. This covers the majority of the MS4 including unincorporated areas.

> *Missoula Municipal Code*
> *Section 13.26.080 PROHIBITED ACTIVITY*
>
> *It is unlawful for any person to:*
> *(a) cause contamination or to place, cause to be placed, or allow to remain in place any substance in a location where it is likely to cause contamination;*
> *(b) violate any provision set forth in a permit for the facility issued pursuant to this Ordinance;*
> *(c) violate any order issued pursuant to this Ordinance; or*
> *(d) violate any provision of this Ordinance.*

Contamination is defined as:

> *Contamination - The presence of any substance (chemical, radiological, or biological) or any condition (temperature, pH, taste, color, odor, turbidity) in soil or water which may create or threaten to create a hazard to human health or the environment, or impair the usefulness of the soil or water.*

The Water Quality Ordinance contains enforcement procedures in Section 13.26.120, and provisions for criminal penalties in Section 13.26.130. The Enforcement section includes provisions for Notice of violation, Administrative Review, Board Hearings, and Judicial Review.

The Missoula City-County Health Code, Regulation 1 regulates discharge of wastewater and is applicable throughout the entire county including the city of Missoula. It states:

> *Regulation 1 (A)(3) A person may not discharge wastewater onto the surface of the ground except for a permitted system designed for surface application and licensed septic tank pumpers discharging septic wastes onto disposal sites approved by the Department*

And:

> *Regulation 1 (A)(4) Unless an Underground Injection Control (UIC) permit is obtained from the U.S. Environmental Protection Agency pursuant to 40 CFR 144, a person may not install or use any sump, dry well, or septic system from disposal of waste fluids from the washing, servicing, maintenance or storage of any vehicle, equipment or components that are associated with an internal combustion engine.*

Wastewater is defined in the Health Code, Regulation 1 as:

> *liquid waste which may include chemicals, household, commercial or industrial wastes, human excreta, animal and vegetable matter in suspension or solution, discharged from a dwelling, building, establishment, vehicle or container.*

The Missoula City/County Health Code also includes detailed enforcement provisions, including administrative and judicial review and civil penalties.

The following chart references the regulations that would be applied to various sources of illicit discharges:

Source of Illicit Discharge	Applicable Regulation
Sanitary Wastewater	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.04.080
Effluent from Septic Tanks	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.04.080
Car Wash Wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.04.080
Improper Oil Disposal	Missoula Municipal Code 13.04.080
Radiator flushing disposal	Missoula Municipal Code 13.04.080
Laundry wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.04.080MMC 13.04.080
Spills from Roadway accidents	Missoula Municipal Code 13.04.080
Improper disposal of auto and household toxics	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.04.080

Investigation: Once complaints are received, they are logged into the Complaint Management Software, *Paragon*. It is assigned to a staff member of the district who receives and immediate notification via email of the complaint. Staff then investigates the complaint, typically by an in-person field inspection. If the complaint is of an immediate nature and takes place after hours, staff are notified via pager and

cell phone. Information obtained during a field visit may include; witness information, photos, property owner interview, soil and/or water samples. If the property owner is not cooperative and the need to inspect is justifiable, District staff may pursue an administrative warrant to investigate the property.

If an illicit discharge is discovered, staff will attempt to receive immediate voluntary compliance through ceasing the activity and using control measures to minimize spread of contamination (ie oil sorbent materials). If necessary, the department may secure contractors necessary to reduce the spread of contamination (ie vactor truck or excavator).

Typical enforcement procedure is as follows

Complaint Receipt ⟶ Investigation ⟶ Notification to responsible party via Notice of Violation (NOV)
(1-3 days) (1-3 days)

This process can be faster if warranted. The timeline for compliance which is outlined in the NOV is based on the circumstances of the illicit discharges. The discharge may be ordered to cease immediately but an extended timeline for investigation and clean-up of investigation may be longer.

If compliance is not achieved through the above procedures, the department will pursue compliance through the enforcement procedures outlined in Municipal Code and City-County Health Code.

The Water Quality Ordinance contains enforcement procedures in Section 13.26.120, and provisions for criminal penalties in Section 13.26.130. The Enforcement section includes provisions for Notice of violation, Administrative Review, Board Hearings, and Judicial Review. The Missoula City/County Health Code also includes detailed enforcement provisions, including administrative and judicial review and civil penalties. The Missoula Municipal Code also contains detailed enforcement provisions.

Missoula City-County Health Department
WATER QUALITY DISTRICT
301 West Alder Street | Missoula MT 59802-4123
www.co.missoula.mt.us/wq
Phone | 406.258.4890
Fax | 406.258.4781

Illicit Discharge Investigation and Corrective Action Plan

Reviewed 2/21/2019

Procedures

To report an illicit discharge in the City and County MS4, the public can contact Missoula Valley Water Quality District staff at (406-258-4890). Office hours are 8:00 AM to 5:00 PM Monday through Friday and messages can be reported to this number 24 hour a day. Calls can be made anonymously, and the hotline number can be found on the County's webpage, Missoula Valley Water Quality District's webpage, and Missoula Valley Water Quality District's education publications. Illicit discharges may also be reported through 911. Pursuant to the Water Quality Ordinance (13.26.070) a person who owns, operates or controls a facility or a person responsible for a release must immediately report a release of a regulated substance to the Missoula 9-1-1 center by telephone. Further, the District will field illicit discharge complaints/reports and route them to the appropriate staff. All illicit discharges will be investigated within 3 working days.

Once a problem area is located, the upstream system is evaluated, and various areas chosen to perform additional sampling. These locations are chosen so as to sample each branch of the system and various places along stretches with no branches in order to isolate the area of discharge. Once the source is identified, the process of removing the discharge will begin using various investigative and enforcement tools to include administrative warrants or use of public health and regulatory tools (Health Code, Water Quality Ordinance and Public Health Powers 50-2-116 and 50-2-118) as appropriate to compel clean-up and mitigation of the violations.

Corrective Action Selection Criteria:

Corrective Action requirements are based on two premises; violation of Missoula Health Code or violation of Missoula Water Quality Ordinance. The **speed** at which compliance is compelled and achieved is based on the threat to public health and the environment AND the willingness of the property owner or responsible party. If an on-going or eminent threat (release to soil, groundwater or surface water) is identified and can be reasonably controlled immediately, Water Quality District staff or designees will identify and document proper actions for the responsible party to take. For example, In the case of a fuel spill to an injection well, for instance, the owner or responsible party will place absorbent material on remaining fuel, investigate and remediate the injection well and, if prudent, the District will notify potential down-gradient users. If the spill is in surface water, sorbent materials and booms will be deployed in coordination with the Missoula Regional Hazardous Materials Team. If, in any circumstance, the responsible party is not immediately located AND the threat to public health or the environment is significant, the department will engage the services of contractors including excavators and environmental consultants to investigate and mitigate the threat. Selection criteria is a combination of these factors:

- Type and Quantity of Release
- Location of Release (proximity to surface water, groundwater, human and ecological receptors)
- Identification of a Responsible Party

- Means Available for Mitigation

In addition to these factors, one must consider the ramifications of using typical enforcement mechanisms (Notice of Violation, Order for Corrective Action) to achieve compliance. If these mechanisms are not timely enough to effectively mitigate the threat, additional tools including local government resources will be employed to protect public health and natural resources.

Receiving Report

- Gather information
    - Description of the Issue
    - Location of the suspicious discharge or connection (Address if available)
    - Description of the discharge
    - Contact information of the complainant
        - Reports may be anonymous,
- Responsible District personnel will respond as soon as possible to the court

Investigation

- The District commits to investigating all illicit discharge complaints within 3 business days of receiving them. If possible, the investigation will take place within 24 hours of receipt.

Enforcement

- Whenever the District has knowledge or evidence that a violation of this Ordinance has occurred, the District may issue a Notice of Violation and Order to Take Corrective Action to be served personally or by certified mail on the alleged violator or its agent. This Notice of Violation and Order to Take Corrective Action shall specify:
    - The provision of this Ordinance or permit alleged violated
    - The facts alleged to constitute the violation
    - Any penalties sought to be assessed pursuant to section 13.26.130.of the Water Quality Ordinance

Documentation and Tracking

- Resulting investigation action and result will be recorded in Paragon Complaint Management Software
- MS4 Committee will use findings to determine priority areas as well as key stakeholders in the MS4 that need to be address
- Reoccurring activity resulting in pollutants reaching waterways or entering the MS4 conveyance system will also be targeted for future public education and outreach

Missoula Public Health
City-County Health Department

Missoula City-County Health Department
WATER QUALITY DISTRICT
301 West Alder Street | Missoula MT 59802-4123
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Phone | 406.258.4890
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August 2014

Policy Statement: Allowable non-stormwater discharges

The Water Quality District is charged with protection of surface and groundwater quality within its designated boundaries. Within 5 miles of the City of Missoula's administrative boundaries, the Water Quality District prohibits activities that threaten surface and groundwater quality or potentially cause soil contamination. It is recognized that certain water-generating activities and discharges are necessary and are non-consequential in threats to the environment. It is the policy of the Missoula Valley Water Quality District to consider the following water-generating activities to be allowed non-stormwater discharges permitted to enter stormwater structures and conveyances within the Water Quality Ordinance boundaries:

- *water line flushing**
- *landscape irrigation*
- *rising ground waters*
- *uncontaminated pumped ground water*
- *discharge from potable water sources**
- *foundation/footing drains*
- *air conditioning condensation*
- *irrigation water, springs*
- *de-chlorinated swimming pool discharges **

*Disposal of Chlorinated Water

- planned discharges to conveyances connected to surface waters with an average flow greater than 50 CFS must be de-chlorinated to less than 1 mg/L
- planned discharges to conveyances connected to surface waters with an average flow less than 50 CFS must be dechlorinated to below .19 mg/L
- discharges to injection wells are acceptable without de-chlorination
- discharges to irrigation canals must meet the conditions described above and be coordinated with the respective irrigation districts/owners.

Building washing and other discharges that could result in deleterious effects to surface or groundwater must be reviewed and approved by the Water Quality District.

If well-development water containing sediment is to be discharged to a publicly owned storm drain network, injection well or directly to surface water, approval must be obtained from the city/county engineer and the Water Quality District.

Appendix C
Outfall Reconnaissance

Storm Water Utility

Outfall Reconnaissance
2017-2021
General Permit MTR040007

Storm Water Utility Division
Public Works Department
City of Missoula
435 Ryman Street
Missoula, Montana 59802-4297

December 2019

Contents

TABLES

1 INTRODUCTION

The City of Missoula (City) Storm Water Utility maintains various infrastructure across the City, to manage runoff and water quality. Pursuant to the requirements in Administrative Rules of Montana §17.30 Subchapters 11, 12, and 13, the Montana Department of Environmental Quality (MDEQ) regulates storm water discharges from the City's municipal separate storm sewer system (MS4). To comply with the U.S. Environmental Protection Agency National Pollutant Discharge Elimination System permit program—administered by MDEQ under the Montana Pollutant Discharge Elimination MS4 permit—the Storm Water Utility is responsible for maintaining and inspecting structural best management practices. Regular inspections are required to determine the structural integrity, proper function, and maintenance needs of storm water infrastructure.

In compliance with the City of Missoula's MS4 General Permit Part II.A.3e, the City must conduct dry weather inspections of all outfalls by the end of the current permit cycle (2021). This report documents outfall reconnaissance for the permit term 2017-2021 and is a dynamic document, with periodic updates and additions.

2 OUTFALL INSPECTIONS

The Storm Water Utility inspected 14 outfalls from August 28, 2019 to September 19, 2019 during dry weather (less than 0.25 inches of precipitation for at least 48 hours). According to the City's geographic information system (GIS) database, there are 59 outfalls within the City's MS4. Outfall characteristics and relevant sampling data were documented on Outfall Reconnaissance/Sample Collection forms (Appendix A). Water samples were collected from outfalls with measureable flow, unless the non-storm water discharge had been previously characterized as non-hazardous. Photos are provided for each of the outfalls; and historic photos are provided for comparison, when available.

The Storm Water Utility intends to inspect 25 outfalls in 2020 and 20 in 2021, to complete the inventory of all identified outfalls by the end of this permit cycle.

Table 1. Outfall Reconnaissance Summary

No.	Asset ID	Date	Subwatershed	Sample Collected	Characterization for Illicit Discharge
1	SNA-1563	8/28/2019	Hayes Creek-Bitterroot	Yes	Unlikely
2	S93-76-L2	8/30/2019	Grant Creek	No	Unlikely
3	S93-76-G2	8/30/2019	Grant Creek	No	Unlikely
4	S93-76-2	8/30/2019	Grant Creek	No	Unlikely
5	SNA-1566	8/30/2019	Grant Creek	No	Unlikely
6	S97-5-1A	8/30/2019	Grant Creek	No	Unknown
7	SNA-1519	9/4/2019	Marshall Creek-Clark Fork	No	Unlikely
8	S05-64-OF2	9/4/2019	Marshall Creek-Clark Fork	Yes	Unlikely
9	SNA-1521	9/5/2019	Marshall Creek-Clark Fork	Yes	Unlikely
10	SNA-1561	9/16/2019	Hayes Creek-Bitterroot	No	Unlikely
11	SNA-1558	9/16/2019	Hayes Creek-Bitterroot	No	Unlikely
12	SNA-1560	9/16/2019	Hayes Creek-Bitterroot	No	Unlikely
13	SNA-1562	9/16/2019	Hayes Creek-Bitterroot	No	Unlikely
14	S86-35-OF	9/19/2019	Hayes Creek-Bitterroot	No	Unlikely

2.1 SNA-1563 Pattee Creek Outfall, above Grit Chamber

This site drains a suburban residential area at the base of Pattee Canyon and has historically had flow during dry weather. The flow rate during the inspection on August 28, 2019 was approximately 20 gallons per minute (gpm) and we collected a sample. The outfall is in good condition, and there were no signs of illicit discharge.

Photo 1. SNA-1563 (July 22, 2009)

Photo 2. SNA-1563 (August 28, 2019)

Table 2. Dry-weather sampling results for the Pattee Creek outfall, above Grit Chamber (SNA-1563)

	Parameter	August 28, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	<0.1
	Chemical Oxygen Demand (mg/L)	<1.0
	Total Phosphorus (mg/L)	0.15
	Total Nitrogen (mg/L)	1.9
	pH (standard units)	8.2
	Copper (mg/L)	ND
	Lead (mg/L)	ND
	Zinc (mg/L)	ND
	Iron (mg/L)	ND
	Estimated Flow (gpm)	20
	Oil and Grease (mg/L)	ND
	Temperature (°C)	15.1
TMDLs	**Lead (mg/L)**	ND
	Temperature (°C)	15.1

ND – not detected, sample was below the detectable limit

2.2 S93-76-L2 Prospect-Upper Detention

This site drains a suburban residential area and is connected to the upper detention basin in the Prospect neighborhood. There was no flow during the inspection (August 30, 2019). The outfall is in good condition but is partially filled (approximately 50%) with sediment. The outfall pipe goes under an unnamed ditch and daylights in the ditch-return to Grant Creek; the outfall was partially submerged in water. There were no signs of illicit discharge.

Photo 3. S93-76-L2 (July 23, 2009)

Photo 4. S93-76-L2 (August 30, 2019)

2.3 S93-76-G2 Comstock Court

This site drains a suburban residential area in the Prospect neighborhood. There was no flow during the inspection (August 30, 2019). The outfall is in good condition and terminates in an unnamed ditch. There were no signs of illicit discharge.

Photo 5. S93-76-G2 (July 23, 2009)

Photo 6. S93-76-G2 (August 30, 2019)

2.4 S93-76-2 Prospect-Lower Detention

This site drains a suburban residential area and is connected to the lower detention basin in the Prospect neighborhood. There was no flow during the inspection (August 30, 2019). The outfall is in good condition and partially filled with sediment (approximately 10%). There were no signs of illicit discharge.

Photo 7. S93-76-2 (August 30, 2019)

2.5 SNA-1566 Old Quarry Road

This site drains a suburban residential area and terminates in a swale in the Prospect neighborhood. The swale extends approximately 225 feet until reaching Grant Creek. There was no flow during the inspection (August 30, 2019). The outfall is in good condition but is completely filled with sediment (approximately 100%). There were no signs of illicit discharge.

Photo 8. SNA-1566 (August 30, 2019)

2.6 S97-5-1A Subterranean connection to Grant Creek

This site drains a commercial area and may be connected to Grant Creek via an underground pipe. We did not find a structure through which to observe this connection during the inspection (August 30, 2019); thus, there is no Outfall Reconnaissance form for this site. We encountered a sump near this location but there were no pipes intersecting the sump. The likelihood of illicit discharge at this location is unknown.

2.7 SNA-1519 To Missoula Irrigation Ditch, underneath UM outfall

This site drains an institutional (University of Montana) and suburban residential area. It terminates in the Missoula Irrigation Ditch, underneath an outfall managed by the University of Montana. There was no flow during the inspection (September 4, 2019). The outfall consists of two 4-foot sections of reinforced concrete pipe, connected to the main pipe. There is no seal connecting any of the pipes, which may allow water to exit the pipe before reaching the ditch. Homeless camps were abundant in the near vicinity, but none were immediately adjacent to the outfall. There were no signs of illicit discharge.

Photo 9. SNA-1519 (August 4, 2008)

Photo 10. SNA-1519 (September 4, 2019)

Photo 11. SNA-1519, showing no seal between pipe sections (September 4, 2019)

2.8 S05-64-OF2 West of Orange Street Bridge, North bank

This site drains a commercial area in downtown Missoula and terminates in the Clark Fork River. This site has historically had flow during dry weather. The flow rate during the inspection on September 4, 2019 was approximately 238 gpm. The outfall is connected to a hydrodynamic separator that was installed in 2005. There is significant erosion around and undercutting of this structure. There were no signs of illicit discharge.

Photo 12. S05-64-OF2 (August 4, 2008)

Photo 13. S05-64-OF2 (September 4, 2019)

Table 3. Dry-weather sampling results for the outfall west of Orange Street, north bank (S05-64-OF2)

	Parameter	September 4, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	<0.1
	Chemical Oxygen Demand (mg/L)	<1.0
	Total Phosphorus (mg/L)	0.15
	Total Nitrogen (mg/L)	1.55
	pH (standard units)	7.76
	Copper (mg/L)	ND
	Lead (mg/L)	ND
	Zinc (mg/L)	ND
	Iron (mg/L)	ND
	Estimated Flow (gpm)	238
	Oil and Grease (mg/L)	ND
	Temperature (°C)	14.8
TMDLs	**Arsenic (mg/L)**	ND
	Cadmium (mg/L)	ND
	Iron (mg/L)	ND
	Chlorophyll-a (mg/m^3)	ND
	Orthophosphate (mg/L)	0.01
	Nitrate/nitrite (mg/L)	1.23

ND – not detected, sample was below the detectable limit

2.9 SNA-1521 Caras Park

This site drains a commercial area in downtown Missoula and terminates in the Clark Fork River. It has historically had flow during dry weather. The flow rate during the inspection on September 5, 2019 was approximately 90 gpm and we collected a sample. The outfall is connected to a hydrodynamic separator that was installed in 2017. The outfall is generally in good condition, with some cracks on top of the pipe. There were no signs of illicit discharge.

Photo 14. SNA-1521 (August 4, 2008)

Photo 15. SNA-1521 (September 5, 2019)

Table 4. Dry-weather sampling results for the Caras Park outfall (SNA-1521)

	Parameter	March 5, 2014	September 5, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	131	<0.1
	Chemical Oxygen Demand (mg/L)	259.3	<1.0
	Total Phosphorus (mg/L)	0.22	<0.1
	Total Nitrogen (mg/L)	1.74	1.57
	pH (standard units)	7.46	7.6
	Copper (mg/L)	0.0201	ND
	Lead (mg/L)	0.00932	ND
	Zinc (mg/L)	0.133	ND
	Iron (mg/L)	3.74	0.02
	Estimated Flow (gpm)	-	90
	Oil and Grease (mg/L)	7.12	ND
	Temperature (°C)	9.9	10.5
TMDLs	**Arsenic (mg/L)**	-	ND
	Cadmium (mg/L)	-	ND
	Iron (mg/L)	-	0.02
	Chlorophyll-a (mg/m^3)	-	ND
	Orthophosphate (mg/L)	-	0.02
	Nitrate/nitrite (mg/L)	0.35	1.4

ND – not detected, sample was below the detectable limit

2.10 SNA-1561 Pattee slope pipe

This site drains a suburban residential area in Pattee Canyon and terminates at Pattee Creek. It consists of a high-density polyethylene (HDPE) pipe that has been placed down the hillside, from the inlet to the creek. There was no flow during the inspection (September 16, 2019). The outfall is in good condition, and there were no signs of illicit discharge.

Photo 16. SNA-1561 (July 22, 2009)

Photo 17. SNA-1561 (September 16, 2019)

Photo 17. SNA-1561, discharge to Pattee Creek (September 16, 2019)

2.11 SNA-1558 Hillcrest

This site drains a suburban residential area in Pattee Canyon and terminates at Pattee Creek. There was no flow during the inspection (September 4, 2019). There is 1-inch irrigation pipe inserted into the outlet, preventing the flap gate from completely closing. The outfall is partially filled with sediment—also preventing complete closure. There were no signs of illicit discharge.

Photo 18. SNA-1558 (September 16, 2019)

2.12 SNA-1560 Takima East

This site drains a suburban residential area in Pattee Canyon and terminates at the Takima Park detention basin, adjacent to Pattee Creek. There was no flow during the inspection (September 16, 2019). The outfall is partially filled with sediment and there is excessive vegetation (e.g., trees) in the flow path. There were no signs of illicit discharge.

Photo 19. SNA-1560 (July 22, 2009)

Photo 20. SNA-1560 (September 16, 2019)

Photo 21. SNA-1560, showing excessive vegetation (September 16, 2019)

2.13 SNA-1562 Takima West

This site drains a suburban residential area in Pattee Canyon and terminates at the Takima Park detention basin, adjacent to Pattee Creek. There was no flow during the inspection (September 16, 2019). The outfall is partially filled with sediment (approximately 50%) and the downstream energy dissipator is half-buried. Additionally, spoil piles have been left in place. There were no signs of illicit discharge.

Photo 22. SNA-1562 (July 22, 2009)


Photo 23. SNA-1562 (September 16, 2019)

2.14 S86-35-OF Bitterroot River

This site drains a large suburban residential area comprised of the South Hills, Pattee Canyon, and south Missoula Valley. It is the terminus of the South Hills Strom Drain System and includes the flow contributed by Pattee Creek. The water is discharged into a vegetated swale for approximately 450 feet before reaching the Bitterroot River. There was flow during the inspection (September 19, 2019); but we did not collect samples because we did not have a multiparameter probe or sample containers. We were waiting for this equipment to be shipped and it had not yet arrived in time for sampling this site. The outfall was partially submerged in water and the energy dissipators were buried. A Public Works crew was performing routine maintenance at this site during our field visit. There were no signs of illicit discharge.

Photo 24. S86-35-OF (September 19, 2019)

Photo 25. S86-35-OF, routine maintenance (September 19, 2019)

Appendix A

Outfall Reconnaissance/Sample Collection Data Sheets

MISSOULA
PUBLIC WORKS • STORM WATER UTILITY
435 RYMAN ST • MISSOULA, MT 59802-4297 • (406) 552-6358

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1563 / Pattee Creek Outfall above grit chamber	
Today's date: 8/28/19		Time (Military): 1340	
Investigators: T Campbell/L McCamant		Form completed by: Tracy Campbell	
Temperature (°F): 77°F	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°49'40.307"N	Longitude: 114°3'5.604"W	GPS Unit: GIS	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Pattee Canyon Dr, Whitaker Dr, Westview Dr storm mains

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☒ Other: PRC per GIS (typo?)	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 30" internal	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume	1	Gallon	Bucket
	Time to fill	3	sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		15.3° C	°C	Multi-probe
pH		8.56	pH Units	Multi-probe
Conductivity		443.9 mg/cm	µg/L	Multi-probe
Dissolved Oxygen		9.4 mg/L	mg/L	Multi-probe
Total Dissolved Solids		286 mg/L	mg/L	Multi-probe

Dead fawn above outfall
est flow:
3s/60s + 0.05 min
1gal/0.05min = 20 gpm

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	■ Yes	☐ No		
2.	If yes, collected from:	■ Flow	☐ Pool		
3.	Intermittent flow trap set?	☐ Yes	■ No	If Yes, type: ☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: S93-76-2	
Today's date: 8/30/19		Time (Military): 1322	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F): 75°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°55'37"	Longitude: 114°1'53"W	GPS Unit: iphonexR	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Ease of access-moderate -> easement thru property to basin

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 24" 1/8 full of sediment	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☐ No ☒ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: S93-76-G2	
Today's date: 8/30/19		Time (Military): 1306	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F): 72°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Cul-de-sac, immediate receiving water-ditch, easy access via paved trail

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 12"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	☐ Yes	☒ No			
2.	If yes, collected from:	☐ Flow	☐ Pool			
3.	Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

No issues

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: S93-76-L2	
Today's date: 8/30/19		Time (Military): 1245	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F): 70°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): On Grant Creek, from upper detention pond, easy access via park/open space

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 36" half-filled w/sediment	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☐ No ☒ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	☐ Yes	☒ No			
2.	If yes, collected from:	☐ Flow	☐ Pool			
3.	Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

More than half-filled w/sediment

Piped outfall goes under ditch, daylights in ditch - return to Grant Creek

Name of ditch? When is it turned on/off?

Attribute 'ease of access'

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: SNA-1566	
Today's date: 8/30/19		Time (Military): 1334	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F): 75°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°55'18"N	Longitude: 114°1'55"W	GPS Unit: iphonexR	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Old Quarry Road & Prospect, outfalls to swale approx

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 18" ?	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☒ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Easy access, outfall filled w/sediment

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek-Clark Fork		Outfall ID: S05-64-OF2	
Today's date: 9/4/19		Time (Military): 1145	
Investigators: TLC		Form completed by: TLC	
Temperature (°F): 75°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°52'18.596"N	Longitude: 114°00'01.256"W	GPS Unit: Trimble GeoXH	GPS LMK #:
Camera: Pixel 3XL		Photo #s: 2 photos	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: downtown Missoula
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Urban runoff, HDS

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☒ Other: flared-6' wide/flat	Diameter/Dimensions: 42"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
■ Flow #2	Flow depth	3.5" = 0.29'	In	Tape measure
	Flow width	4 ' 0 "	Ft, In	Tape measure
	Measured length	4 ' 0 "	Ft, In	Tape measure
	Time of travel	7s	S	Stop watch
Temperature		14.8°	°C	Multi-probe
pH		7.76	pH Units	Multi-probe
Conductivity		SPC 255.7 ms/cm	µg/L	Multi-probe
Dissolved Oxygen		7.07	mg/L	Multi-probe
Total Dissolved Solids		166.4	mg/L	Multi-probe

Estimated flow = 238 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☒	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	erosion & undercutting around outfall
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☒	☐ Brown ☐ Orange ■ Green ☐ Other:	Algae-covered bottom of pipe

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Easy access from Fox Theatre parking lot

Significant erosion and undercutting - compared to 2008 photo

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek-Clark Fork		Outfall ID: SNA-1519	
Today's date: 9/4/19		Time (Military): 1019	
Investigators: TLC		Form completed by: TLC	
Temperature (°F): 75°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°51'57.863"N	Longitude: 113°59'15.371"W	GPS Unit: Trimble GeoXH	GPS LMK #:
Camera: Pixel 3XL		Photo #s: 5 photos	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☒ Institutional
- Other: UM
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Outfall to irrigation ditch (Missouri Irrigation District), metal UM outfall pipe above the City outfall - more on page 4

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 18"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	■ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

General Notes: Homeless camps - abundant around ditch/banks but not in immediate area of the outfall

Outfall is two 4' pipe sections placed next to one another, no sealant at any joints; it is likely that water flows from the one at the bank before reaching the outfall at the ditch.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek-Clark Fork		Outfall ID: SNA-1521 Caras Park Outfall	
Today's date: 9/5/19		Time (Military): 0930	
Investigators: TLC/BH		Form completed by: TLC/BH	
Temperature (°F): 59°	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 46°52'11.2794"N	Longitude: 113°59'49.92"W	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s: 1 photo	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Open Space ☐ Golf Course
- ☒ Ultra-Urban Residential (High Density)
- ☐ Institutional
- ☐ Suburban Residential
- Other: downtown Missoula
- ☒ Commercial
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Downtown Missoula, easy access via Caras Park, riprap stairs at Brennan's Wave

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 36" ?	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume	1.5	Gallon	Bucket
	Time to fill	1	sec	
☐ Flow #2	Flow depth	3.5" = 0.29'	In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		10.5°	°C	Multi-probe
pH		7.56	pH Units	Multi-probe
Conductivity		277.6 ms/cm	µg/L	Multi-probe
Dissolved Oxygen		8.04	mg/L	Multi-probe
Total Dissolved Solids		179.4	mg/L	Multi-probe

1.5 X 60 = 90 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ■ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☒	■ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	top of pipe
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ■ Green ☐ Other:	Moss/Algae

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	■ Yes	☐ No		
2.	If yes, collected from:	■ Flow	☐ Pool		
3.	Intermittent flow trap set?	☐ Yes	■ No	If Yes, type: ☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1558	
Today's date: 9/16/19		Time (Military): 1150	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F):	Rainfall (in.): Last 24 hours: 0 Last 48 hours: 0		
Latitude:	Longitude:	GPS Unit: GIS	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Irrigation pipe inside pipe, preventing closure

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 18" flapgate partially open due to sediment	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☐ No ☒ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Black irrigation pipe (1") inserted into outfall pipe to inlet, buried downstream of outfall

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1560	
Today's date: 9/16/19		Time (Military): 1213	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F):	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude:	Longitude:	GPS Unit: GIS	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☑ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): 36" square inlet? catchbasin? uphill drains don't drain & all comes here. ?piped to outlet in detentin basin - unknown

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☑ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☑ HDPE ☐ Steel ☐ Other: _____	☑ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☑ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 18"	In Water: ☑ No ☐ Partially ☐ Fully With Sediment: ☐ No ☑ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☑ No ***If No, Skip to Section 5***				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☒	■ Excessive ☐ Inhibited	Trees in flow path
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	☐ Yes	☒ No			
2.	If yes, collected from:	☐ Flow	☐ Pool			
3.	Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Outfall w/debris blocking flow & trees in flow path

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1561	
Today's date: 9/16/19		Time (Military): 1240	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F):	Rainfall (in.): Last 24 hours: 0 Last 48 hours: 0		
Latitude:	Longitude:	GPS Unit: GIS	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Long pipe down hillside

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☒ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 10"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1562	
Today's date: 9/16/19		Time (Military): 1203	
Investigators: TLC/MN		Form completed by: TLC	
Temperature (°F):	Rainfall (in.): Last 24 hours: 0 Last 48 hours: 0		
Latitude:	Longitude:	GPS Unit: GIS	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Outfall to detention basin

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 36"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☐ No ☒ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☒ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°C	Multi-probe
pH			pH Units	Multi-probe
Conductivity			µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☒ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☒ No			
2. If yes, collected from:	☐ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Nearly half-full w/sediment

Energy dissipator >50% buried

Spoil piles left in place after excavating previously

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: S86-35-OF	
Today's date: 11/19/2019		Time (Military): 1040	
Investigators: Tracy Campbell, Marie Noland		Form completed by: TLC/MN	
Temperature (°F): 41°	Rainfall (in.): Last 24 hours: .21	Last 48 hours: .21	
Latitude: 114°3'5.642"W	Longitude: 46°49'40.282"N	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 48"	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
■ Flow #2	Flow depth	.52'	In	Tape measure
	Flow width	5 ' 8.4 " feet	Ft, In	Tape measure
	Measured length	35 ' 0 "	Ft, In	Tape measure
	Time of travel	18.68	S	Stop watch
Temperature		5.9°	°C	Multi-probe
pH		7.89	pH Units	Multi-probe
Conductivity		511.3 SPC	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		332	mg/L	Multi-probe

Estimated flow = 1987.5 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☒ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
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Color	☒	☐ Clear ☒ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☒	See severity	☐ 1 – Slight cloudiness	☒ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☒	☐ Sewage (Toilet Paper, etc.) ☒ Suds ☐ Petroleum (oil sheen) ☐ Other:	☒ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

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INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
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Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	■ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Appendix D
Illicit Discharge Investigations – 2019

Missoula Valley Water Quality District Illicit Discharge Investigations (City of Missoula) - 2019

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
24-Jan-2019	5920	Sandpiper Dr	2019-0124-5001	Deicer, Chemicals, Other	NOV Issued	I called Dan and discussed the complaint in more detail. -The plant shut down for a week to clean once they learned we were coming for an inspection. -There were chemicals stored on the west side of the building that were discoloring the trees. -They had a fertilizer spill that put around 2000 gal of ammonium sulphate and urea into the east side lot and conveyances -Clean the warehouse and let drain to the east lot and wash out deicer tanks in the east field. -Chlorine into the drainage ditch from the east ; Travis and I talked about getting maps from Dan that show locations of these complaints and then doing a surprise visit where we respond to the complaint with Pelican. Also need to see if they've met requirements from last inspection while out there. ; 2/7/19 Dan sent photos and description of activities
25-Feb-2019	1700	S 8th St W	2019-0225-3842	Chemicals	NOV Issued	Visited the alley and noticed blue coloring to the snow/ice in front of the porto-potty. The blue fluid encompassed area of approx. 7 yd x 3 yd or 60 sq ft. I contacted Sweet Pea and explained complaint and spoke with Kim Stoltz. She committed to cleaning the alley within the next few days. No imminent threat to ground or surface water is present but I explained that even if this fluid is non-toxic it cannot be dumped in an alley or stormwater conveyance. Will follow up with an NOV and contact the complainant. Kim said that the area was shoveled over the following two days. Visited site in April after snowmelt and didn't see any fluid remaining in alley.
21-Mar-2019	4104	Concord Dr	2019-0321-1051	Other	Referred to DEQ	Talked to Kevin in Streets about moving up the street sweeping schedule and he is going to take a look to see if it is sufficient to alter street sweeping in the hills where they are getting dust complaints. ; Emily talked to Streets when they called back and they are taking a look and may move up street sweeping. ; Recent rains and street sweeping have removed most of the

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						sawdust. ; Karen talked to management and DEQ/Air are pursuing this separately.
9-Apr-2019	101	Takima Dr	2019-0409-7698	Petroleum		Went onsite and observed sheen along roadway spanning from below Whitaker Dr and followed it to the JTL gravel pit/city of Missoula drying bed property. It appeared to be a diesel spill that was only in the right lane as you travel up the canyon. Sweeping trucks have been in and out of the property. I contacted Brian Hensel with the Street Division and he met me onsite. He said he doesn't have any reports of any of his trucks leaking. The precipitation was significant and by the time he met me the sheen was already getting less noticeable. I put down some absorbant pads down from the JTL lot where some water was pooling up at the end of a driveway and one down at Whitaker Dr. We agreed to have the road sanded and swept if the rain stopped and a noticeable sheen was still present. About 2 hrs later the rain slowed and Travis and I went back out. There was still some evidence and smell of the diesel but most of it was washed off the road by this point.
12-Apr-2019	1000	Rollins St	2019-0412-7750	Petroleum		Called Anne Hordby from the city police dept. to see if they had an owner of the vehicle I could contact. They didn't. Jim Biondich ended up towing it but didn't know the owner either. There was a spill covering about 10 sq ft next to the curb on chip sealed road. A lot of it was soaked into the road. Jim came and put a bag of floor-dry on it. I think it's best to let it sit there over the weekend and soak up the oil and then we can either shovel it up or call city streets to sweep it.
17-Apr-2019		Upper Miller Creek	2019-0417-4930	Sewage		4/16/2019 Followed up on phone call with home visit. Took some pictures attached. Martin provided a water sample that he collected a few weeks prior. We can't do any bacteria tests etc. but the pH was 7.79 and conductivity 642us. Travis recollected that this was an issue before and found some photos called Ravenwood

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						in the stormwater file. 4/17- Emailing Christy and Brent 4/22 - Brent confirmed maintenance was done by the City and that Pat with City Sewer is the main point of contact.
19-Apr-2019	300	Eddy	2019-0419-5204	Petroleum		4-17-19Investigated and the boat was leaking a considerable amount that was flowing along the road and eventually into the gutter. Street cleaning had occurred on Tuesday so it is a lot of oil. Taped letter of leaking boat/vehicle to the drivers side of the truck and put down cardboard beneath the oil. Photos attached. 4-18-19 Boat still leaking and notice still attached to car. 4-22-19 Boat has been moved and it looks like there was an effort to clean the spill.
21-May-2019	900	Phillips	2019-0520-7045	Petroleum		May 21, 2019 Called Karli Smith today to find out more about the release and to schedule an inspection. She explained that they had overfilled the 12,000 gal waste oil tank by 50 gal and the oil went to the secondary containment vault. She is from transportation compliance though and referred me to Jess Brown their environmental compliance person ((503) 277-9574).; Jess communicated via email that Emerald's Missoula facility manager, Brad Clawson, informed him of the spill and that him and Karli began coordinating reporting requirements. According to him, tank No. 11 was inadvertently overfilled, resulting in approximately a combined volume of used oil and oily water of 100-gallons of which nearly 50 percent was oily water resulting from pressure-washing cleanup efforts. The total volume was confined to the Emerald Services, Inc.'s Missoula facility's secondary containment area. Emerald used their vacuum truck to recover as much spilled oil as could be accessed, and in the late afternoon, a local pressure-washing contractor arrived to wash the exterior of the tank that had been

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						overflowed and to wash residual oil that could not be reached by our own vacuum truck to areas in the containment area so as to allow that oily water mix to be removed from the containment area by vacuum truck. ; I explained that now would be a good time to conduct an inspection to better understand what engineering controls or procedural controls are in place to prevent overfills and what the failure was in this case. Since Jess is out of Oregon and is trying to plan his visit to coincide with availability of Brad as well. Earliest we could schedule was June 17th.
23-May-2019	1519	South Ave W	2019-0523-1064	Other		See attached pdf. Visited site, contacted contractor, told him to clean conveyance and inside of sump.
3-Jun-2019	1850	Idaho St	2019-0603-1903	Paint		6/4/19 Talked to Cate who sent pictures. Brought a picture to show the owner at Pro Sweep. Some residual paint on the ground. He said they had a paint sprayer explode and they had tried to clean it up some. I asked that they clean some more and then send me a picture. 7/1/19 The owner said he would send pictures when he cleaned up more but he did not. The area was clean however when I drove past last week.
1-Jul-2019	Under I-90	Rattlesnake Creek	2019-0701-6908	Other	Referred to MDT	As retaining wall is to protect MDT infrastructure, Steve Felix of MDT was sent a letter identifying the complaint
3-Jul-2019	1921	E Broadway	2019-0703-2759	Sewage		Visited the Cobblestone Townhomes and complainant didn't come when I rang the door bell. I went down to the city park (hellgate) to access the river trail. I wanted to see if I could find evidence of repeated use of the river bank area or find human waste. The riverbank along the townhome side (north side) of the river is steep with little to no eddy but the other side of the river had large areas that looked good for a raft to dock. I assume it is on that side of the river on the city property that the complainant is referring to. I was heading back to town when the RiverCityBrew raft passed me on Broadway. I followed it to the Sha-Ron FAS and talked with the operator (Drew) and his

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						partner. I explained the complaint and that the best practices are to always go 200' for urinating and to pack out any feces when floating. He said they've only had clients that need to urinate and haven't ever needed to use their "Wag Bag" yet.
16-Aug-2019	4951	N Reserve St	2019-0821-3120	Chemicals, Other		The storm drain that was impacted is a sump. I went out there and the kitty litter hadn't absorbed everything. I encouraged Jim and Shannon to have it swept up otherwise I could arrange for a sweeper but would have to charge the county. County public works said they couldn't get anyone out until Monday. I had Jim apply more kitty litter and had him send me photos once it was cleaned up on Monday.
20-Aug-2019	1003	E Broadway	2019-0820-1014	Paint	NOV Issued	8/21/19 Visited Albertson's and spoke with manager. Staff had some photos of paint running down the parking lot in the rain. No paint residue was observed in the lot or the conveyances and stormdrains by today however. Found out that Pro-Sweep was the contractor that did the painting. Will issue them an NOV. Received photos from Marie and followed up with Deb. ; 8/29/19 Mike received NOV and reached out. He explained that most of the lot had dried prior to the rain but as soon as he heard about the washed off paint his crew pressure washed the area and vacuumed up the paint before any of it went into the storm drains. We talked about timing of jobs and general BMPs for future work.
27-Aug-2019	1850	Idaho	2019-0827-8728	Petroleum		Aug 27th Visited site and took photos. It's not oil it's the same asphalt sealer that was causing a mess onsite last year. I spoke with Mike on the phone and we talked through options to keep that area cleaner including making a bermed area to accept the waste which then can be cleaned, paving the area, and simply being more careful.

Missoula Valley Water Quality District Illicit Discharge Investigations (City of Missoula) - 2019

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
4-Sep-2019	4242	Expressway	2019-0904-3045	Chemicals		I went out to look at the site. A neighbor told me that a dryer had caught fire in an apartment and was dragged out to the parking lot where it was further extinguished with fire extinguishers. The main component of fire extinguishers is sodium bicarbonate so this is not a regulated substance under the water quality act. I stopped into the management office where they said they would sweep it up and follow up with an email or a call to confirm it had been completed. They sent confirmation
18-Sep-2019	835	E Broadway St	2019-0918-8595	Other		Visited location and spoke with John Kelly the owner of the pressure washing business. He had not used soap on the pavement and was in the midst of shoveling up sediment and grit from the lot. There was one storm sump in the east edge of the lot. There was a low area up gradient of the sump that was holding and catching the majority of the water and I didn't see evidence of washing any debris or water into the curb line or road. The nearest sump in the road was upgradient of the site. I explained BMPs for lot washing and how anything more than stormwater cannot enter our storm drain system. Took photo that is saved in file.
15-Feb-2019	540	E Broadway St		Petroleum		Fire Dept called office and I was given message via text from Emily. I then also got a text from 911. A woman walked away from her vehicle while filling and approx 5-10 gallons of fuel overfilled onto the ground. When I arrived on scene fire was leaving. I spoke with three different Noon's managers but mainly Earl (Earl Allen - marketing mnger (532-0391), John - sales mnger, and Bryce - fuel mnger). Absrobant pads and floor-dry were placed in conveyances and near the rock berm down gradient of the spill. Two storm drains that were up gradient of the spill were covered but the surface outfall drain was unprotected. I directed relocation of absorbants and advised clean up. The under-canopy vault that is designed to accept spills like this was overfull and standing water was present at the inlet.

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						Went to Rattlesnake Cr to check that outfall but since the surface was frozen it was impossible to observe a sheen. Sweet Pea tried to pump vault but didn't have way to dispose of oily waste and since no absorbants had been used in the vault they put water back in. I gave Nash's number to them and explained that if waste is full of gas, diesel, oil, etc. it cannot go to the WWTP and only a pumper that has the permit to take this kind of waste can be used.
10-Jul-2019	1305	Scott St		MgC12		Fire called Travis directly. I responded and found that a valve had broke on a 8,000 gallon MgCl2 tank and it was leaking into the secondary containment area. About 300-500 gallons had spilled. City staff were emptying the remainder of the tank into a vac truck and were planning on sucking up remainder in the the containment area for reuse.
7-Oct-2019	5225	Highway 10 W	2019-1011-1333	Deicer, Chemicals, Other		Travis went out to the airport with Tony this afternoon. It smells like degraded deicer (ammonia) bound up in tight clay. I don't believe further follow up is needed as current practices are in place to eliminate this scenario.
16-Oct-2019	6240	Industrial Way	2019-1017-9518	Other	NOV Issued	I visited Industrial Rd and found the trailer. It was full of wet spent grain. I left my card on the trailer with a note to call me. I contacted Big Sky Brewing and left a message for Matt Long, he handles grain donations to farmers. Later that evening Matt went to the spot and confirmed that it was Russel Hudson's trailer. Russ is his only grain acceptor at this point. Russ's number is 880-3640. Today (10/17/19) I received a call from Russ. I explained that we can't allow him to dewater the grain on the road and basically add anything to the road that is beyond stormwater. He understood and said he hoped that leaving it in an area away from any storm drains would be OK. I advised he use a tarp or other means to line his trailer and prevent leaking in the future. Did not issue an NOV even though this is the

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						same complaint we had for him last year but no one talked to him directly other than Matt at Big Sky.
23-Oct-2019	4921	N Reserve	2019-1023-1244	Petroleum, Chemicals, Other	No Illicit discharge	12/4/2019: Site Visit: Kyle Crapster: I did a site visit and the drains were frozen with ice and snow. I observed 4 buckets, two had paint and two buckets had an unknown frozen liquid. The boxes of trash, engine oil and other solid waste items observed by Todd during the initial site visit had been removed. I will send a certified letter to the Owners (Meyer Holding LLC) informing them the property is being used as an area to dump waste and it must be maintained, including all solid waste containerized and removed weekly. ; 10/24/19 I visited the location today. The drain grates are missing from the drains and they appear to be clogged/backed up and have an offensive odor. The drains go to a Sand/Oil interceptor. I contacted Nate Gordon at the WWTP to inform him of this complaint as the interceptor is likely not being serviced and may still be accepting waste or is backing up into the drain vaults. Solid waste is being stored in the bays (5-gallon buckets of paint, used engine oil, and other substances (I didn't open all the buckets)) as this location is becoming an attractive nuisance. I have photos too big to attach here. ; This complaint appears to be in violation of Missoula City-County Health Code, Regulation 3: Solid Waste Management, (8) Illegal Dumping, which states, in part: "No person shall dump, store, place or leave or cause to be dumped, placed or left any solid waste upon any public or private property within the county, unless the solid waste is clean fill and permission has been granted by the property owner or owners",; as well as Missoula City-County Health Code, Regulation 1: Wastewater Treatment and Disposal Systems, 5 (A) (1) Prohibited Activities and Exceptions, which states, in part that: No person may use a wastewater treatment and

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						disposal system that may contaminate any actual or potential drinking water supply; cause a public health hazard as a result of access to insects, rodents, or other possible carriers of disease to humans; cause a public health hazard by being accessible to persons or animals; or cause a nuisance due to odor, unsightly appearance or other aesthetic consideration.; For this reason I am referring this complaint to the Environmental Health Division for follow up.
31-Oct-2019	2207	3rd St W	2019-1031-6922	Petroleum		Sand was spread on oil/tar and swept up by city street sweeper. City pumper truck was called in to pump out sump. Ben was on scene for 1.5 hours. Next morning, Ben handed off to Elena for possible follow-up. Elena talked to Kevin O'Brien at city. Kevin advised it's been handled. Hardly got anything out of sumps w/vector, will place sweepings w/other sweepings that are tested annually. Elena spent about 30 minutes talking to Kevin and Travis. Incident logged into Stormwater log and report scanned into G drive.
1-Nov-2019	336	South Ave E	2019-1101-2827	Petroleum	Warning Letter sent	Visited the address. There were 12 what-felt-to-be empty barrels in the back pad along alley. I knocked on garage door rental but no one answered. Need to discern if this resident is operating an auto business that requires permitting or secondary containment and if there are any other issues (internal floor drains, etc.). Will reach out to landlord next with a warning letter. ; 12/18/19 Never heard back from landlord after sending letter. Drove by site and it is cleaned up.
16-Dec-2019	32	Campus Dr	2019-1216-5785	Petroleum		Emailed Paul to get some more info on quantity, where the oil went, and storm drain locations. They sent me a storm system map and were able to catch the sheen as it moved toward a sump and it was a few tablespoons of oil. No further action is required.
17-Dec-2019	825	Cooper St	2019-1217-9338	Petroleum, other, antifreeze		Visited location. Did not see problematic fluid leakage. There were a number of vehicles parked in the road

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						and railroad area but did not see business access restriction nor is that in my purview.
23-Dec-2019	928	S 5th W	2019-1223-6801	Water Pollution		12/23/19 - I drove through the alley to see if I could smell anything out the ordinary. There was a smell in the alley that was sour and could have been rotting food. Some component of the smell could have been methanol but I was not able to determine where the smell was coming from. There is a lot that needs to be cleaned up and disposed of properly on the property. Pictures are in sharepoint. 12/30/19- Drove by the property again in an effort to talk with those undertaking demolition activities. It does not look like there has been activity since 12/23. Left a message with the property owner to give me a call to discuss proper disposal of hazardous waste and to discuss complaint. 12/30/19 - Talked with Scott Smith regarding the complaint. He stated that he had Keith with Advanced Environmental come and take two gallons of old gas and look at other potential hazardous waste on the property. Scott stated that the 50 gallon barrel was labeled methanol and that it had one gallon of methanol that was spilled onto the concrete pad when the operator crushed it, thinking it was empty. The concrete slab is being torn out by Friday and then the soil will be scraped 8 inches prior to reconstruction. Scott said that the smell is coming from the refrigerator that was in an old RV on the property and is producing strong odors. He was hoping to get it removed from the property earlier but has had trouble due to the holidays. It will be removed by the end of the week. Emailed Scott proper disposal locations for different hazardous substances in order to encourage appropriate disposal. 1/6/2020 - Western Excavation is half way through demolishing the building. Following up via email to request that any area that appears to be contaminated

Missoula Valley Water Quality District Illicit Discharge Investigations (City of Missoula) - 2019

Date	Address	Street Name	Complaint No.	Complaint Type	Action Taken	Description
						be excavated even if greater than the 8 inch depth previously discussed. The full extent of the spill should be excavated.
2-Oct-2019		Corner Russell & W Railroad		Sewage		Pumper truck collided with statiomnary train, tipped, and spilled bulk of contents. Sewage mostly infiltrated substrate (pourous railway rock). Sweet pea sent additional truck to remove any standing sewage. Sweet pea applied lime to contaminated area. I surveyed scene and determined that no wells or surface water appeared at risk of contamination due to spill. I phoned DEQ solid wasdte Dept. 10/03/19 and notified of incident. They requested no follow up action.

Appendix E
City of Missoula
Storm Water Specifications and Design Standards

2016

Storm Water Specifications and Design Standards

CITY OF MISSOULA
STORM WATER UTILITY DIVISION
PUBLIC WORKS DEPARTMENT
435 RYMAN ST
MISSOULA, MT 59802

Contents

Section 1 – General Requirements

1.1 Introduction

These specifications are the latest adopted by the Missoula Storm Water Utility Division. The specifications are to be used in conjunction with City of Missoula standard drawings as well as Montana Department of Environmental Quality standards. They are meant to provide minimum standards for site grading and the control of storm water runoff, both quantity and quality. In addition, they create permitting, submittal, and development design standards for erosion and sedimentation control, preservation of natural drainage systems, flood mitigation, site grading, and property protection.

The specifications and detail drawings shall be made a part of the contract documents for construction of development and redevelopment projects.

Any reference to an ordinance, administrative rule, permit, or other directive contained within these specifications implies the latest edition of that document. All contract documents must be completed and signed before any construction may begin.

1.2 Acronyms

BMPs – Best Management Practices
MT DEQ – Montana Department of Environmental Quality
NOI – Notice of Intent
NOT – Notice of Termination
PTN – Permit Transfer Notice
SWPPP – Storm Water Pollution Prevention Plan
U. S. EPA – United States Environmental Protection Agency

Section 2 – Grading, Drainage, and Erosion Control

2.1 Plans

2.1.1 Plans for Grading, Drainage, and Erosion Control shall be approved by the City Engineering Division and the Storm Water Utility Division, prior to any on-site grading. Applicants shall submit the information required in this section for a Building and / or Zoning Compliance Permit for all new construction and / or additions including but not limited to structures, driveways, streets and parking. The site plan and grading plans may be on one sheet.

2.1.2 Plans for Grading, Drainage and Erosion Control shall be in accordance with and include the following:

2.1.2.1 The landscape design shall incorporate berms and / or landscape grading to:
2.1.2.2 slow or direct storm water runoff;
2.1.2.3 provide shallow infiltration and evaporation;

2.1.2.4 distribute collection and detention throughout the site to minimize large, ditch like detention ponds; and

2.1.2.5 minimize standing water, especially due to the collection of irrigation runoff.

2.1.3 Drywells (Sumps) are not allowed within the Missoula Business / Development Park or any other areas / locations with predominately clay soils.

2.1.4 Each site will provide for the adequate storage for the difference between the existing (*pre-development*) storm water runoff for the greater amount of either the 24-hour 10-year or 24-hour 100-year storm event and the proposed (*post-development*) storm water runoff for the greater amount of either the 24-hour 10-year or 24-hour 100-year storm event.

2.1.4.1 Drawings that are to scale and do not exceed one inch (1") equals forty feet (40');

2.1.4.2 All proposed and existing structures;

2.1.2.2 All existing and proposed property corners and adjacent right-of-way, including location of curbs, sidewalks, and driveways;

2.1.2.3 All existing and proposed utilities and utility easements and other documented easement locations;

2.1.2.4 Existing and proposed finished floor elevations for primary structures;

2.1.2.5 North arrow and scale;

2.1.2.6 Spot elevations for existing and proposed (a) driveway at the street; (b) finished elevation for garage; and (c) existing and finished grade at building corners;

2.1.2.7 Areas of riparian resource;

2.1.2.8 Existing trees including location and size;

2.1.2.9 Locations of proposed cut and fill;

2.1.2.10 Existing and proposed drainage structures and flow lines;

2.1.2.11 Proposed slopes in excess of 2:1;

2.1.2.12 Existing and proposed retaining walls;

2.1.2.13 Storm Water Pollution Prevention Plan (SWPPP);

2.1.2.14 Drag-on prevention plan;

2.1.2.15 For slopes ten (10%) percent or greater, all multi-family, commercial, and industrial parcels with more than four parking spaces require the following additional information:

2.1.2.15.1 A contour map showing two foot (2') existing and proposed contours of the entire lot up to one acre in size.

2.1.2.15.2 A contour map showing two foot (2') existing and proposed contours for the disturbed area on lots exceeding on acre in size.

2.1.2.15.3 The contour maps including the grading and drainage plans shall be prepared, stamped and signed by a licensed professional engineer, surveyor, or architect.

2.1.3 Plans and project design submittals shall include the following:

2.1.3.1 Five **(5)** copies of the submitted plans for the proposed grading, drainage, erosion control, and SWPPP shall be submitted to Development Services at the time of the application for zoning compliance permit and / or building permit which requires site grading as described in these Specifications. The submitted plans shall be in conformance with MMC Title 12, Title 15, and Title 20, or as required by any federal, state, and / or local agency.

2.1.3.2 All disturbed slopes shall be graded or have retaining walls constructed according to an approved grading plan. The required grading plans shall be in accordance with the following:

2.1.3.2.1 Cut-and-fill slopes and intersections of manufactured and natural slopes shall have curved configurations that reflect the forms and shapes of surrounding topography.

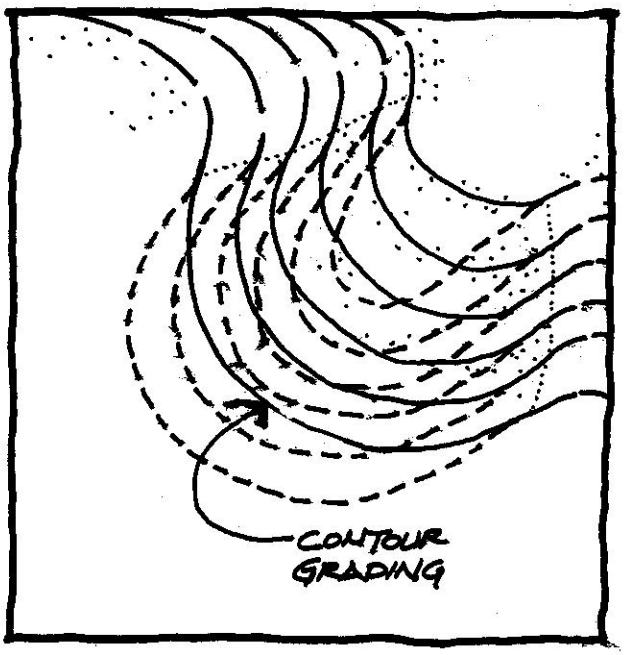


Figure 2.1—Contour Grading Illustration

2.1.3.2.2 Grading shall incorporate elements to protect drainage systems. Natural drainage ways shall be preserved. Drainage ways shall remain clear and open and shall not be obstructed with fences, structures, etc. Streets and roads which cross a drainage way shall preserve the capacity of the drainage.

2.1.3.2.3 Grading shall integrate landscaping design to provide erosion protection and prevent weed infestation to the site. Landowners shall replant areas of disturbance no later than the first growing season in consultation with the County Extension Office.

2.1.3.2.4 Where site grading is necessary, topsoil shall be salvaged or imported to redistribute on areas to be re-vegetated.

2.1.3.2.5 Where drainage swales are used to divert surface waters, they shall be constructed, vegetated and protected to minimize potential erosion.

2.1.3.2.6 Manufactured slopes may not exceed a slope ratio of 2:1 unless all of the following requirements are met and satisfied:

2.1.3.2.6.1 The soils are suitable.

2.1.3.2.6.2 Only if it is necessary so that significant environmental characteristics of a site are preserved or the need for extensive cut and fill slopes is substantially reduced.

2.1.3.2.6.3 Shall have certification by a licensed professional geotechnical or soils engineer.

2.1.3.2.7 Within public rights-of-way, private use of retaining structures shall be allowed only if approved by the Development Services Director. Slope ratios within the public right-of-way require approval by Development Services.

2.1.3.2.8 Use of retaining structures outside of the right-of-way may be allowed, if approved by Development Services, as part of the grading plan.

2.1.3.2.9 Provisions for the collection of storm water runoff and prevention of soil erosion shall be the first improvements constructed on the development site. Such improvements shall be designed to divert surface water away from cut faces or sloping surfaces of a fill.

2.1.3.2.10 Unless an adequate storm sewer exists or is provided, all surface run-off in addition to that normally present before development shall be retained on-site or released from the site in a manner which shall not substantially increase the peak run-off normally present before development. Restrictive covenants may be required to mitigate adverse effects of property drainage. Mitigation may involve the installation of drainage structures or the connection to an existing storm drainage system. Drainage easements across adjoining land to the nearest drainage way may be required.

2.1.3.2.11 Design of such drainage facilities shall be based upon local soil factors, topography, natural drainages, gullies and swales, aesthetics, and capacity for proper disposal of excess water. Drainage facilities shall be designed to handle both the post-development and the existing adjacent storm water runoff / drainage.

2.1.3.2.12 Any trees to be saved shall be noted on the site plan and grading shall not take place inside the “drip line” of the tree canopy.

2.1.3.2.13 All cut and fill shall be confined to stated right-of-way widths or roadway easement widths.

2.1.3.2.14 In residential developments with lot sizes one (1) acre or smaller in size, if the total percentage of the impervious surface exceeds thirty-five (35%) percent of the total lot size, additional drainage and / or erosion control measures may be required.

2.2 Permits

2.2.1 Grading, Drainage, and Erosion Control Permits are required in accordance with the following:

2.2.1.1 Applicants shall obtain a Grading Permit from Development Services before beginning any grading associated with a building permit or zoning compliance permit on public or private property.

2.2.1.2 Any new building that requires a building permit where grades are altered more than three (3) feet, except single-family residences located on slopes less than five (5%) percent, require a Grading Permit.

2.2.1.3 Any construction activities related to grading that meet the requirements outlined in these Specifications require a Grading Permit.

2.2.1.4 Permit applicants shall provide plans of the proposed site development in accordance with these Specifications and receive approval for such plans before beginning any construction.

2.2.1.5 Grading, Drainage, and Erosion Control Permits expire by limitation and become null and void if work authorized in the permit does not begin within one hundred-eighty (180) calendar days after date of issuance. Also, permits expire by limitation and become null and void if work authorized by the permit is suspended for more than thirty (30) calendar days, except for weather related delays. Issued Grading, Drainage, and Erosion Control Permits expire one (1) year from date of issuance. Before work begins following an interruption, applicants must pay the full permit fee and must have applied for and been issued a new permit. The Development Services Director may grant a time extension on certain permits and a case-by-case basis. Applicants shall give Development Services staff at least two (2) hours' notice before beginning grading operations, and they shall notify Development Services that work under the permit has been completed.

2.2.1.6 Storm Water Pollution Prevention Plan (SWPPP) Permits expire by limitation and become null and void if work authorized by the permit does not begin within one hundred-eighty (180) calendar days after date of issuance. Also, permits expire by limitation and become null and void if work authorized by the permit is suspended for more than thirty (30) calendar days, except for weather related delays. Issued SWPPP Permits expire one (1) year from date of issuance. Before work begins following an interruption, applicants must pay the full permit fee and must have applied for and been issued a new permit. The Development Services Director or a designated agent may grant extension of time on permits.

Applicants shall give the Development Services staff two (2) hours' notice prior to beginning grading operations, and provide notice of completion of work under the permit.

2.3 General Requirements for Single Family and Duplex Residential Parcels

2.3.1 The finished grade of the ground shall slope away from the house.

2.3.2 Roof drainage structures shall be installed so as to divert storm water away from the foundation of the structure. Roof drainage shall not be constructed to concentrate storm water runoff on to an adjacent parcel.

2.3.3 The finished grade shall be contoured to move storm water away from any structures, this includes:

2.3.3.1 Storm water runoff from impermeable surfaces such as roofs, driveways, and sidewalks on the subject property; and

2.3.3.2 Runoff from adjacent properties and undeveloped lands.

2.3.4 The finished grade shall be contoured such that:

2.3.4.1 Storm water runoff shall not impact structures on adjacent parcels but shall be configured to direct storm water runoff to landscaped and / or undevelopable areas, or when and where available capacity exists, to drainage facilities on adjacent properties, if reviewed and when approved by the City Engineer and the Storm Water Utility.

2.3.4.2 That natural drainage patterns shall be unaltered or if approved by the City Engineer and the Storm Water Utility, may be redirected.

2.3.4.3 Post-development drainage patterns shall be unaltered or if approved by the City Engineer and the Storm Water Utility, may be redirected.

2.3.5 Irrigation shall be installed and used in a manner that does not impact adjacent properties.

2.4 General Requirements for Multi-family, Commercial, and Industrial Parcels

2.4.1 All storm water runoff shall be retained on site.

2.4.2 Drainage and grading plans shall be prepared, stamped and signed by a by a Montana licensed professional engineer, surveyor or architect.

2.4.3 A minimum of one (1) eight-foot (8') dry well (sump) shall be installed per every ten thousand (10,000) square feet of impervious area, including but not limited to paved areas, sidewalks, roofs, etc. Additional drainage facilities may be required if soil permeability indicates a slow percolation rate, dry wells (sumps) are not permitted in clay soils.

2.4.4 Alternative drainage systems may be considered with approval from the City Engineer and the Storm Water Utility.

2.4.5 Multifamily, commercial, and industrial parcels that have four (4) or fewer parking spaces shall meet the requirements set forth in these Specifications.

2.5 Storm Water Pollution Prevention Plan (SWPPP) Requirements

2.5.1 All areas of construction where earthwork / grading (soil movement) occurs shall take measures to prevent all dirt, soil, sand, gravel, mud, rock, concrete, and / or any other debris from being spilled, tracked, and / or dragged onto streets, alleys, or rights-of-way.

2.5.2 A MT DEQ and a City of Missoula SWPPP is required for all grading, drainage and erosion control work on parcels one (1) acre or greater in size, including access points and routes to and from the parcel.

2.5.2.1 SWPPPs shall comply with current U.S. EPA and MT DEQ requirements.

2.5.2.2 SWPPPs shall identify storm water pollution prevention measures or Best Management Practices (BMPs) to be used and shall identify where on the parcel which BMPs will be applied.

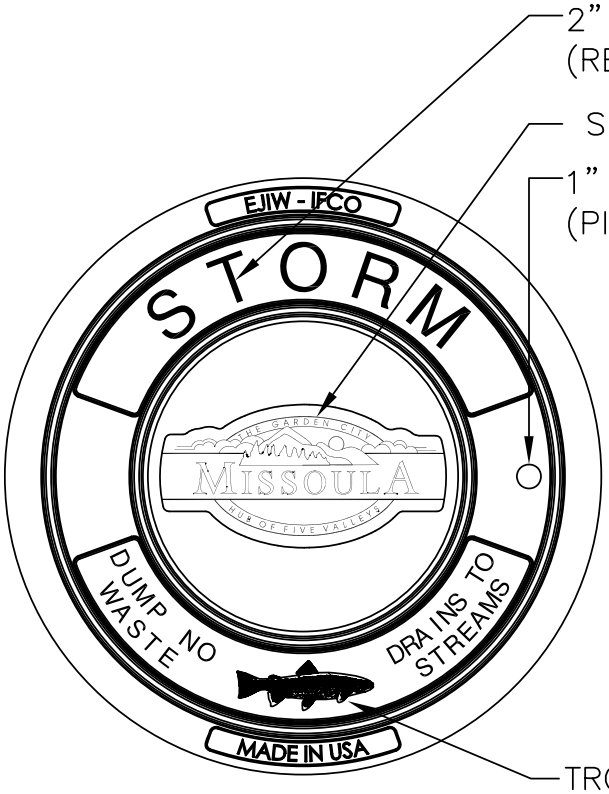
2.5.3 Before work may begin, applicants shall include a copy of their Notice of Intent (NOI), issued by MT DEQ, with their SWPPP submittal.

2.5.4 Copy of SWPPP Notice of Termination (NOT) issued by MT DEQ is required prior to release from approved SWPPP requirements and final approval of permit.

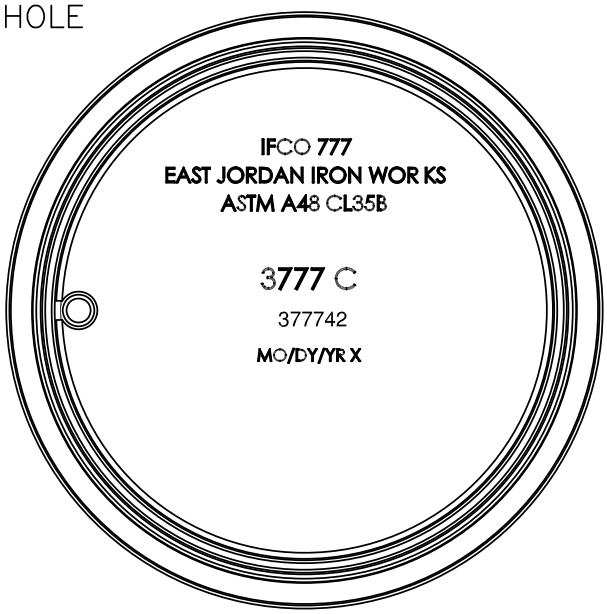
2.5.5 Copy of SWPPP Permit Transfer Notice (PTN) issued by MT DEQ is required prior to release of current NOI permit holder from approved SWPPP and/or assumption by new NOI permit holder.

Appendix F
City of Missoula Storm Water Utility
Standard Drawings

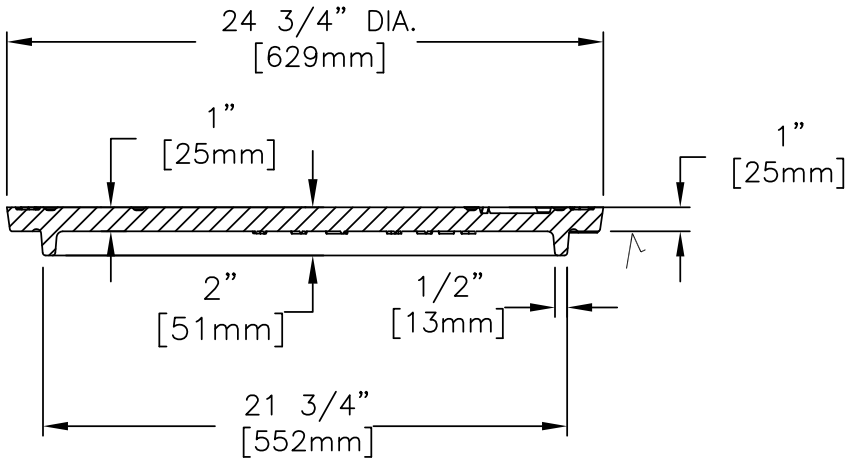
EJIW / IFCO 3777–M
OR APPROVED EQUIVALENT



TOP VIEW



BOTTOM VIEW



SECTION

√ MACHINED SURFACE

SEE STD–300D FOR STANDARD
MANHOLE RING SPECIFICATIONS

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
Engineering Division

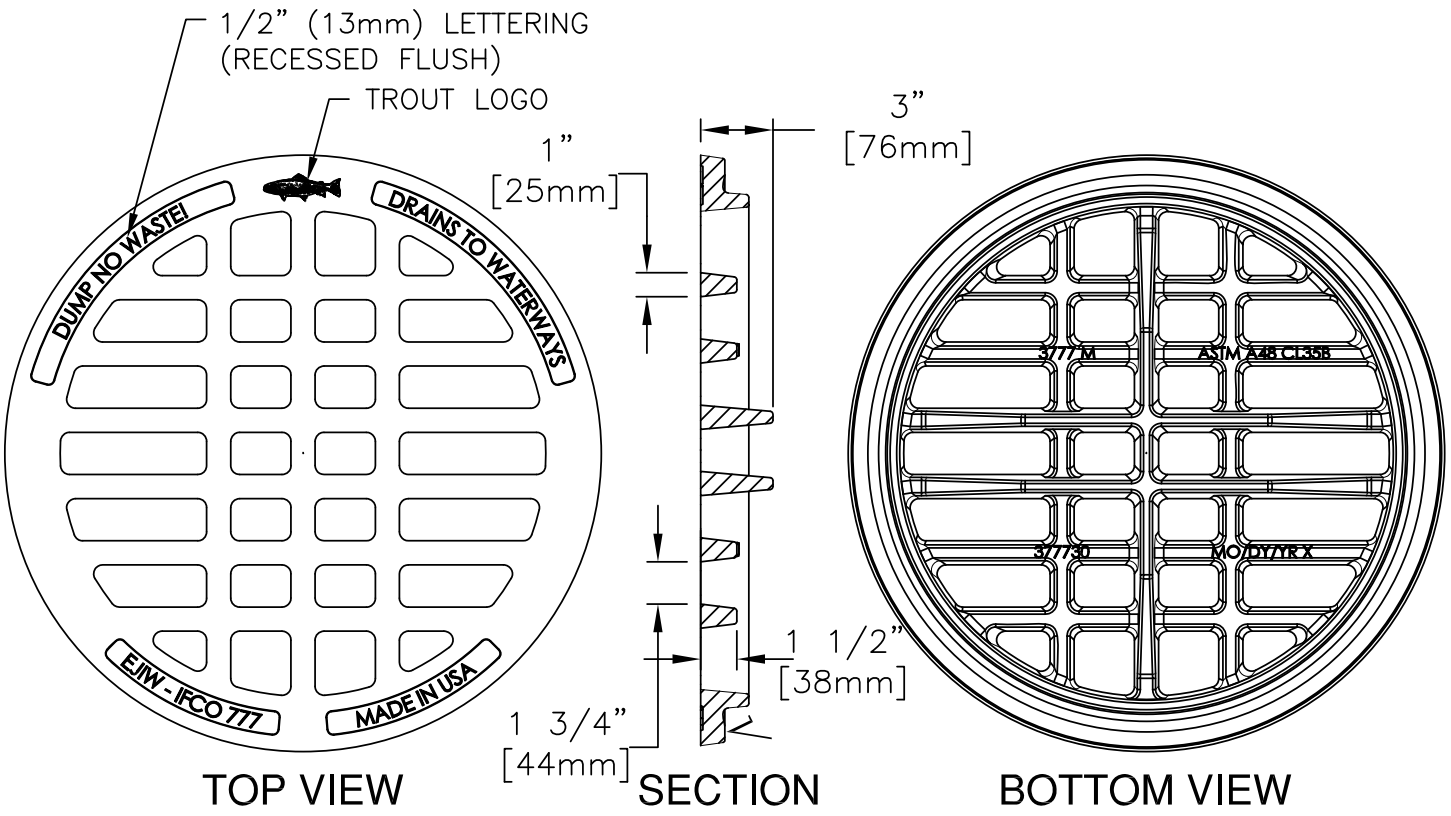
Storm Sewer Manhole Cover

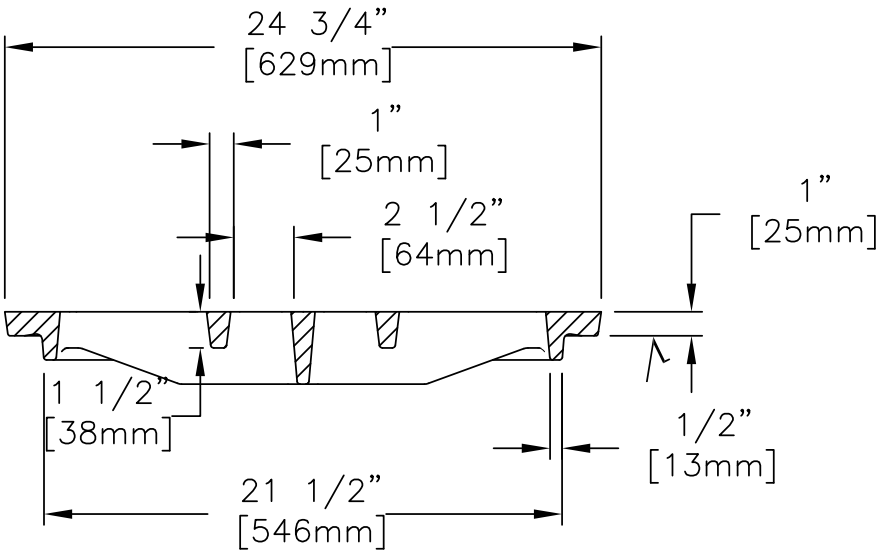
Approved By
City Engineer
Kevin J. Slovarp

Adopted: 01/31/2006
Revised: 01/08/2007

STD - 300B

EJIW / IFCO 3777–M
OR APPROVED EQUIVALENT





√ MACHINED SURFACE

SEE STD–300D FOR STANDARD MANHOLE RING SPECIFICATIONS

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
Engineering Division

Dry Well or Sump Cover

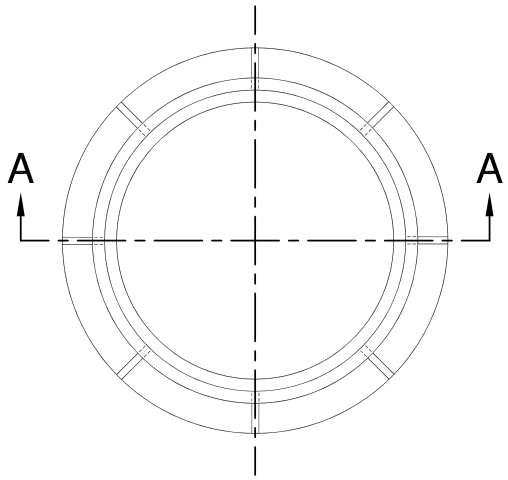
Approved By
City Engineer
Kevin J. Slovarp

Adopted: 01/31/06
Revised: 01/08/2007

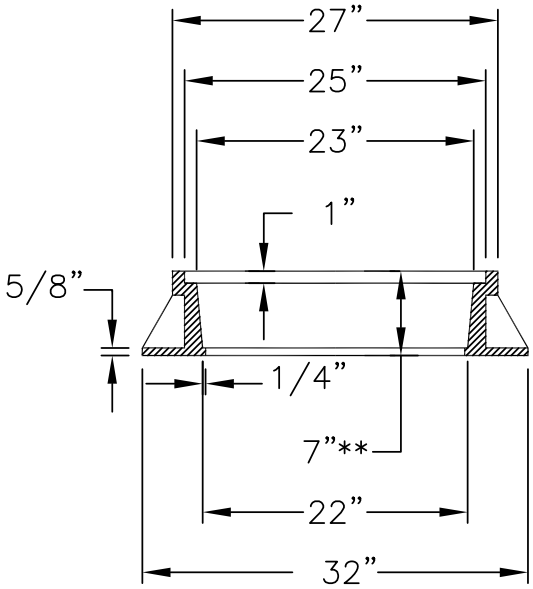
STD -300C

EJIW / IFCO NO. 3777
OR APPROVED EQUIVALENT

MANHOLE RING



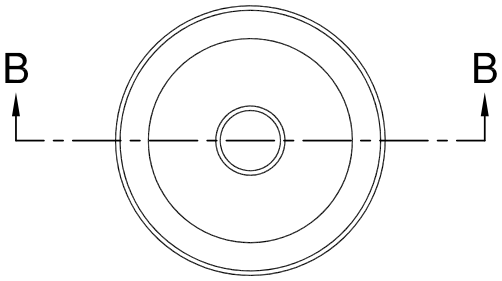
TOP VIEW



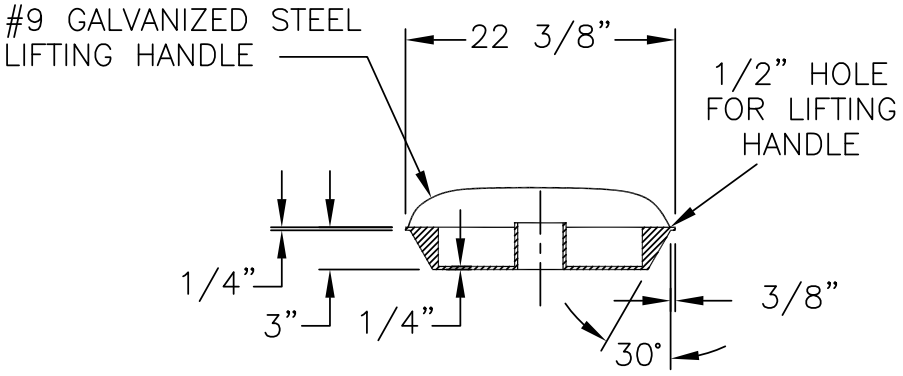
SECTION A-A

MANHOLE RING – MINIMUM 180lb.

DUSTPAN



TOP VIEW



SECTION B-B

DUSTPAN – GRAY IRON

** 4” MANHOLE RING MAY BE USED ONLY WITH PRIOR CITY ENGINEER APPROVAL

USE ONLY APPROVED COVERS:
STD–300A SANITARY SEWER
STD–300B STORM SEWER
STD–300C DRY WELL / SUMP

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
THE GARDEN CITY
HUB OF FIVE VALLEYS
Engineering Division

Standard Manhole Ring and Dustpan
(Replaces STD-319)

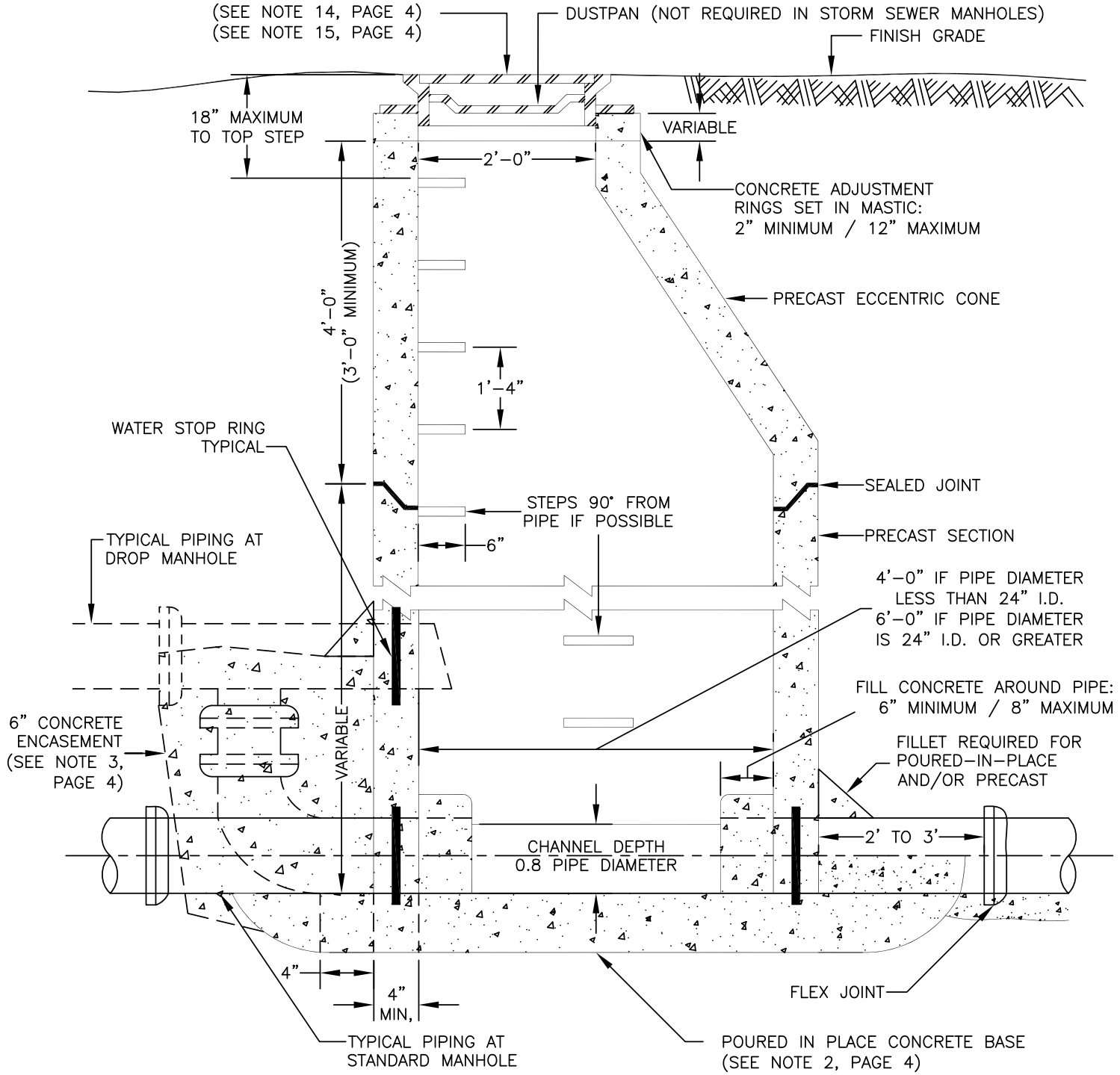
Approved By
City Engineer
Kevin J. Slovarp

Adopted: 11/1997
Revised: 01/08/2007

STD -300D

USE ONLY APPROVED COMPONENTS:

STD–300A SANITARY SEWER COVER
STD–300B STORM SEWER COVER
STD–300C DRY WELL / SUMP COVER
STD–300D FOR FRAME AND DUSTPAN



NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD–301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
Engineering Division

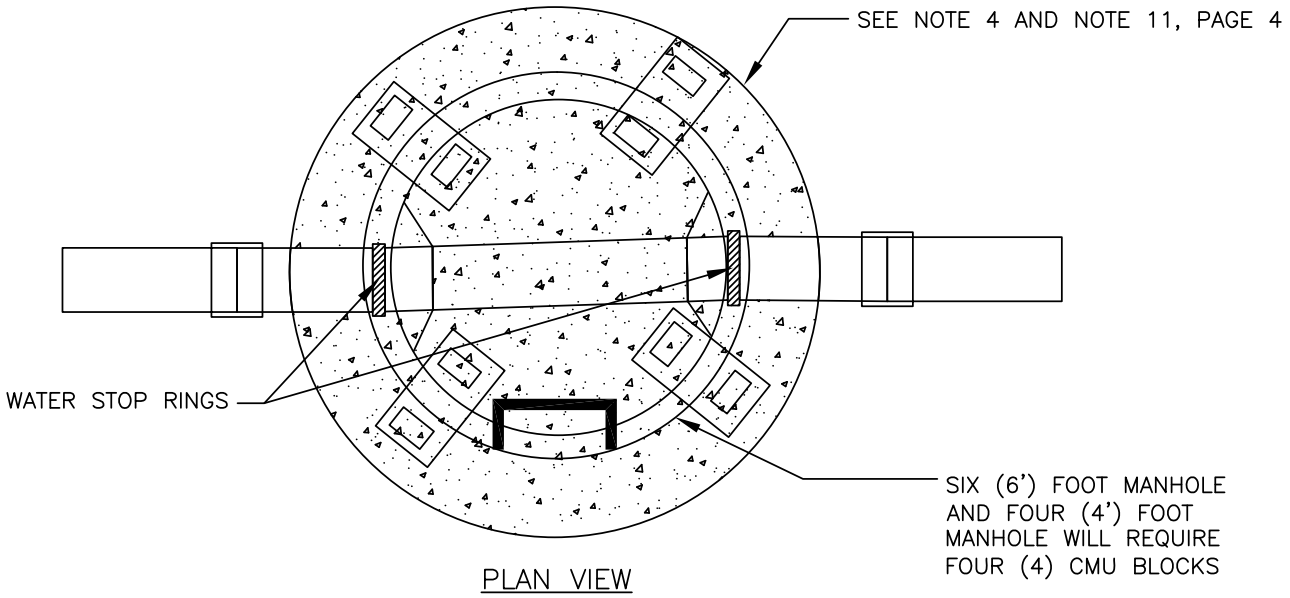
Sanitary and Storm Sewer Manhole

Approved By
City Engineer
Kevin J. Slovarp

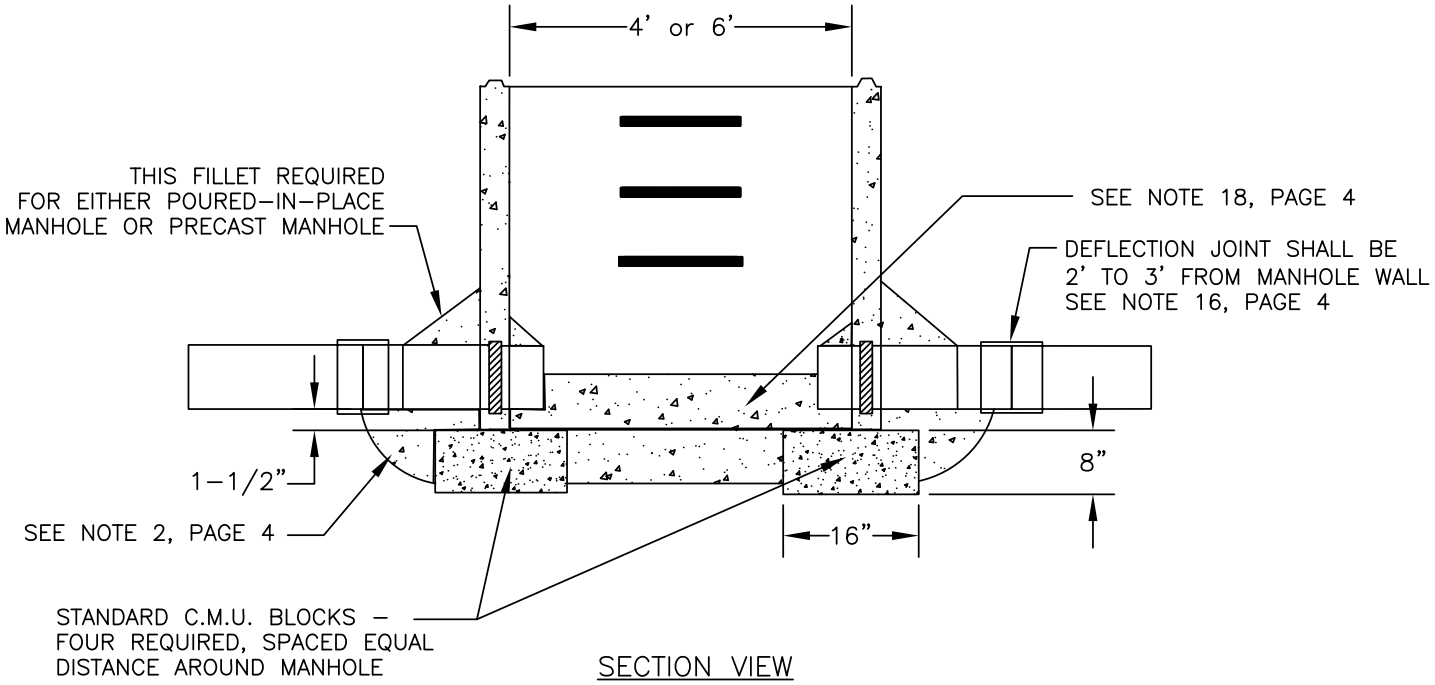
Adopted: 01/1973
Revised: 01/10/2007

STD - 301

POURED IN PLACE MANHOLE BASE



PLAN VIEW



SECTION VIEW

NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD-301

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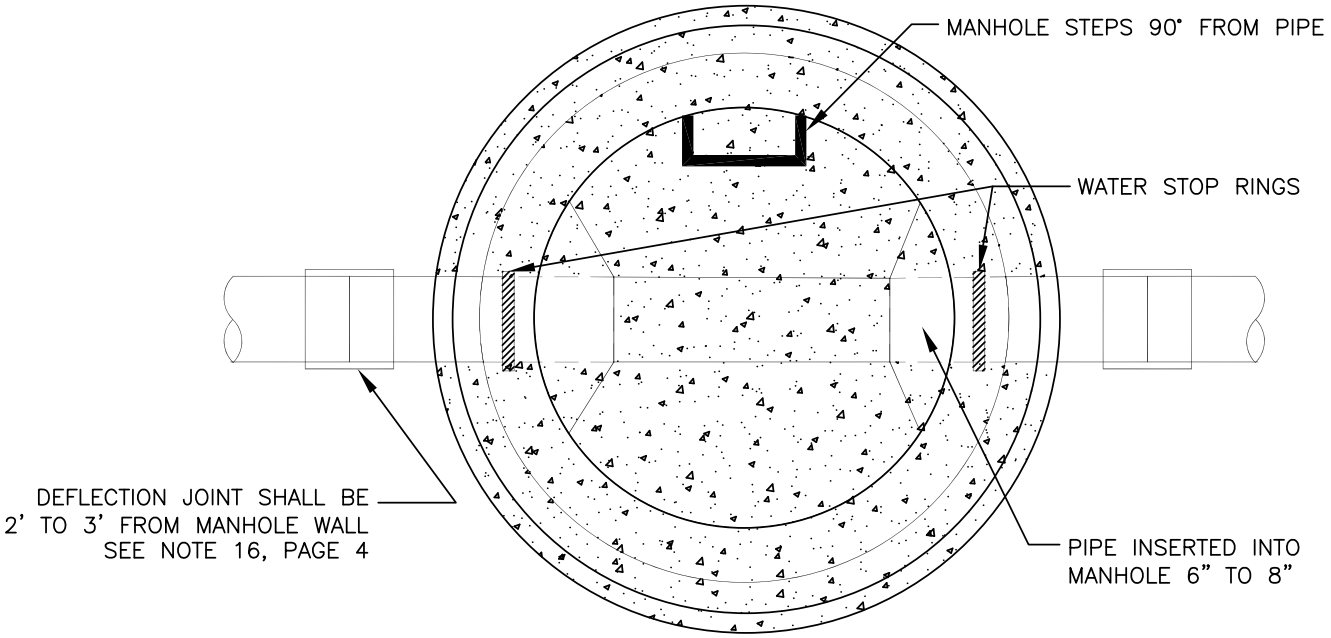
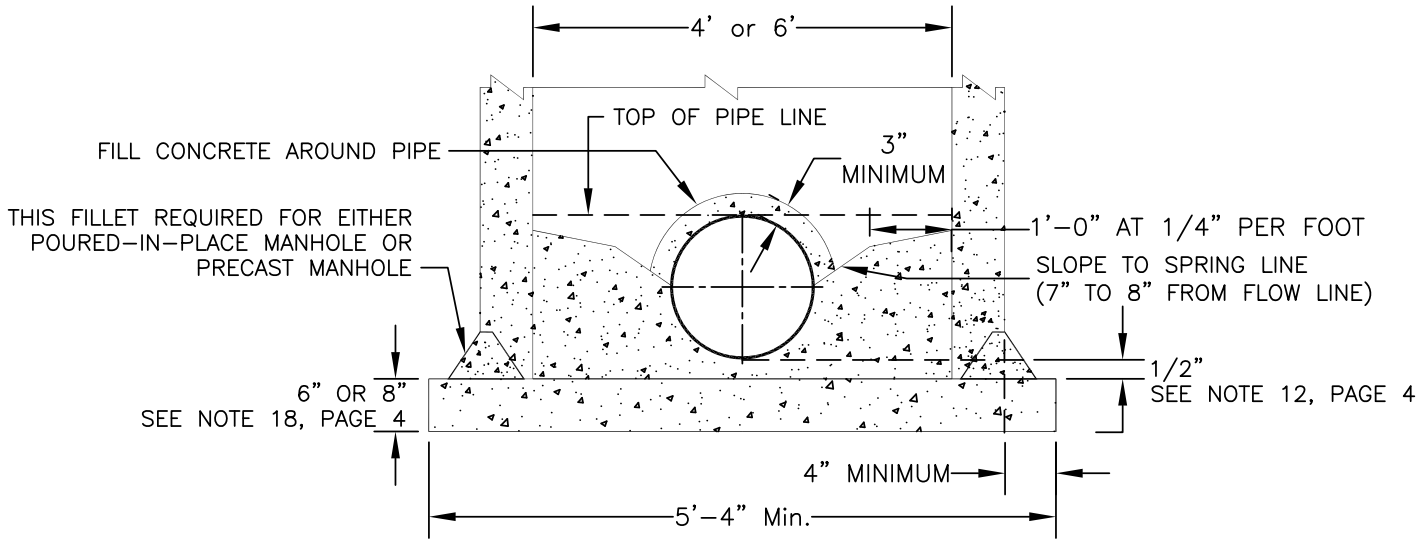
MISSOULA Engineering Division	Sanitary and Storm Sewer Manhole	Page 2 of 4	
	Approved By City Engineer Kevin J. Slovarp	Adopted: 01/1973 Revised: 01/10/2007	STD - 301

PRECAST MANHOLE BASE



PLAN VIEW



SECTION VIEW

NOTE: ALL PERTINENT DESIGN AND CONSTRUCTION NOTES ARE ON PAGE 4 OF STD-301

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

ADDITIONAL NOTES FOR MISSOULA SANITARY SEWER AND STORM SEWER MANHOLE STANDARDS

1. USE MONTANA PUBLIC WORKS STANDARD SPECIFICATIONS (MPWSS) SECTION 02700 WITH CITY OF MISSOULA AMENDMENTS.

2. POURED–IN–PLACE OR PRECAST BASE MAY BE USED.
   POURED–IN–PLACE BASE: MINIMUM CONCRETE THICKNESS MUST BE SIX (6) INCHES.
   PRECAST BASE: MINIMUM THICKNESS MUST BE SIX (6) INCHES PER MPWSS STANDARD DRAWING 02720–3

3. THE POURED–IN–PLACE CONCRETE BASE MUST START ONE (1') FOOT FROM OUTSIDE THE MANHOLE AND MUST BE A MINIMUM OF EIGHT (8") INCHES DEEP UNDER THE MANHOLE WITH A THREE (3") INCH COLLAR AROUND THE PIPE.

4. POUR AGAINST UNDISTURBED EARTH SIX (6") INCHES OF CONCRETE ENCASEMENT TO SPRING LINE AND FIRST JOINT OF INLET PIPE.

5. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM–NEK®" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL.

6. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.

7. ALL MANHOLE PENETRATIONS SHALL BE MADE BY CORE DRILLING.

8. DROP MANHOLE CONNECTIONS SHALL BE USED ONLY WHERE SLOPE OF LATERAL INCOMING TO MAIN SEWER WOULD EXCEED TEN PERCENT AND ONLY WITH APPROVAL OF THE CITY ENGINEER.

9. CROWN OF LATERAL MAIN SHALL MATCH CROWN OF TRUNK SEWER.

10. MANHOLES PLACED IN UNPAVED AREAS SHALL HAVE THE COVERS PLACED EIGHTEEN (18") INCHES ABOVE FINISHED GRADE PER CITY OF MISSOULA, ENGINEERING/UTILITY SECTION ADMINISTRATIVE RULE NO. 604.

11. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.

12. ONE–HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.

13. BASE IS TO BE SUPPORTED BY FOUR (4) CEMENT BLOCKS (CMU) EQUALLY SPACED AROUND PERIMETER OF MANHOLE.

14. DUE TO PROVISIONS IN THE FEDERAL TRANSPORTATION ACT, VENDOR MUST AUTHENTICATE UNITED STATES ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.

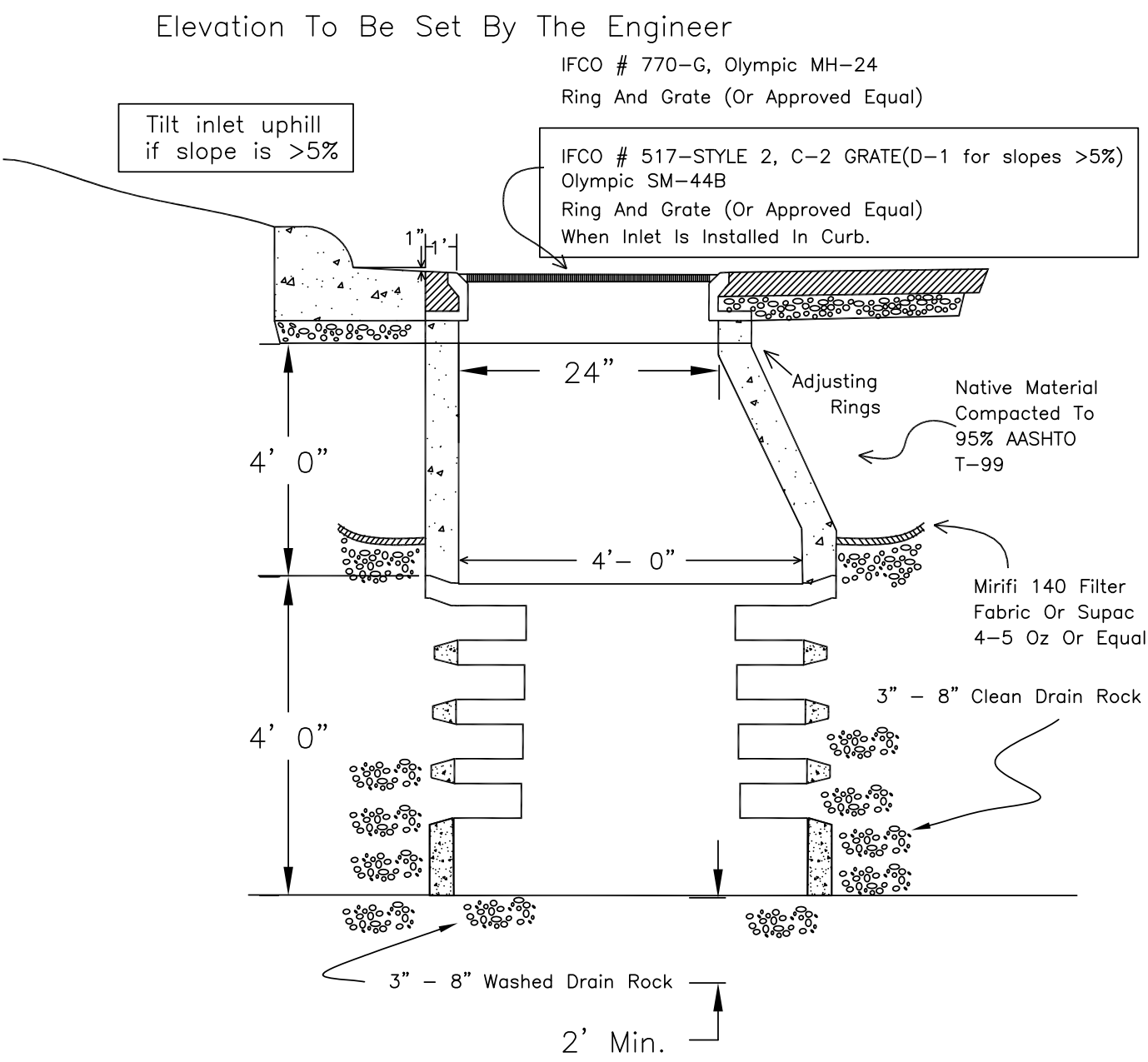
15. COVERS (LIDS) MUST BE AS SPECIFIED IN STANDARD DRAWINGS; STD–300A (SANITARY SEWER), STD–300B (STORM SEWER) OR STD–C (DRY WELL OR SUMP).

16. ALL P.V.C. TO P.V.C. DEFLECTON JOINTS SHALL BE MADE WITH A GASKETED P.V.C. REPAIR COUPLING AS A GPK 906 STYLE COUPLING OR EQUIVALENT. THE USE OF A PIPE BELL AND SPIGOT ASSEMBLY WILL ALSO BE ALLOWED.

17. ALL PRECAST MANHOLE BASES SHALL HAVE A FOUR (4") INCH CONCRETE BASE EXTENSION OUTSIDE THE MANHOLE FOR SUPPORT.

18. ALL FLOW ACROSS MANHOLES SHALL BE ONE–TENTH (1/10') OF A FOOT FALL, UNLESS THE FLOW CHANGES DIRECTION MORE THAN FORTY–FIVE (45°) DEGREES, THEN THE FALL SHALL BE TWO–TENTHS (2/10') OF A FOOT FALL OR GREATER.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm



NOTE: Due To Provisions In The Intermodal Surface Transportation Act, Vendors Must Authenticate U.S. Origin of Castings In Projects Involving Federal Funds.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
THE GARDEN CITY
HUB OF FIVE VALLEYS
Engineering Division

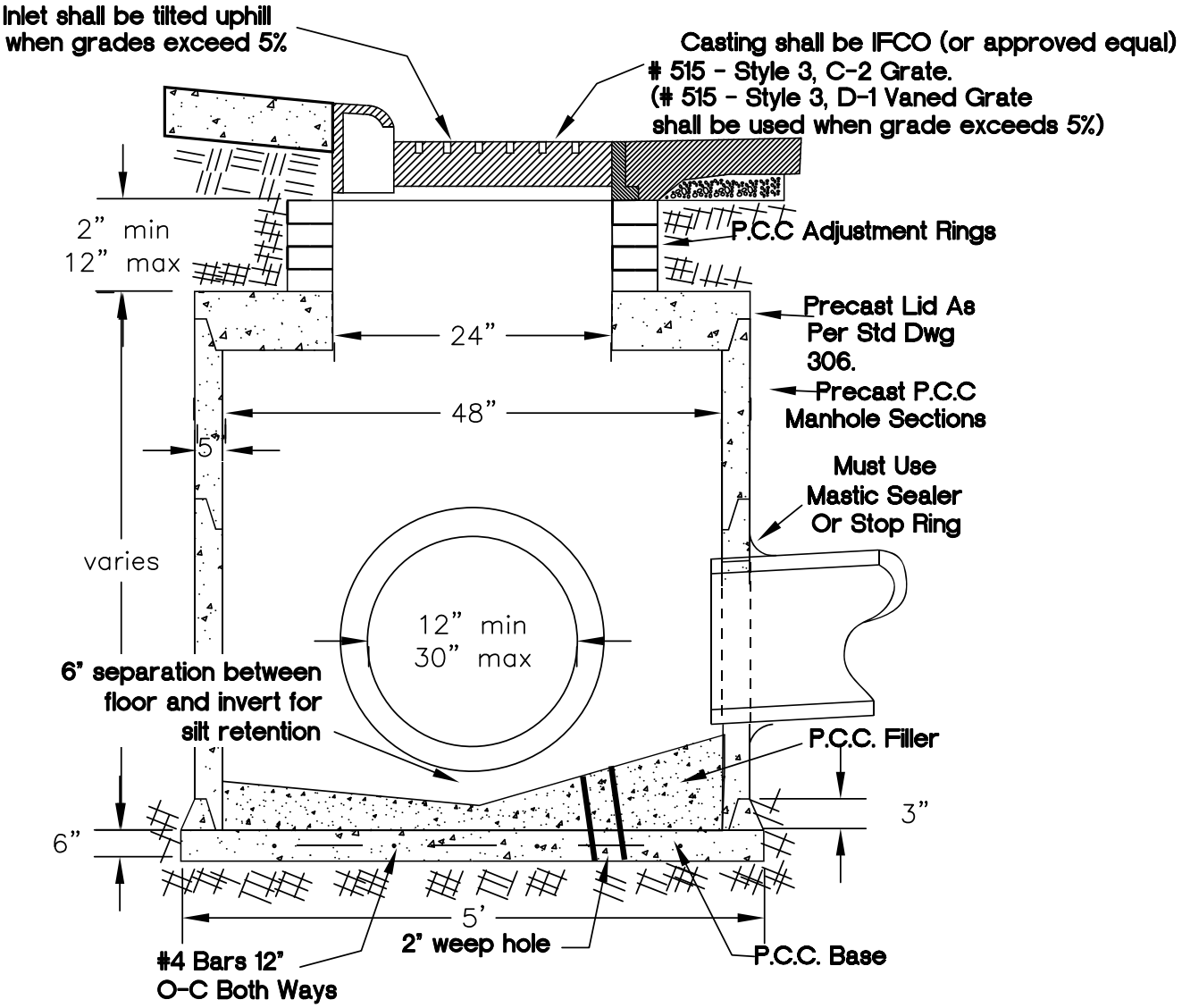
Standard 8' Precast Sump

Approved By City Engineer
R. Steven King

Adopted: 04/24/1985
Revised: 03/12/2004

STD - 302

Elevation To Be Set By The Engineer



Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

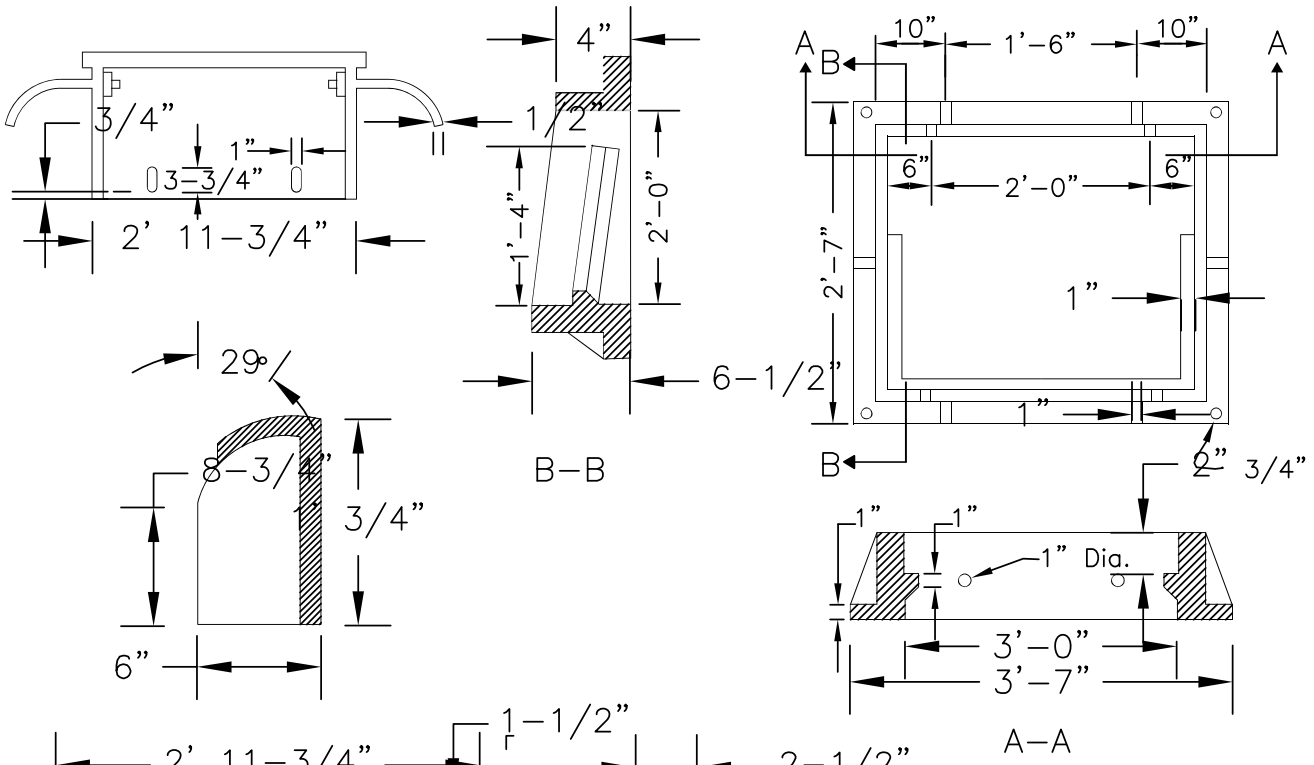
MISSOULA
Engineering Division

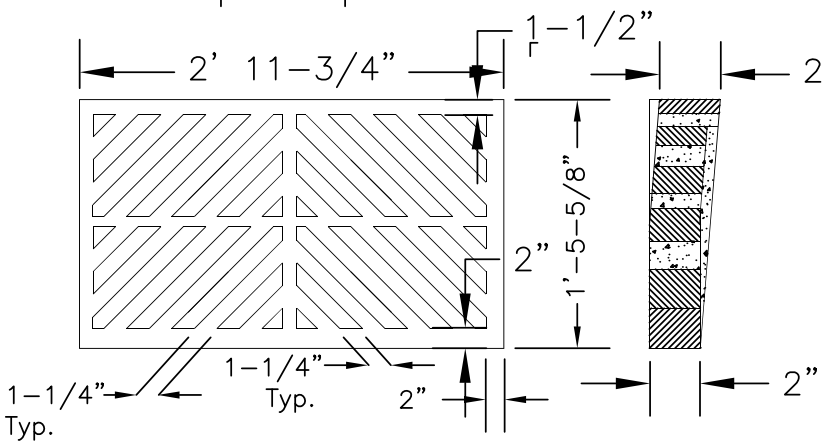
Standard Curb Intake

Approved By City Engineer
R. Steven King

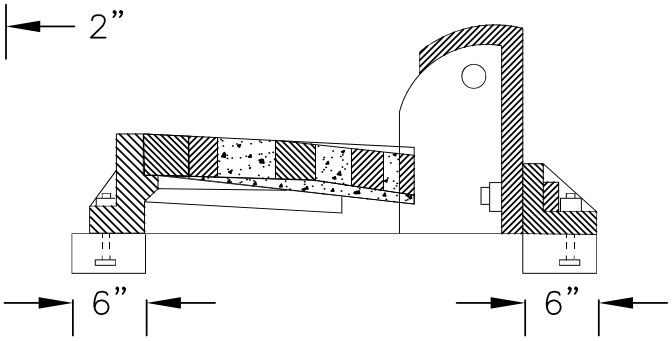
Adopted: 04/09/1973
Revised: 03/30/2005

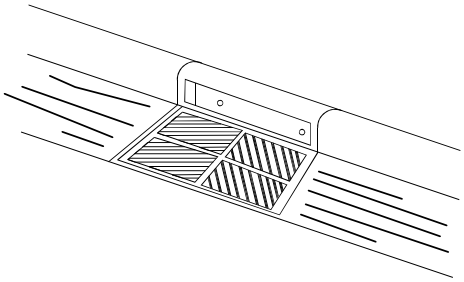
STD - 602





Curb Inlet Frame and Box with IFCO #515-9, Olympic #SM-47Q or Approved Equal.





NOTE: Due To Provisions In The Intermodal Surface Transportation Act, Vendors Must Authenticate U.S. Origin Of Castings For Federally Funded Projects.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

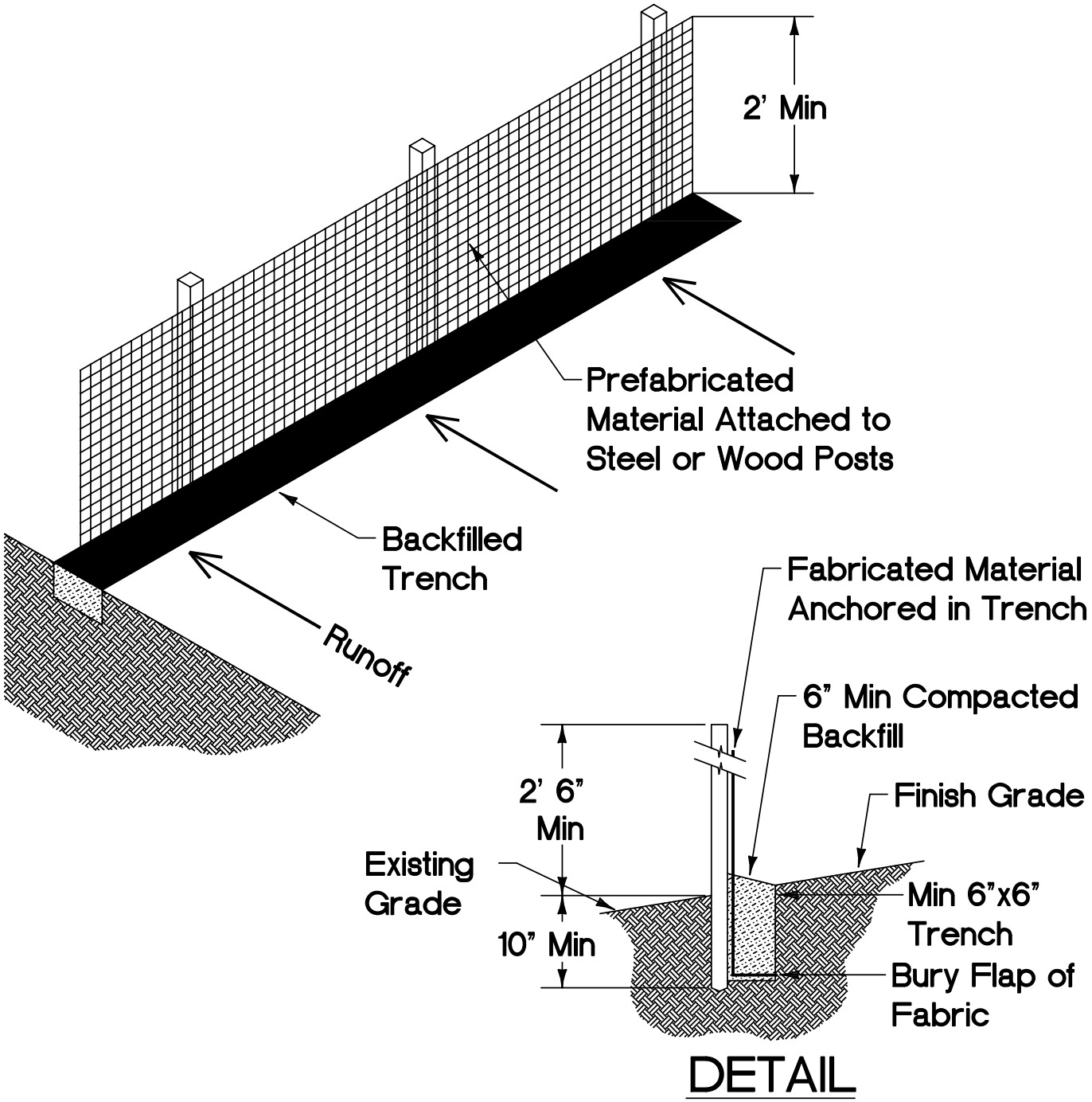
MISSOULA
THE GARDEN CITY
HUB OF FIVE VALLEYS
Engineering Division

Missoula Curb Inlet

Approved By City Engineer
R. Steven King

Adopted: 02/1973
Revised: 03/30/2005

STD - 603



DETAIL

Notes:

1. Silt fence shall be installed before any earth removal or excavation takes place.
2. Set posts maximum 8 feet on center and excavate 6"x6" trench upslope along the line of posts.
3. Attach filter fabric to posts and extend it into trench.
4. Backfill and compact excavated soil.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

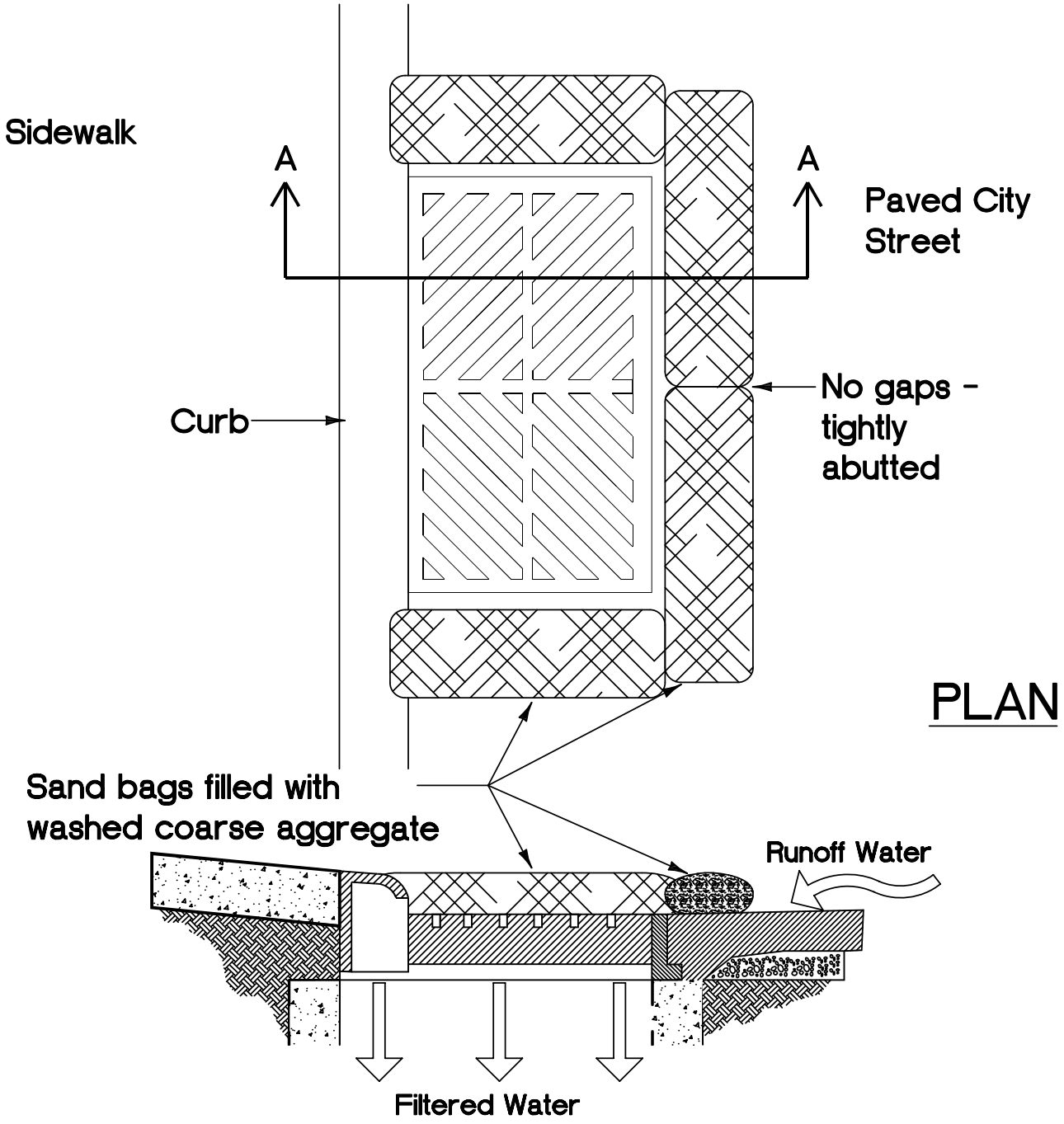
MISSOULA
Engineering Division

Silt Fence Installation

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

STD - 604



Note: This application for paved streets. See STD-606 for inlets on gravel roads.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

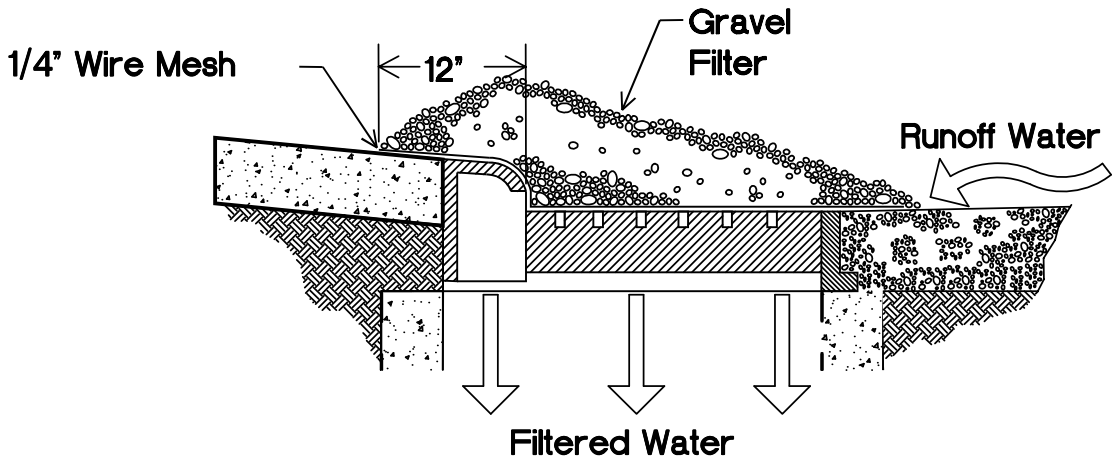
MISSOULA
Engineering Division

Post-Paving Gravel Curb Intake Filter

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

STD - 605



Notes: This application for gravel roads. See STD-605 for inlets on paved streets.

Sand bags filled with washed coarse aggregate may also be used.

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

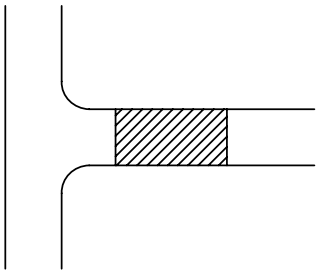
MISSOULA
Engineering Division

Pre-Paving Gravel Curb Intake Filter

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

STD - 606

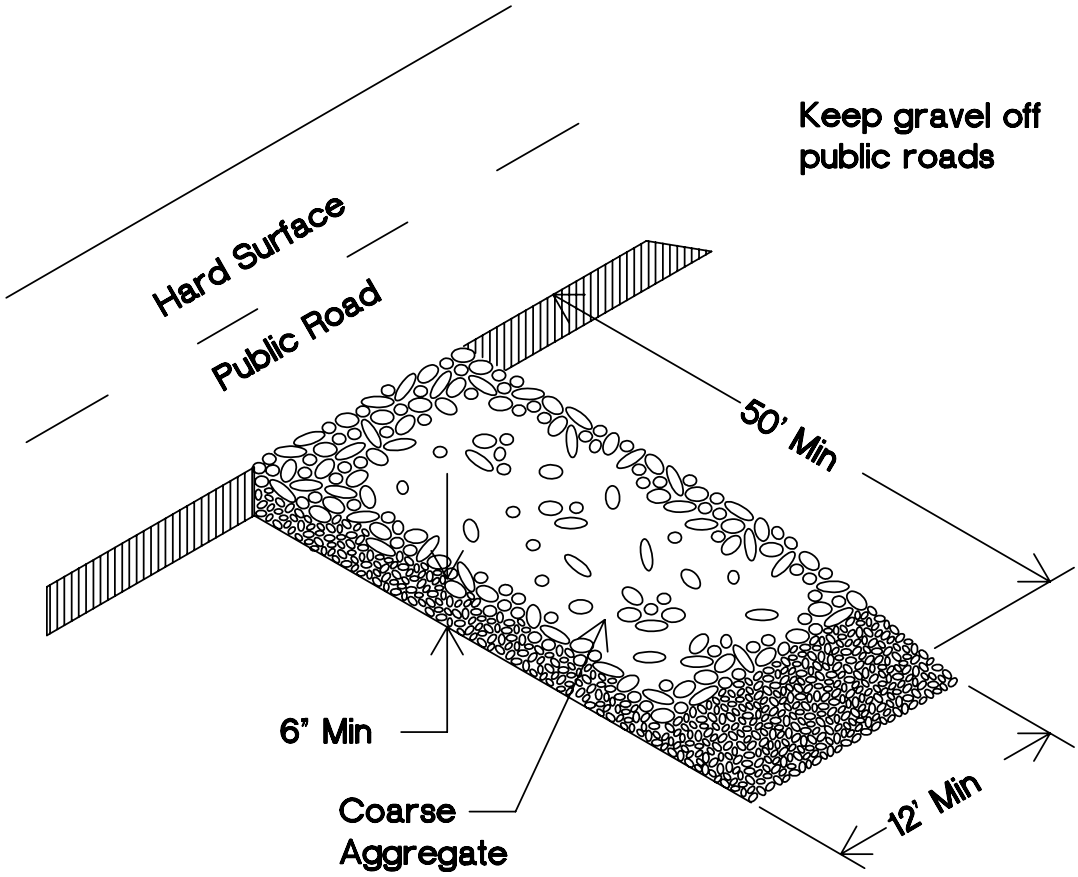


Definition

A stone stabilized pad located at points of vehicular ingress and egress on a construction site

Purpose

To reduce the amount of mud transported onto public roads by motor vehicles or runoff



Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
Engineering Division

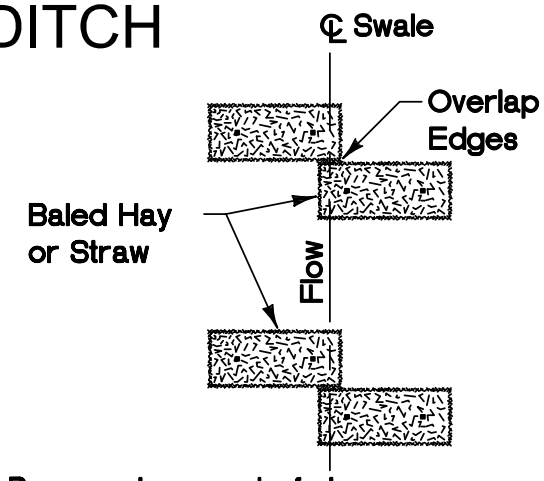
Temporary Gravel Construction Entrance

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

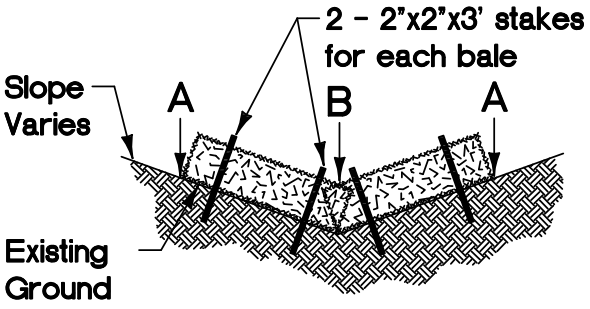
STD - 607

NARROW DITCH



Proper placement of straw bale barrier in small swale

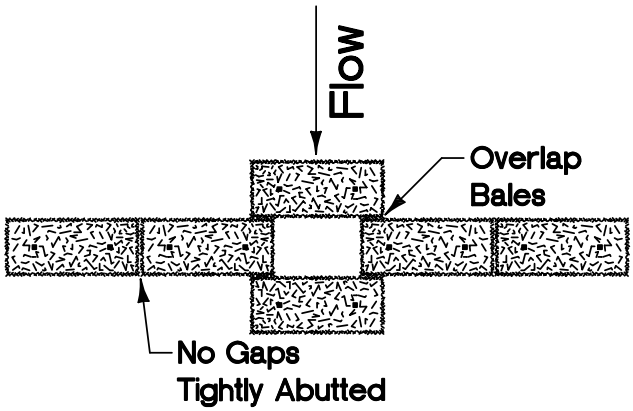
PLAN



End points "A" must be higher than flow line point"B"

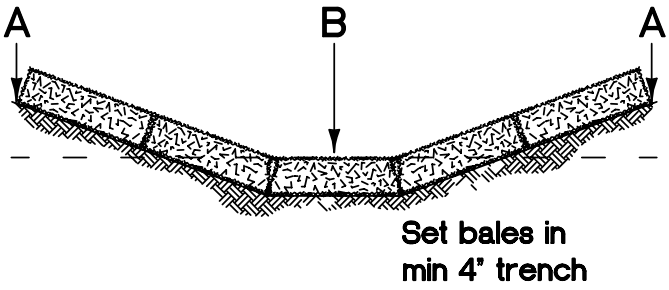
ELEVATION

WIDE DITCH



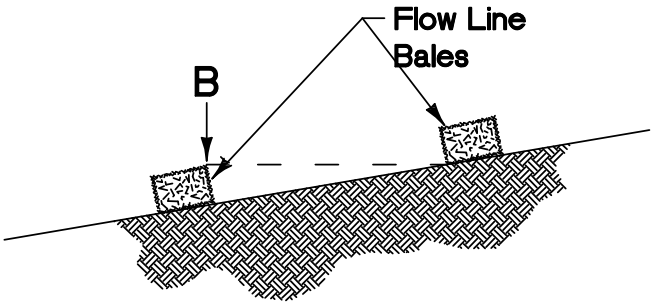
PLAN

End points "A" should be higher than point "B"



Proper placement of straw bale barrier in drainage way

ELEVATION



Place downstream bales such that point "B" is approximately level with the lowest elevation of the upstream bale

PROFILE

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

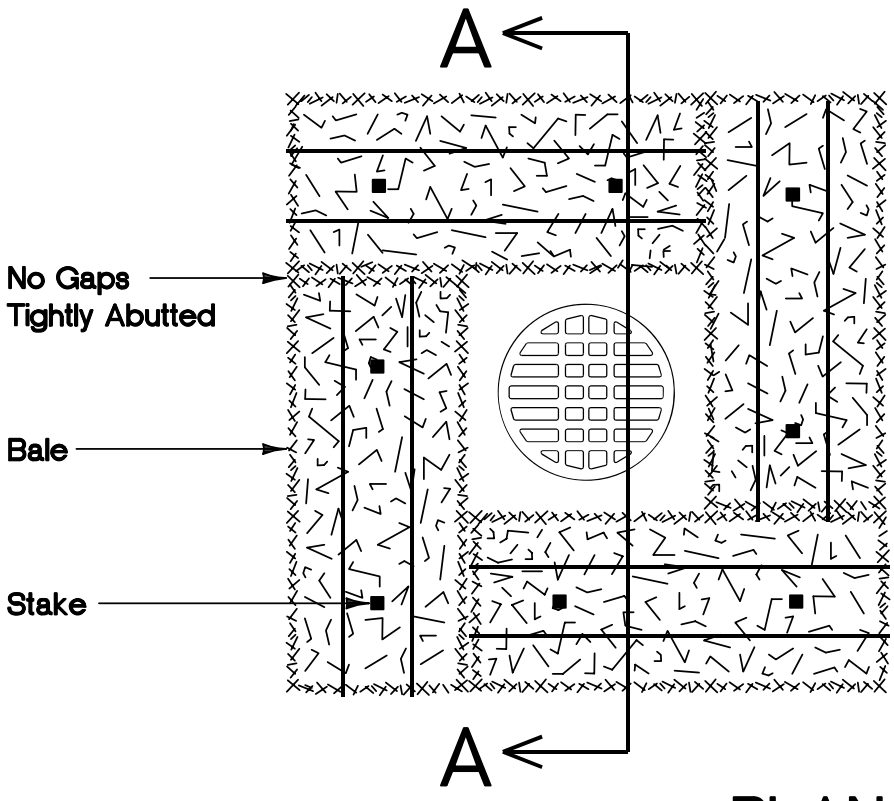
MISSOULA
Engineering Division

Straw Bale Check Dams

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

STD - 608

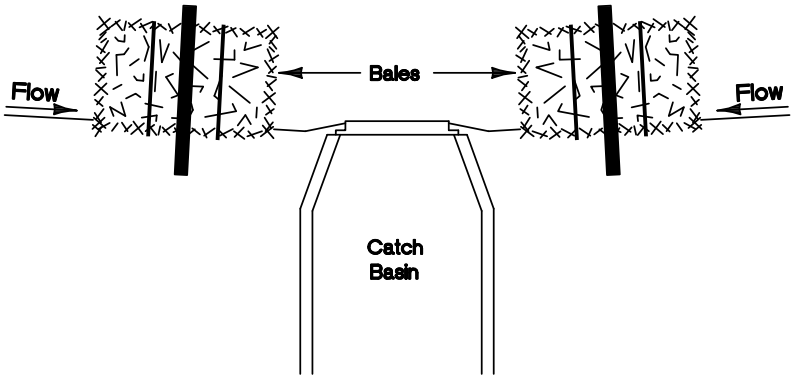


PLAN

NOTES:

1. Bales are to be placed 4" in the soil, tightly abutting with no gaps, staked and backfilled around the entire outside perimeter.

2. Not recommended for receiving concentrated flows, such as streets or highway medians.



SECTION A-A

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
THE GARDEN CITY
HUB OF FIVE VALLEYS
Engineering Division

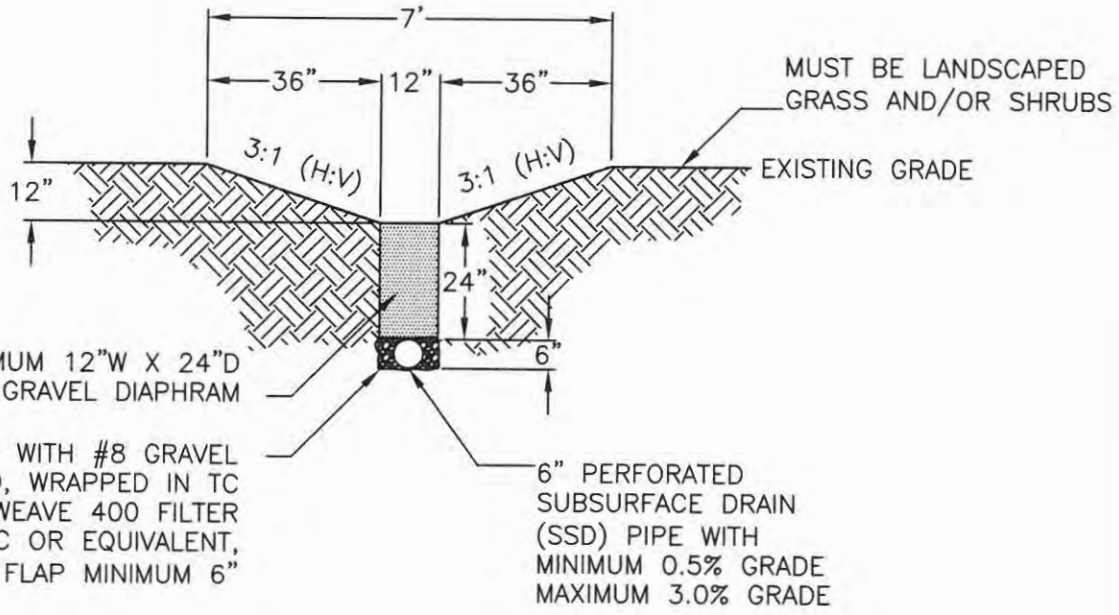
Straw Bale Sediment Control at Field Catch Basins

Approved By City Engineer
R. Steven King

Adopted: 01/01/2005
Revised:

STD - 609

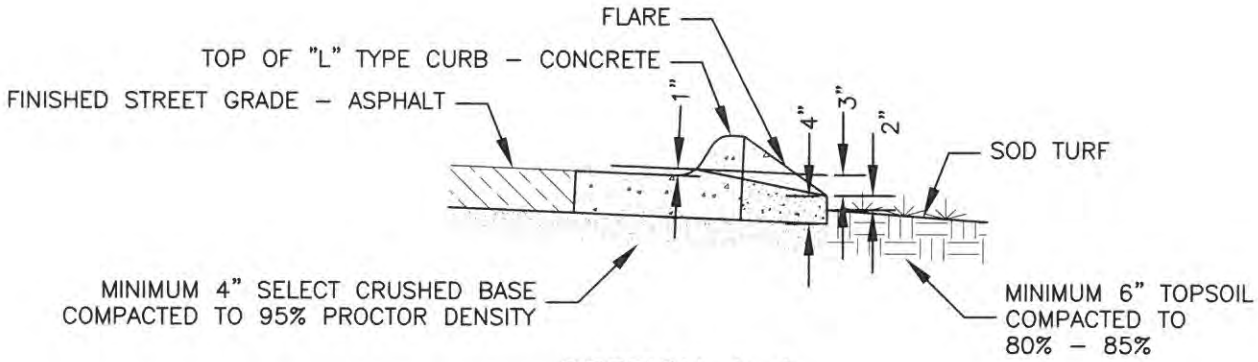
U.S. ENVIRONMENTAL PROTECTION AGENCY REQUIRED STORM WATER POLLUTION PREVENTION PLAN = SWPPP TYPICAL RESIDENTIAL DRAINAGE SWALE



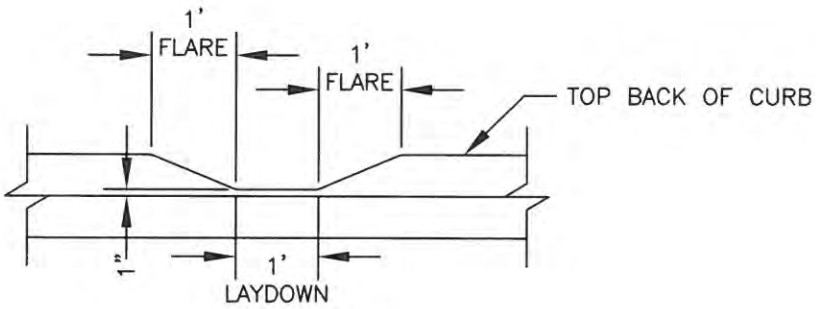
1. DRAINAGE SWALE DESIGN AND PLACEMENT MAY NEED CERTIFICATION OF A LICENSED PROFESSIONAL ENGINEER, DEPENDING ON SLOPE/GRADE OF SITE.
2. SWALE WALLS SHALL BE 3:1 (2:1 MAY BE ALLOWED, DEPENDING ON SITE TOPOGRAPHY).
3. MAXIMUM SLOPE OF THE SWALE MAY NOT EXCEED 3%.
4. DIMENSIONS SHOWN ARE MINIMUM - A WIDER AND/OR DEEPER SWALE MAY BE REQUIRED.
5. SWALE LOCATION AND DESIGN MUST BE APPROVED BY THE CITY ENGINEER.
6. SWALE MAY NOT DISCHARGE OFF OF PROPERTY, UNLESS A RUNOFF COLLECTOR HAS BEEN DESIGNED FOR THE SUBDIVISION - THIS REQUIRES A DRAINAGE EASMENT.

MISSOULA Engineering Division	Typical Residential Drainage Swale (EPA SWPPP Compliance)			
		Approved By City Engineer Kevin J. Slovarp	Adopted: 01/08/2007 Revised: 06/22/2017	STD - 615

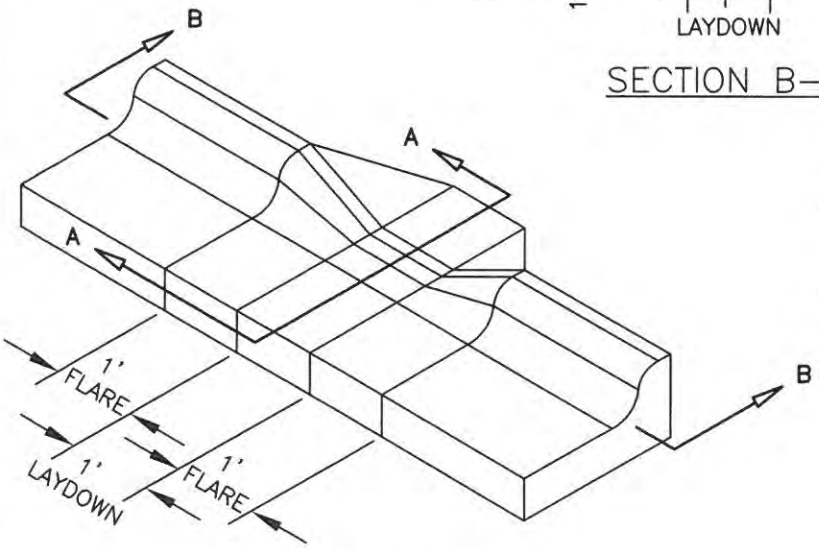
STORMWATER MANAGEMENT
CURB OPENING INTO BOULEVARD



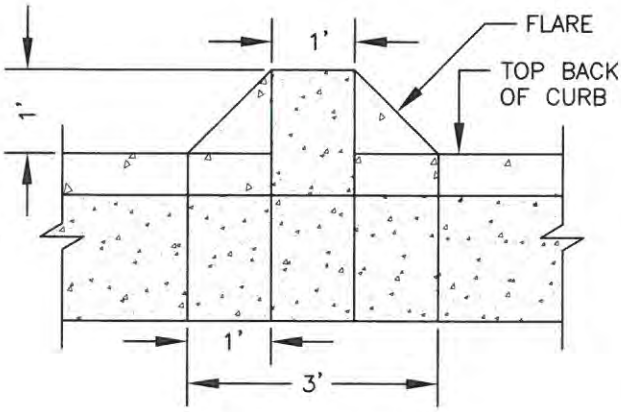
SECTION A–A



SECTION B–B



PERSPECTIVE VIEW

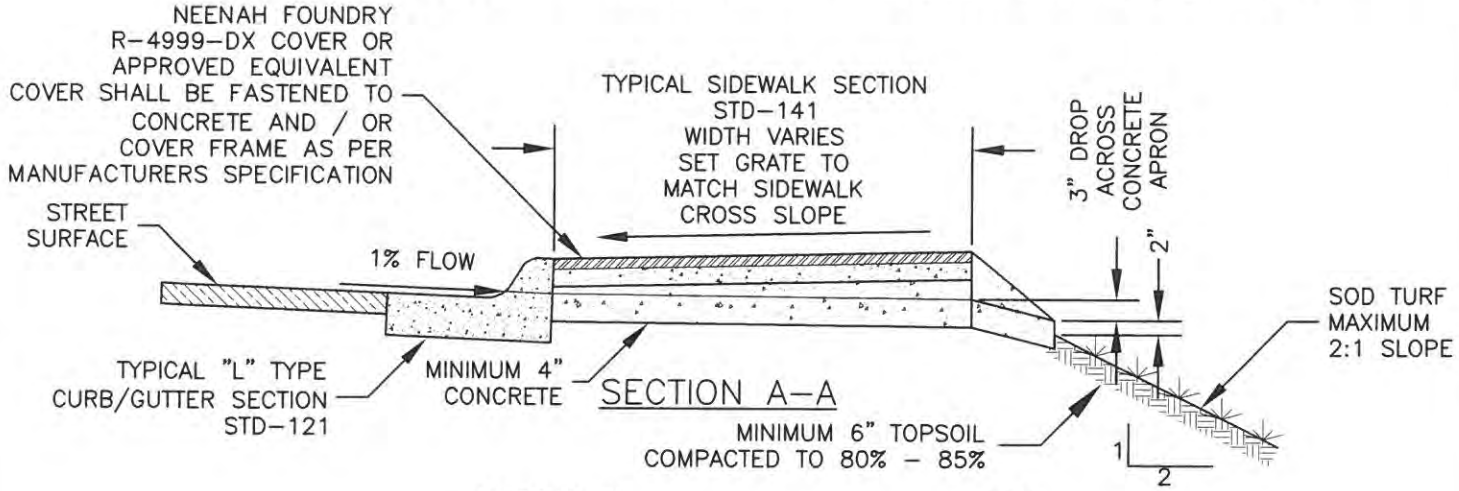


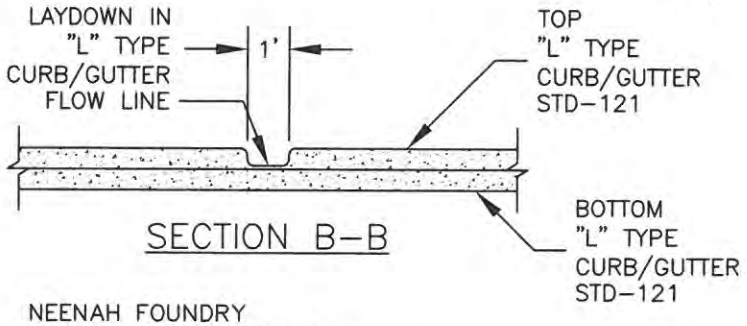
PLAN VIEW

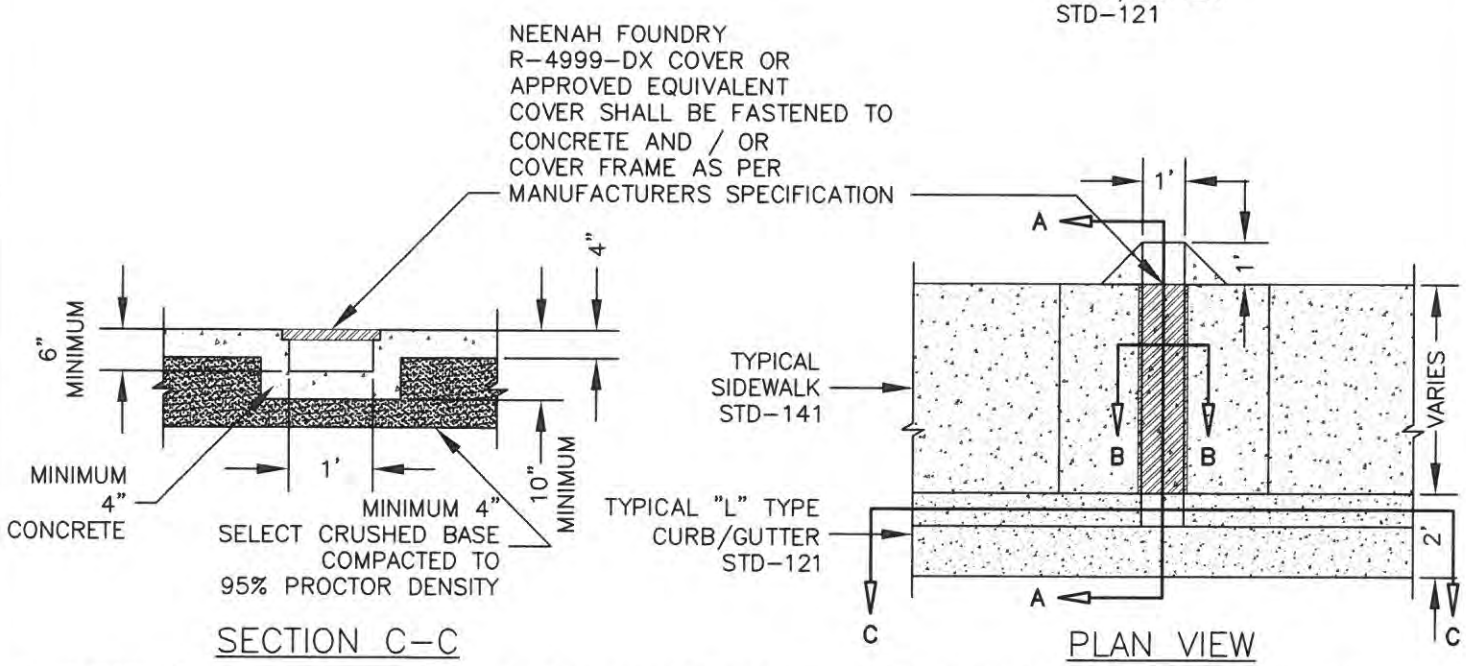
1. POUR ENTIRE CURB OPENING SECTION AND SPILLWAY MONOLITHICALLY
2. SEE STANDARD DRAWING STD–121 'TYPICAL "L" TYPE CURB/GUTTER SECTION' FOR CURB/GUTTER SPECIFICATIONS

MISSOULA Engineering Division	Stormwater Management Curb Opening Into Boulevard		
	Approved By City Engineer Kevin J. Slovarp	Adopted: 10/25/2013 Revised: 06/28/2017	STD - 625

STORMWATER MANAGEMENT
CURB OPENING THROUGH SIDEWALK SECTION







1. SUBSTITUTION OF 'EQUIVALENT' MATERIALS / PRODUCTS SHALL BE SUBMITTED TO AND APPROVED BY CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK
2. ALL MATERIALS / PRODUCTS SHALL BE PLACED / INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION
3. POUR ENTIRE CURB OPENING SECTION AND SPILLWAY MONOLITHICALLY

MISSOULA
Engineering Division

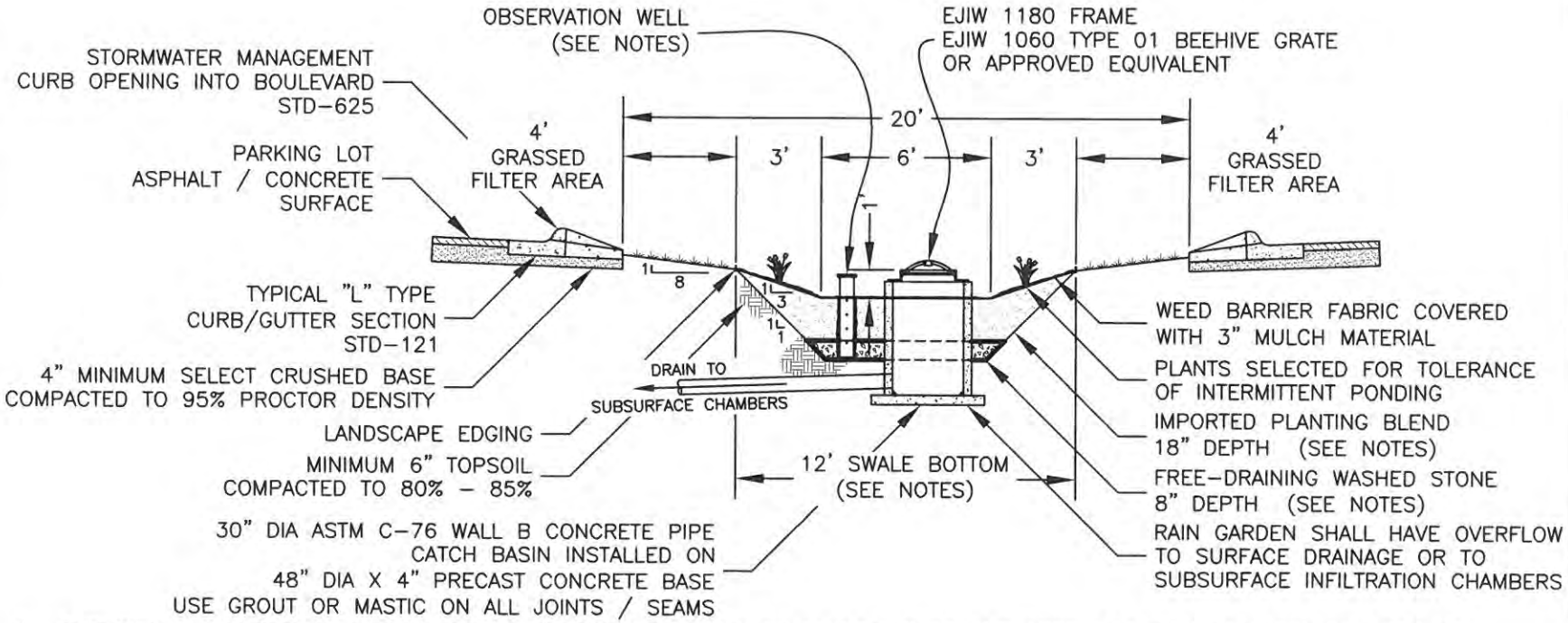
Stormwater Management
Curb Opening Through Sidewalk Section

Approved By
City Engineer
Kevin J. Slovarp

Adopted: 10/25/2013
Revised: 06/28/2017

STD - 626

STORMWATER MANAGEMENT
TYPICAL RAIN GARDEN – PARKING LOT



1. SUBSTITUTION OF 'EQUIVALENT' MATERIALS / PRODUCTS SHALL BE SUBMITTED TO AND APPROVED BY CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK
2. ALL MATERIALS / PRODUCTS SHALL BE PLACED / INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION
3. SWALE STORAGE VOLUME = 17 FT^3/FT
4. BASED ON SOIL TYPE, PERFORM SOIL CLASSIFICATION
5. 12' SWALE BOTTOM IN SITU SOILS SHALL NOT BE COMPACTED IF COMPACTION OCCURS RIP COMPACTED SURFACE TO A DEPTH OF 18"
6. GRASS FILTER STRIP, COMPACTED TO 80% – 85%, INSTALLATION SHALL HAVE ONE OF THE FOLLOWING OPTIONS SELECTED:
   - 6.1. SOD SHALL BE LAID
   - 6.2. AREA SHALL BE HYDROSEEDED AND HYDROMULCHED
   - 6.3. EROSION CONTROL BLANKET, NAG S75BN OR EQUIVALENT SHALL BE INSTALLED AFTER SEEDING
7. OBSERVATION WELL, ONE REQUIRED PER RAIN GARDEN, SHALL BE:
   - 7.1. 36" X 6"ø SCH40 PVC PIPE SECTION
   - 7.2. DRILLED WITH 1/2"ø HOLES ON FOUR FACES OF SCH40 PVC PIPE SECTION @ 6" O.C.
   - 7.3. INSTALLED AND SECURED PIPE CAP ON SCH40 PVC PIPE SECTION OBSERVATION WELL
   - 7.4. WRAP SCH40 PVC PIPE SECTION IN FILTER FABRIC TO PREVENT SOIL CONTAMINATION IN OBSERVATION WELL
8. IMPORTED PLANTING BLEND, COMPACTED TO 80% – 85%, SHALL BE:
   - 8.1. 20% – 30% SCREENED / CLEAN TOPSOIL
   - 8.2. 50% – 60% CLEAN SAND
   - 8.3. 20% – 30% PEAT MOSS OR CERTIFIED COMPOST
6. FREE–DRAINING ANGULAR / CRUSHED WASHED STONE 3/4" DIAMETER – 2" DIAMETER MATERIAL AND SURROUNDED WITH TENCATE MIRAFI(R) RSi SERIES GEOTEXTILE OR APPROVED EQUIVALENT – TOP, BOTTOM AND ALL SIDES – OVERLAP SEAMS AND SECURE IN–PLACE

MISSOULA
Engineering Division

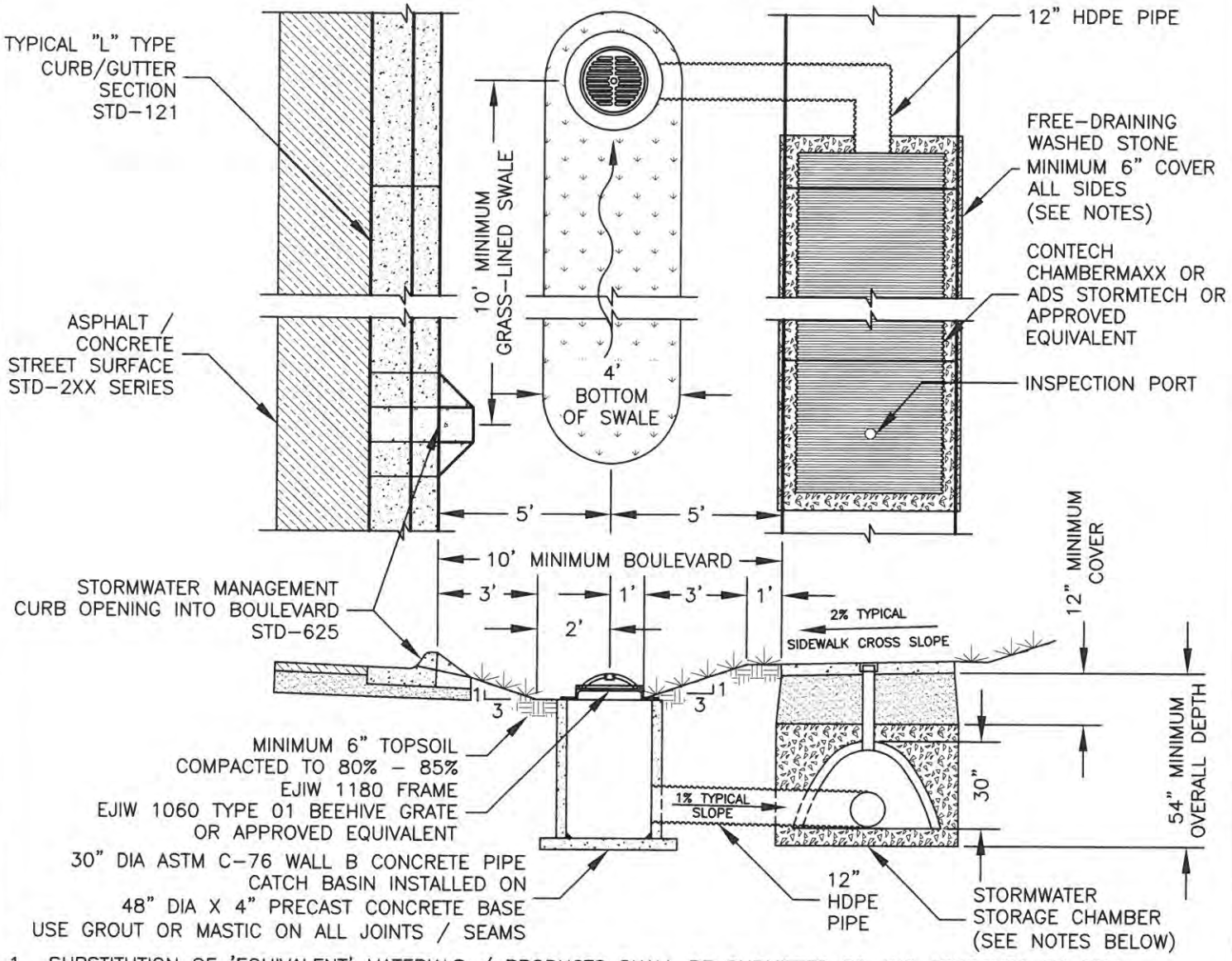
Approved By
City Engineer
Kevin J. Slovarp

Adopted: 10/25/2013
Revised: 06/28/2017

Stormwater Management
Typical Rain Garden - Parking Lot

STD - 627

STORMWATER MANAGEMENT
SUBSURFACE INFILTRATION CHAMBER
BOULEVARD INSTALLATION



1. SUBSTITUTION OF 'EQUIVALENT' MATERIALS / PRODUCTS SHALL BE SUBMITTED TO AND APPROVED BY CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK
2. ALL MATERIALS SHALL BE INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION
3. TOTAL SWALE DEPTH SHALL BE 12" FROM TOP BACK OF CURB/GUTTER SECTION AND SIDEWALK SECTION
4. EJIW 1060 TYPE 01 BEEHIVE GRATE OR APPROVED EQUIVALENT ON EJIW 1180 FRAME OR APPROVED EQUIVALENT
5. INSPECTION PORT, ONE REQUIRED PER STORMWATER CHAMBER SYSTEM, SHALL BE:
   - 5.1. 4"ø SCH40 PVC PIPE SECTION WITH A 6" VALVE BOX / ROAD BOX AS REQUIRED
   - 5.2. INSTALL AND SECURE PIPE CAP ON SCH40 PVC PIPE SECTION INSPECTION PORT
6. STORMWATER STORAGE CHAMBER SHALL BE CONTECH CHAMBERMAXX, ADS STORMTECH OR APPROVED EQUIVALENT
7. STORMWATER STORAGE CHAMBER SHALL BE SURROUNDED ON TOP, BOTTOM AND ALL SIDES WITH A MINIMUM OF 6" COVER / DEPTH / THICKNESS OF FREE–DRAINING ANGULAR / CRUSHED WASHED STONE 3/4" DIAMETER – 2" DIAMETER MATERIAL AND SURROUNDED WITH TENCATE MIRAFI(R) RSi SERIES GEOTEXTILE OR APPROVED EQUIVALENT – TOP, BOTTOM AND ALL SIDES – OVERLAP SEAMS AND SECURE IN–PLACE

MISSOULA
Engineering Division

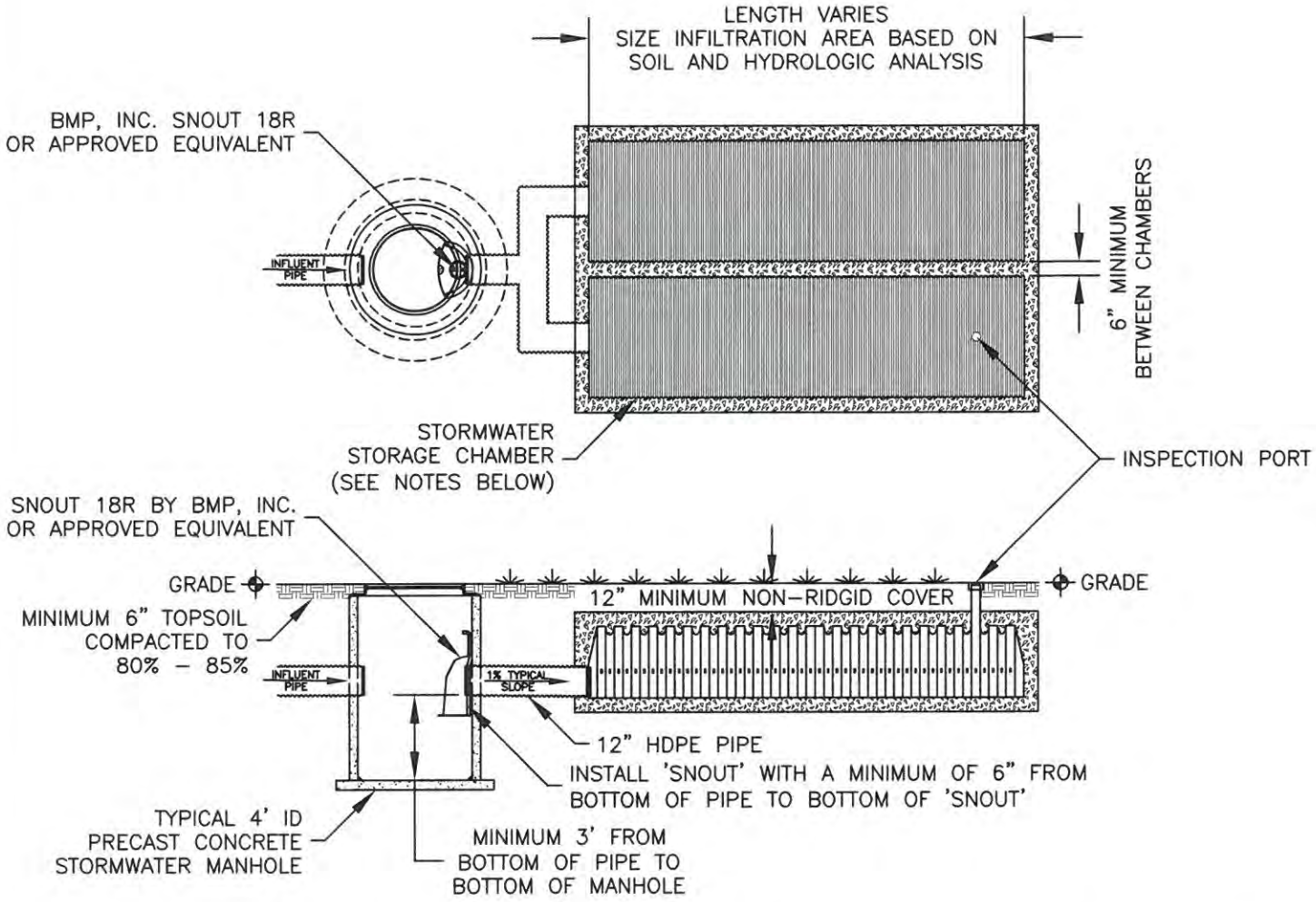
Stormwater Management
Subsurface Infiltration Chamber-Boulevard Installation

Approved By
City Engineer
Kevin J. Slovarp

Adopted: 10/25/2013
Revised: 06/28/2017

STD - 628

STORMWATER MANAGEMENT
SUBSURFACE INFILTRATION WITH PRETREATMENT



1. SUBSTITUTION OF 'EQUIVALENT' MATERIALS / PRODUCTS SHALL BE SUBMITTED TO AND APPROVED BY CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK
2. ALL MATERIALS SHALL BE INSTALLED AS PER MANUFACTURER SPECIFICATIONS FOR WARRANTY INSTALLATION
3. THIS SYSTEM MAY BE USED FOR DRAINAGE AREAS WITH UP TO ONE (1) ACRE OF IMPERVIOUS SURFACE
4. NO MORE THAN TWO CHAMBERS SHALL BE INSTALLED IN PARALLEL AT ANY SINGLE LOCATION
5. HERBACEOUS PLANTINGS SUCH AS GRASSES AND FERNS AS WELL AS ANNUAL, BIENNIAL OR PERENNIAL FLOWERS MAY BE USED OVER CHAMBERS, HOWEVER NON-HERBACEOUS WOODY VEGETATION SUCH AS TREES, SHRUBS AND VINES SHALL NOT BE USED
6. NON-MOTORIZED PEDESTRIAN FACILITIES MAY PASS OVER CHAMBERS, HOWEVER MOTORIZED VEHICULAR TRAFFIC; DRIVEWAYS, PARKING AREAS, ROADS, ETC., SHALL NOT
7. STORMWATER STORAGE CHAMBER SHALL BE CONTECH CHAMBERMAXX, ADS STORMTECH OR APPROVED EQUIVALENT
8. STORMWATER STORAGE CHAMBER SHALL BE SURROUNDED ON TOP, BOTTOM AND ALL SIDES WITH A MINIMUM OF 6" COVER / DEPTH / THICKNESS OF FREE-DRAINING ANGULAR / CRUSHED WASHED STONE 3/4" DIAMETER - 2" DIAMETER MATERIAL AND SURROUNDED WITH TENCATE MIRAFI(R) RSi SERIES GEOTEXTILE OR APPROVED EQUIVALENT - TOP, BOTTOM AND ALL SIDES - OVERLAP SEAMS AND SECURE IN-PLACE
7. INSPECTION PORT, ONE REQUIRED PER INSTALLATION, SHALL BE 4"ø SCH40 PVC PIPE RISER AND COVER
8. 'SNOUT' MAY BE INSTALLED IN A CONCRETE MANHOLE WITH A SOLID CASTING STORMWATER LID OR A GRATED STORMWATER INLET LID

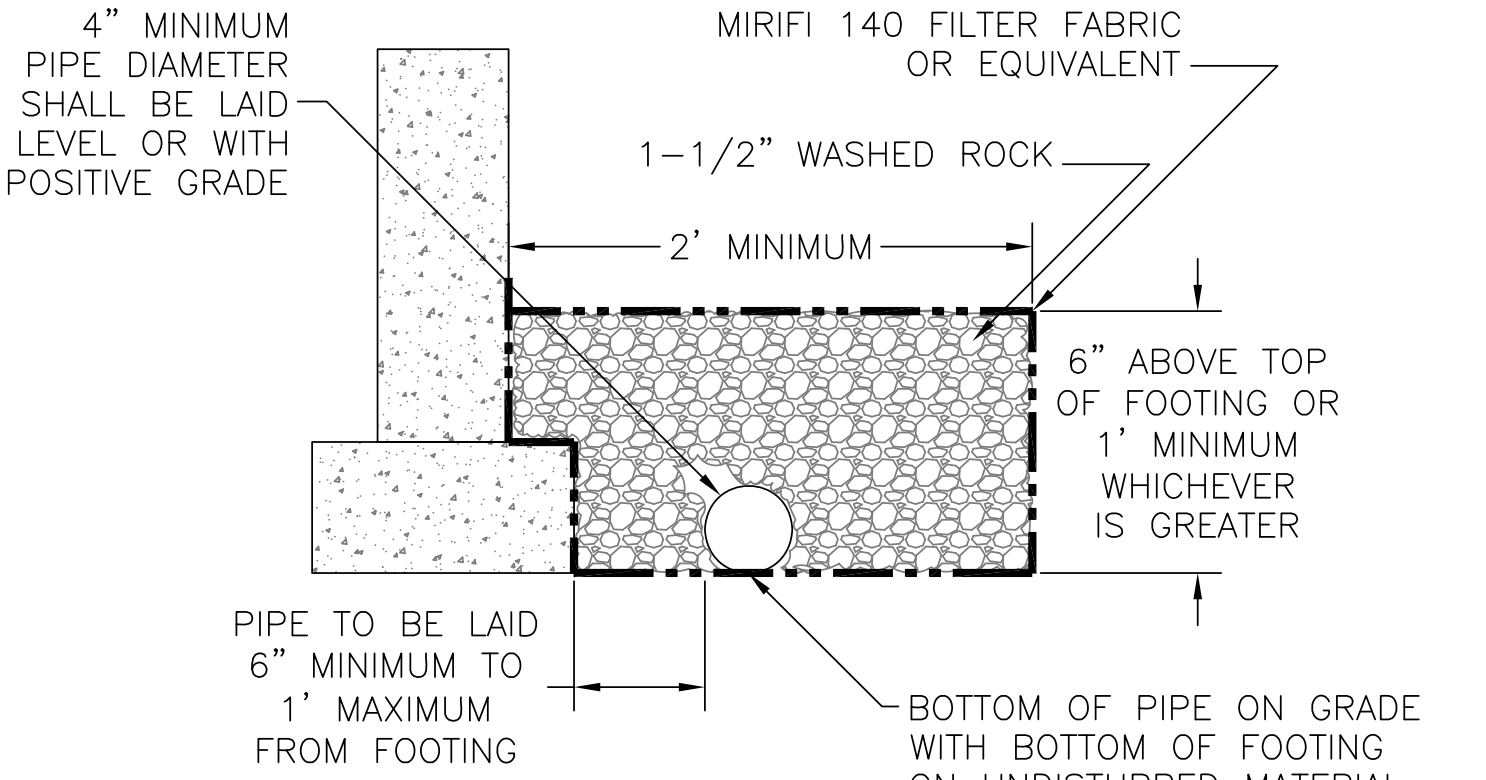
MISSOULA
Engineering Division

Stormwater Management
Subsurface Infiltration with Pretreatment

Approved By
City Engineer
Kevin J. Slovarp

Adopted: 10/25/2013
Revised: 06/28/2017

STD - 629



1. PIPE MATERIAL SHALL BE HDPE OR SDR35
2. DRAIN PIPE SHALL BE 4" MINIMUM DIAMETER
3. FILTER FABRIC IS REQUIRED, BEFORE PLACING WASHED ROCK AND/OR BACKFILLING

Digital Standard Drawings and other maps are available on the City website: http://www.ci.missoula.mt.us/publicworks/gis_maps.htm

MISSOULA
Engineering Division

Footing Drain System

Approved By
City Engineer
Kevin J. Slovarp

Adopted: 07/05/2006
Revised: 01/02/2008

STD - 690

Appendix G
Chapter 13.27, Missoula Municipal Code
(Draft Ordinance)

City of Missoula, Montana
Item to be Referred to City Council Committee

Committee:	**Public Works**
Item:	An Ordinance Amending Missoula Municipal Code Chapter 13.27 to Update Storm Water Regulations
Date:	February 6, 2020
Sponsor:	Tracy Campbell
Prepared by:	Lori Hart
Ward(s) affected:	All

Action Required:
Set a public hearing and adopt an ordinance generally amending Missoula Municipal Code Title 13, Chapter 13.26 entitled "Missoula Valley Water Quality Ordinance" Section 13.26.090 to reflect City of Missoula ownership of the water system to allow for installation of new wells; and generally amending Missoula Municipal Code Chapter 13.27 entitled "Storm Water Utility, Rates and Regulations" renaming the chapter "Storm Water Management" to update the storm water regulations in compliance with the City's MS4 Storm Water Discharge Permit and provide for the enactment of standards by administrative rule.

Recommended Motion(s):
Motion for February 24, 2020
[First reading and preliminary adoption] Set a public hearing on March 9, 2020, and preliminarily adopt an ordinance amending Missoula Municipal Code Title 13, Chapter 13.26 entitled "Missoula Valley Water Quality Ordinance" Section 13.26.090 to reflect City of Missoula ownership of the water system to allow for installation of new wells; and generally amending Missoula Municipal Code Chapter 13.27 entitled "Storm Water Utility, Rates and Regulations" renaming the chapter "Storm Water Management" to update the storm water regulations in compliance with the City's MS4 Storm Water Discharge Permit and provide for the enactment of standards by administrative rule.

Motion for March 9, 2020
[Second and final reading] Adopt/Deny an ordinance amending Missoula Municipal Code Title 13, Chapter 13.26 entitled "Missoula Valley Water Quality Ordinance" Section 13.26.090 to reflect City of Missoula ownership of the water system to allow for installation of new wells; and generally amending Missoula Municipal Code Chapter 13.27 entitled "Storm Water Utility, Rates and Regulations" renaming the chapter "Storm Water Management" to update the storm water regulations in compliance with the City's MS4 Storm Water Discharge Permit and provide for the enactment of standards by administrative rule.

Timeline:

Referral to committee:	Feb. 10, 2020
Committee discussion:	Feb. 12, 2020
Council acts to set hearing:	Feb. 24, 2020
Public Hearing:	March 9, 2020
Deadline:	N/A

Background and Alternatives Explored:
Changes to Chapter 13.26 are needed to reflect that the City of Missoula now owns the water system and will allow for new water wells to be installed.

The City's Storm Water Utility was created in October 2016, and since that time, the utility has been working to identify areas that need additional focus in order to fully comply with state and federal storm water regulations. The utility realized that revisions to Chapter 13.27 are needed to ensure the City's Storm Water Utility is in compliance with its Municipal Separate Storm Sewer System (MS4) General Permit, which is administered by the Montana Department of Environmental Quality on behalf of the U.S. Environmental Protection Agency and in order to comply with The Clean Water Act of 1972. Changes to this chapter also address requirements for storm water injection well (i.e., dry well or "sump") permitting and operation to comply with the Safe Drinking Water Act of 1974, all with the goal of preventing the pollution of the Missoula Valley aquifer. This sole-source aquifer provides drinking water for Missoula Valley residents, including all Missoula Water customers.

Financial Implications:
None.

Links to external websites:

Public Works MISSOULA	**Public Works Administrative Rule No. 689**
	Storm Water Specifications and Design Standards

Adopted: _____

Revised: _____

PURPOSE: To establish specifications and design standards for construction and post-construction storm water management, for compliance with the conditions of the City of Missoula's Municipal Separate Storm Sewer System (MS4) General Permit and the Clean Water Act.

APPLICABILITY: Public Works Department, Development Services Department, and any other staff assigned to plan review.

DISCUSSION: The attached *Storm Water Specifications and Design Standards* manual, as updated, shall be used in conjunction with the City's standard drawings and Montana Department of Environmental Quality standards. This manual and Chapter 13.27 provide the minimum standards for construction and post-construction storm water management, regarding both the quantity and quality of runoff. In addition, they establish permitting, submittal, and development design standards for erosion and sediment control, preservation of natural drainages, flood mitigation, site grading, and property protection.

Drafted by:

_____
Tracy Campbell, Regulatory Compliance Manager

Prepared by:

_____
Tracy Campbell, Regulatory Compliance Manager

Recommended by:

_____
Kevin Slovarp, City Engineer

Approved by:

_____
Jeremy Keene, Public Works Director

Ordinance _____

An ordinance generally amending Missoula Municipal Code Chapter 13.27 entitled "Storm Water Utility, Rates and Regulations" renaming the chapter "Storm Water Management" to update the storm water regulations in compliance with the City's MS4 Storm Water Discharge Permit and provide for the enactment of standards by administrative rule.

Be it ordained that Chapter 13.27 is hereby amended as follows:

CHAPTER 13.27
STORM WATER MANAGEMENT

Articles:

Article I. Storm Water Utility

Sections:

13.27.010 Storm Water Utility Established

The City of Missoula Storm Water Utility is hereby established along with administrative rules to implement the provisions of this chapter.

13.27.020 Purpose and Intent

The purpose and intent of this ordinance is to:

A. Protect and enhance the water quality of named and unnamed surface waters, groundwater, and wetlands within the city limits, in a manner pursuant to and consistent with current federal and state water quality standards and regulations.

B. Create permitting, submittal, and design standards for erosion and sedimentation control, protection of the storm water system, flood mitigation, site grading, and protection of property.

C. Minimize pollutants and non-storm water discharges to storm drains.

D. Provide design, construction, operation, and maintenance criteria for permanent and temporary Best Management Practices (BMPs) for storm water systems.

E. Establish legal authority to conduct inspections, surveillance, monitoring, and enforcement procedures necessary to ensure compliance with federal and state regulations.

F. Establish legal authority to develop, implement, and enforce a program to reduce pollutants in storm water runoff from new development, redevelopment, and construction activities.

G. Provide an equitable distribution of cost for the program as outlined in the storm water utility rate schedule, which will be established by City Council resolution following a public hearing.

H. Provide for the regulation of contributors or dischargers to the City's storm water system through the development of a Storm Water Management Program.

I. Regulate construction, grading, and post-construction storm water management to protect natural resources from erosion and in accordance with current federal, state, and local environmental quality standards and regulations.

J. Establish remedies and penalties for violations of this chapter.

K. Ensure consistency with the applicable requirements of the Clean Water Act, Safe Drinking Water Act, Montana Water Quality Act, and acts amendatory thereof or supplementary thereto, applicable implementing regulations, and Montana Pollutant Discharge Elimination System (MPDES) permits that may affect storm water and any amendments, revisions, or re-issuance thereof.

13.27.030 Definitions

The following words, terms, and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context explicitly indicates a different meaning.

"Administrative rule(s)" means any rule(s) approved by the Director for the implementation of this chapter.

"Administrative Rules of Montana (ARM)" means the regulations, standards, or statements of applicability that implement, interpret, or set law or policy in Montana.

"*Authorized agent*" means the Director or any individual or entity designated by the Director with the authority to inspect or enforce storm water compliance.

"*Best Management Practices (BMPs)*" means schedule of activities, prohibition of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of state waters. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"City" is the City of Missoula and its employees designated by the Director with the authority to inspect or enforce storm water compliance.

"*Code of Federal Regulations (CFR)*" means the compilation of administrative laws governing federal regulatory agency practice and procedures.

"*Construction activity*" means an activity (e.g., clearing, grading, excavation, stockpiling earth materials, and other placement or removal of earth material performed during construction projects) that is subject to MPDES construction permits and/or an activity subject to a City Storm Water and/or Excavation Permit.

"Construction General Permit" means the MPDES General Permit for Storm Water Discharges Associated with Construction Activity, required for construction activities that disturb greater than or equal

to one acre of land, including clearing, excavating, grading, grubbing, or placement/removal of earth material. A Construction General Permit is also required if construction activity that disturbs less than one acre is part of a larger common plan of development or sale that would disturb one acre or more. A Construction General Permit (commonly referred to as a SWPPP) is issued by MDEQ under ARM 17.30.1341.

"Construction Site BMP Manuals" means the Montana Department of Transportation Erosion and Sediment Control Best Management Practices Manual and the Montana Department of Environmental Quality Storm Water Management During Construction Field Guide for Best Management Practices, as periodically updated. Where there may be discrepancies between the two, the MDEQ manual shall prevail.

"Design standards" means the City standards and specifications prepared and updated by the Public Works Department or Development Services Department.

"Developer" means a person who creates a development or causes a development to be created.

"*Development*" means any construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure within the jurisdiction of the City as well as any manmade change or alteration to the landscape, including but not limited to mining, drilling, dredging, grading, paving, excavating, and filling.

"Director" means the Public Works Director or their designee.

"*Discharge*" means any introduction or addition of any substance into the storm water system or state waters.

"*Discharger*" means any person who causes, allows, permits, or is otherwise responsible for a discharge, including, without limitation, any operator of a construction site or industrial facility.

"Drainage" means the natural and/or artificial draining, movement, or removal of water due to the following:

- a named or unnamed creek, stream, or river in normal or flood capacity or other natural body of water;
- natural rainfall, runoff, or storm water; or
- irrigation.

"Dry Well" means a USEPA-designated Class V storm water injection well: a bored, drilled, or driven shaft or dug hole whose depth is greater than the opening width at the widest point, for the subsurface infiltration of storm water.

"Final approval" is the completion of a project, site, or building in accordance with City requirements and ordinances. In the case of a building, a certificate of occupancy is issued. In case of a subdivision, when the two-year warranty and maintenance bond has been submitted and the appointed City employee certifies all work is complete.

"Grading" means the mechanical movement of dirt, gravel, rock, sand, or soil to adjust the level or steepness (grade) of a construction site, development, parcel, or lot.

"*Green infrastructure"* means an approach to storm water management that protects, restores, or mimics the natural water cycle. Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments.

"Hazardous material" means any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

"*Illicit connection*" means any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the storm water system, including but not limited to any conveyances which allow any discharge, such as sewage, process wastewater, and wash water, to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether the drain or connection had been previously allowed, permitted, or approved by a government agency; or any drain or conveyance connected from a commercial or industrial land use to the storm water system which has not been documented in plans, maps, or equivalent records and approved or permitted by the City.

"*Illicit discharge*" means any discharge to the storm water system that is not composed entirely of storm water, except as exempted in §13.27.200B of this chapter.

"*Impervious surface*" means a surface which prevents or retards the penetration of water into the ground, including but not limited to roofs, sidewalks, patios, driveways, parking lots, concrete and asphalt paving, gravel, compacted native surfaces and earthen materials, and oiled, macadam (asphalt), or other surfaces which similarly impede the natural infiltration of storm water.

"Larger common plan of development or sale" means a contiguous area where multiple separate and distinct land-disturbing activities may be taking place at different times, on different schedules, but under one proposed plan. For the purposes of this definition, "one proposed plan" is broadly defined as any announcement or piece of documentation (e.g., a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, or computer design) or physical demarcation (e.g., boundary signs, lot stakes, or surveyor markings) indicating construction activities may occur on a specific parcel.

"Low impact development" means practices that work with nature to manage storm water as close to its source as practicable, utilizing various principles: e.g., preserving and recreating natural landscape features; minimizing effective imperviousness; creating functional and aesthetically appealing site drainage; and treating storm water as a resource rather than a waste product.

"*Major modification*" means an alteration to an existing or planned storm water drainage facility that does one or more of the following: changes the volume, surface area, depth, capacity, inflow rates, outflow rates, or level of treatment by 5% or more; changes the treatment process; adds more than 1,000 square feet of impervious surface; or increases the tributary impervious drainage area to an individual drainage facility component by more than 10%.

"*Maximum extent practicable*" means there must be a serious attempt to comply with technology-based effluent limitations to reduce pollutants in storm water discharges, established by the Clean Water Act §402(p), also see ARM 17.30.1111(5). Practical solutions may not be lightly rejected. If a permittee chooses only a few of the least expensive BMPs, it is likely that 'maximum extent practicable' has not been met. However, if a permittee employs all applicable BMPs, except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit to be derived, it would have met the standard. 'Maximum extent practicable' requires permittees to choose effective BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive.

"*Missoula Municipal Code (MMC)*" means the official code of the general ordinances of the City of Missoula.

"Montana Department of Environmental Quality (MDEQ)" means the Montana state agency responsible to protect the environment as guaranteed by the Montana State Constitution.

"*Montana Pollution Discharge Elimination System (MPDES) permit*" means any of the permits issued by MDEQ that regulate discharges by limiting the quantities of pollutants to be discharged. The limits and/or

requirements in the permit help ensure compliance with Montana's Water Quality Standards, state, and federal regulations, all of which were written to protect public health and the aquatic environment.

"Municipal Separate Storm Sewer System (MS4) Permit" means the MPDES General Permit for Storm Water Discharges Associated with Small MS4s.An MS4 means a system of conveyances that is:

- owned by a state, city, town, village, or other public entity that discharges to state waters;
- designed or used to collect or convey storm water (e.g., dry wells, inlets, pipes, and outfalls),
- not a combined sewer; and
- not part of a sewage treatment plant, or publicly owned treatment works per ARM 17.30.13.

The City's MS4 Permit (MTR040007) is administered by MDEQ, under authorization of the USEPA for compliance with the Clean Water Act. Pursuant to the Montana Water Quality Act (§75-5-401, MCA) and requirements in ARM 17.30 §§11-13, MDEQ requires designated municipalities, like the City, to obtain and maintain coverage under this permit.

"*Non-point source discharge*" generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification. Non-point source pollution, unlike pollution from industrial and sewage treatment plants or other discrete point sources, comes from many diffuse sources. Non-point source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, and groundwater.

"*Non-storm water discharge*" means any discharge that is not entirely composed of storm water.

"Notice of Violation (NOV)" means a notice issued by City inspectors for failure to comply with any of the listed conditions in the Storm Water Permit or Dry Well Approval.

"Noxious weed" is a non-native plant that displaces native plant species. The Montana Department of Agriculture updates the Montana State Noxious Weed List annually. The Missoula County Weed District monitors the control and eradication of noxious weeds throughout Missoula County. The City relies on the designations provided by these entities regarding the noxious weed status of a non-native plant species. The City reserves the right to prioritize management of non-native species that are not listed as noxious weeds, for site-specific management.

"*Owner or operator*" means a person who owns, leases, operates, controls, or supervises an activity that may produce storm water runoff. For the purpose of permitting, an "owner or operator" means a person associated with a construction project who is designated as an eligible signatory, has operational control over the construction plans and specifications, or has day-to-day operational control at the project to ensure compliance with any applicable permits.

"Permittee" means the person, owner, or operator to whom any permit issued pursuant to this chapter.

"*Person*" means any individual, firm, association, club, organization, corporation, partnership, business trust, company, or other entity that is recognized by law as the subject of rights or duties.

"*Point source*" means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, and vessel or other floating craft from which pollutants are or may be discharged, including but not limited to chemical mixing, loading, and storage sites and sites of hazardous material spills.

"*Pollutant*" means anything that causes or contributes to pollution: e.g., paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; sediment, refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, which may cause or contribute to pollution; floatables; detergents, pesticides, herbicides, and fertilizers; hazardous materials and wastes; sewage, fecal coliform, and pathogens; dissolved and particulate metals; animal wastes; construction wastes and residues; and noxious or offensive matter of any kind. The terms

"sewage," "industrial waste," and "other wastes" as defined in §75-5-103, MCA, are interpreted as having the same meaning as pollutant.

"Post-Construction BMP Design Manual" is the Montana Post-Construction Storm Water BMP Design Guidance Manual produced for Montana's MS4 Municipalities, as periodically updated.

"Post-construction storm water management controls" are the BMPs that are used to manage storm water and prevent potential pollutants in storm water discharges after construction activities have been completed: e.g., biofiltration (vegetated) swale, bioretention pond, detention basin, proprietary treatment device, rain garden, and dry well.

"*Redevelopment*" means a project that proposes to add, replace, and/or alter impervious surfaces affecting an existing storm water system, other than routine maintenance, resurfacing, or repair. A project which meets the criteria of a major modification as defined in this chapter shall be considered redevelopment.

"*State waters*" has the meaning provided in § 75-5-103(34a), MCA.

"*Storm water*" means storm water runoff, snow melt runoff, and surface runoff and drainage. The City has relied on MDEQ's use of the term as two words, per the MS4 Permit. However, MDEQ uses the compound word in its Construction General Permit.

"*Storm water management*" means the process of collection, conveyance, storage, treatment, and disposal of storm water to ensure control of the magnitude and frequency of runoff and to minimize the hazards associated with flooding. Also includes implementing controls to reduce the discharge of pollutants, including management practices, control techniques and systems, and design and engineering methods.

"*Storm Water Management Site Plan*" means details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction storm water management, including drawings.

"Storm Water Management Report" means the engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation for the Storm Water Management Site Plan.

"*Storm Water Pollution Prevention Plan (SWPPP)*" is a document developed to help identify sources of pollution potentially affecting the quality of storm water discharges associated with a facility or activity, and to ensure implementation of measures to minimize and control pollutants in storm water discharges associated with a person, facility, or activity. A SWPPP is required when applying for a Construction General Permit.

"*Storm water system*" means the physical facilities, private and public, temporary or permanent, designed to treat, collect, and transport storm water, including but not limited to curbs, inlets, pipe, culverts, dry wells, swales, ditches, ponds, French drains, boulder pits, wattles, and silt fences. "Storm water system" in this chapter also includes the City's flood control devices, such as levees, floodwall, high-hazard dams, and their appurtenances.

"*Storm water utility*" means a mechanism for planning, operating, maintaining, regulating, financing, and performing capital improvements to the City's storm water system. The storm water utility is funded from a rate that is charged to properties within the service area.

"Underground source of drinking water (USDW)" is an aquifer or part of an aquifer that is currently used as a drinking water source. A USDW may also be groundwater needed as a drinking water source in the future.

"*United States Environmental Protection Agency (USEPA)*" means the federal agency established to coordinate programs aimed at reducing pollution and protecting the environment.

"Wetland" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support and that, under normal circumstances, does support a prevalence of vegetation typically adapted for life in saturated soil conditions.

13.27.040 Authority

A. The Director shall have the authority to adopt administrative rules interpreting this chapter and governing the use, operation, and management of the storm water utility.

B. The City shall create and maintain administrative rules that provide additional policy, criteria, and information for the proper implementation of the requirements of this chapter. Design and construction of storm water facilities shall meet the minimum water quality performance standards contained in this chapter and any applicable administrative rules.

C. Activities regulated by this chapter may be subject to further regulation by administrative rules and/or specifications and design standards. No permit or approval issued pursuant to this chapter shall relieve a person of the responsibility to secure permits and approvals required for activities regulated by any other federal, state, and/ or local law, rule, code, act, permit, and/or ordinance.

13.27.050 Applicability

This chapter shall apply to any activity that may potentially affect the City's storm water system or may introduce storm water pollutants into any storm water system or any state waters within the City's jurisdiction. Exceptions include activities that are contained entirely on federal, state, or county lands and do not affect adjacent jurisdictions or storm water systems.

Additionally, permanent and temporary storm water management controls and facilities constructed as part of any activities listed in this chapter that are located within the City's jurisdiction are also subject to this chapter.

13.27.055 Infrastructure Protection

To ensure public safety and the security of storm water infrastructure, no person may break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is part of the City storm water system, including but not limited to, any storm hatch, conveyance, detention/retention basin, power source, sampling equipment, supporting structures or substrate, or any part whatsoever.

13.27.060 Storm Water Utility Service Area

The storm water utility service area is inclusive of all lands annexed to the City and bounded by the incorporated city limits as the same may be adjusted by the City Council, with the exception of lands under the jurisdiction of another MS4 Permit. The City reserves the right to plan for storm water system improvements outside the service area. The City may also construct storm water system improvements outside the service area when needed as an integral part of the storm water system located within the storm water utility service area, or as part of an agreement with a neighboring MS4.

13.27.070 Operation Cost Determination

The Director shall determine the total annual cost of operation and maintenance of the City's storm water system and shall develop operating plans for the system. The City is responsible for maintaining the storm water system within the City right-of-way and on City-owned properties. Storm water systems that are not on City-owned properties and are outside the City right-of-way are maintained by the property

owner or their assignee. The total annual cost of operation and maintenance of the City storm water system shall include, but is not limited to, all costs related to the following:

A. The acquisition by gift, purchase, or condemnation of real and personal property, and interests therein, necessary to manage storm water or to construct, operate, and maintain storm water systems;

B. Costs of administration and implementation of the storm water utility, including the establishment of reasonable operating and capital reserves to meet unanticipated or emergency storm water management requirements;

C. Costs related to planning, engineering and design, debt service and related financing expenses, construction costs for new storm water systems, and enlargement or improvement of existing storm water systems;

D. Operation and maintenance of the City's storm water system;

E. Monitoring, surveillance, and inspection of the City's storm water system;

F. Water quality monitoring and water quality programs;

G. Retrofitting developed areas for pollution control;

H. Inspection and enforcement activities;

I. Billing and administrative costs;

J. Permitting;

K. Staff;

L. Equipment; and

M. Other expenses related to the storm water utility.

13.27.080 Storm Water Utility Service Fee

A storm water utility service fee shall be charged to properties in the utility service area based upon a methodology and at a rate to be established by City Council resolution following a public hearing. A copy of the resolution shall be placed on file in the City Clerk's office and on the City's website. Any changes to the methodology or rates also shall be made by City Council resolution following a public hearing. The storm water utility service fee is to be used to pay for the costs necessary to fulfill the purpose and intent of this chapter, including but not limited to, all costs related to the City's activities under this chapter.

13.27.090 Coordination with the Missoula Valley Water Quality District and Neighboring MS4s

The City may coordinate storm water-related management activities with the Missoula Valley Water Quality District and neighboring MS4s, in order to attempt to seek the best use of resources and finances for the purpose of meeting all the City's MS4 Permit requirements. Coordination may include pooling resources, forming interlocal agreements, and entering into contractual agreements with other agencies where applicable.

13.27.100 Ultimate Responsibility of Discharger

The standards set forth in and promulgated pursuant to this chapter are minimum standards. This chapter does not intend or imply that compliance by any person will ensure that there will be no contamination,

pollution, or unauthorized discharge of pollutants into state waters caused by that person. This chapter shall not create liability on the part of the City or any authorized agent or employee for any damages that result from any discharger's reliance on this chapter or any administrative decision lawfully made pursuant to this chapter.

13.27.110 Conflict of Law or Regulations

This chapter shall not diminish nor supersede any of the laws and regulations governing the Missoula Valley Water Quality District. In the event any part of this chapter or referenced regulations in this chapter should overlap or conflict with any other chapters in the MMC, the more stringent of the codes or regulations shall prevail.

Article II. Discharge Prohibitions

Sections:

13.27.200 Prohibition of Illicit Discharges

A. Except as authorized by a separate MPDES permit, it shall be unlawful to discharge or cause to be discharged into the storm water system any discharge that is not composed entirely of storm water, including but not limited to discharges containing pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards or that could cause the City to be in violation of its MPDES permit.

B. The commencement, conduct, or continuance of any discharge not composed entirely of storm water to the storm water system is prohibited except as follows:
   1. Discharges pursuant to an MPDES permit and discharges due to firefighting activities.

   2. Discharges from the following activities shall not be considered a source of pollutants to the storm water system and to state waters when properly managed and shall not be considered illicit discharges unless determined by the City to be significant contributors of pollutants to the storm water system, or to cause a violation of the provisions of the Clean Water Act or this chapter based on quantity of flow, concentration of pollutants, proximity to a watercourse, or condition of a receiving water:
      a. Irrigation water;
      b. Irrigation ditch return flows;
      c. Landscape irrigation;
      d. Permitted diverted stream flows;
      e. Rising groundwater;
      f. Rising natural floodwaters;
      g. Uncontaminated groundwater infiltration to separate storm sewers;
      h. Uncontaminated pumped groundwater;
      i. Discharges from potable water sources;
      j. Foundation drains;
      k. Air conditioning condensation;
      l. Springs;
      m. Water from crawl space or basement pumps;
      n. Footing drains;
      o. Lawn watering (excluding overwatering);
      p. Residential car washing;
      q. Residential dechlorinated swimming pool and hot tub discharges;

r. Residential street washing;
s. Flows from riparian habitats and wetlands;
t. Uncontaminated water from irrigation system meter pits;
u. Flows from emergency firefighting activities; and
v. Residential gardening or landscaping activities.

3. Before applying the listed exceptions, the City shall make a determination as needed regarding what is considered significant contributors of pollutants. In addition, the following non-storm water discharges are not prohibited from entering the storm water system, provided that approved BMPs are implemented:
   a. Municipally owned dechlorinated swimming pool discharges, municipal water tank draining, and water from street washing (including sidewalks and medians) that is conducted by City staff or under contract with the City;

   b. Charity or other non-commercial car washes;

   c. Fire hydrant flushing; and

   d. Water line flushing.

C. No person shall throw, deposit, leave, maintain, wash, rinse, or keep any substance that may cause or contribute to pollution or permit any such substance to be thrown, deposited, left, maintained, washed, or rinsed in or upon any public or private property, driveway, parking area, street, alley, sidewalk, catch basin, structure/storm hatch, ditch, channel, pond, or any other component of the storm water system or state waters. Pollutants for this purpose include but are not limited to oil, solvents, antifreeze, flammables, septage, poisonous or infectious substances, garbage, soaps, acids, bases, and sediment. Wastes deposited in streets in a manner allowed by the City for the purpose of collection are exempted from this prohibition.

D. It shall be unlawful to store, handle, or apply any pollutant in a manner that will cause exposure to storm water, rainfall or runoff, which may lead to a discharge to the storm water system, state waters, or waters of the United States.

E. All other requirements and restrictions pertaining to illicit discharges to the storm water system shall comply with the requirements of this chapter, administrative rules, and any applicable chapters of the MMC.

13.27.210 Prohibition of Illicit Connections

A. The construction, use, maintenance, or continued existence of illicit connections to the storm water system is prohibited. An owner or operator responsible for an illicit connection to the storm water system shall comply with the requirements of this chapter and any applicable chapters of the MMC.

B. This prohibition expressly includes, without limitation, illicit connections made in the past regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. A person is in violation of this chapter if the person connects a line conveying sewage or other pollutant to the storm water system or allows an existing connection to continue.

D. Illicit connections shall be disconnected at the property owner's expense, or the City shall arrange for the disconnection and charge the resulting costs to the property owner.

E. Any drain or conveyance that has not been documented in plans, maps, or equivalent—and which may be connected to the storm water system—shall be located by the owner or operator of that property upon receipt of written notice from the City. The notice will specify a reasonable time period

to locate the drain or conveyance, identify the drain or conveyance as storm water, sanitary sewer, or other, and identify the outfall location or point of connection to the storm water system, sanitary sewer system, or other discharge point. Results of these investigations shall be documented and provided to the Director.

Article III. Regulations and Requirements

Sections:

13.27.300 Requirement to Control and Reduce Storm Water Pollutants

A. Based on federal and state law, MDEQ requires the City to obtain and maintain coverage under the MS4 Permit, and abide by applicable water quality laws and regulations.

B. Pursuant to the Safe Drinking Water Act of 1974, the City must also report on dry wells that are part of the City's storm water infrastructure. An owner or operator of a dry well on private property is required to submit its inventory information directly to the USEPA. Owners or operators of dry wells on private property shall not rely on the City to submit their inventory for them.

C. The administrative rules adopted pursuant to this chapter, which include the Construction Site BMP Manuals and Post-Construction BMP Design Manual, outline the BMPs to control the volume, rate, and potential of pollutants in storm water runoff from new development and redevelopment projects that may be appropriate to minimize the generation, transport, and discharge of pollutants and comply with federal and state water quality laws.

D. The City supports and encourages the use of post-construction storm water management controls that rely on low-impact development and green infrastructure techniques. In addition to reducing and delaying runoff volumes, these techniques can also reduce pollutant levels in storm water, enhance aquifer recharge, protect surface water from storm water runoff, increase carbon sequestration, mitigate urban heat islands, and increase wildlife habitat.

E. Any owner or operator engaged in activities or operations, which will or may result in pollutants entering storm water, the storm water system, or state waters, shall implement BMPs to the maximum extent practicable. BMPs shall be provided and maintained at the owner or operator's expense. The Director shall have the authority to require the installation, operation, maintenance, and/or replacement of BMPs as well as the authority to order the removal of temporary BMPs.

13.27.310 Requirement to Monitor and Analyze

The City may require any owner or operator engaged in any activity that may cause or contribute to storm water pollution, illicit discharges, or non-storm water discharges to the storm water system or state waters, to undertake at the owner or operator's expense, monitoring and analysis by a state-certified laboratory, pursuant to the provisions of this chapter. These reports shall be submitted to the Public Works Department, to determine compliance with this chapter and administrative rules.

13.27.320 Notification of Spills

Notwithstanding other requirements of law, as soon as any owner or operator of a facility or operation has information of any known or suspected release of pollutants discharging into a storm water system from that facility, that person shall take all necessary steps to ensure the discovery, containment, cleanup, and documentation of the release. If a hazardous material is released, the owner or operator shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). If there is a release not requiring an emergency response, the owner or operator shall notify the Missoula Valley Water Quality District and the Public Works Department within 24 hours and provide a written notice thereto within five business days. If the discharge of a hazardous material emanates from a commercial or industrial establishment, the owner or operator shall make and keep an onsite written record of the circumstances of the discharge and the actions taken to prevent its recurrence. These records shall be retained for not less than five years.

The Missoula Valley Water Quality District administers an Enforcement Response Plan and Illicit Discharge Investigation and Corrective Action Plan for spills within the City limits and all places within five miles outside the City limits (MMC 13.26), and spills in this area must comply with the requirements of those plans.

13.27.330 Discharge Pursuant to an MPDES Permit

The prohibition of discharges shall not apply to any discharge regulated under an MPDES permit issued and administered by MDEQ, provided that the discharger is in full compliance with all requirements of the permit and other applicable laws or regulations. Compliance with an applicable MPDES permit governing discharges into the storm water system shall be considered compliance with this chapter.

13.27.340 Noncompliance with an MPDES Permit

Any storm water discharge within the City limits that would constitute a violation of an MPDES permit and any amendments, revisions, or re-issuance thereto, when either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person causing or responsible for the discharge.

All owners or operators shall comply with applicable federal and state laws, including those related to facility personnel, training, training records, training record maintenance, maintenance of notification procedures, and implementation of notification requirements for spill response, to ensure containment, cleanup, and immediate notification to the owner or operator of the storm water system. Persons responsible for spills are to comply with applicable state and federal notification requirements to ensure containment, clean up, and immediate notification to the owner or operator of the storm water system.

Article IV. Construction Activity

Sections:

13.27.400 Permits Required

A. Storm Water Permit. It shall be unlawful to conduct any type of earthwork that will result in more than 2,500 square feet of land disturbance or change the grade of the lot by 3 feet or more without first

obtaining a Storm Water Permit from the City. Land disturbance activities related to agricultural practices or improvements are exempt from this requirement, as is any emergency activity that is immediately necessary for the protection of life, property, or natural resources. Activities that disturb one acre or more of land—or less than one acre but are part of a larger common plan of development—are also required to obtain coverage under a Construction General Permit, in addition to the Storm Water Permit. The Storm Water Permit application shall be submitted to Development Services no more than 180 days and no fewer than 60 days from the start date of construction.

1. Erosion Control Site Plan. This plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used to manage storm water runoff during construction. An Erosion Control Site Plan is required as part of the Storm Water Permit package.
    a. The applicant shall use the Erosion Control Site Plan Review Checklist to ensure their plan meets the City's requirements.
    b. The applicant shall complete the Construction Inspection Frequency Determination to identify their project's priority ranking.

2. Storm Water Management Site Plan and Report. This site plan shall provide details of the on-site drainage system, structures, BMPs, concepts, and techniques that will be used for post-construction storm water management, including drawings. The Storm Water Management Report shall include engineering calculations, computer analyses, maintenance and operations procedures, and all other supporting documentation. A Storm Water Management Site Plan and Report are required for medium- to high-priority projects, per the Construction Inspection Frequency Determination.
    a. The applicant shall use the Storm Water Management Site Plan Review Checklist to ensure their plan meets the City's requirements.
    b. The applicant shall complete the Post-Construction Inspection Frequency Determination to identify their project's priority ranking.
    c. The City shall determine the final priority ranking.

B. Construction General Permit. An authorization from MDEQ under the Construction General Permit is required for construction activities—including clearing, excavating, grading, grubbing, or placement/removal of earth material—that disturb a total area of one or more acres of land, including activities that disturb less than one acre when part of a larger common plan of development or sale that would disturb one acre or more. To apply for an authorization under the Construction General Permit, a complete Notice of Intent Application Package shall be submitted to MDEQ. Once the application has been approved by MDEQ, a copy of the Notice of Intent, Storm Water Pollution Prevention Plan (SWPPP), and MDEQ's approval letter shall be submitted to the Storm Water Utility for review. Upon City approval, the City will then issue any required permits for construction activity. When construction activity is completed, MDEQ's Notice of Termination for Storm Water Construction (NOT-SWC) shall be submitted to both MDEQ and the Storm Water Utility. The NOT-SWC is separate from the NOT required by the City for termination of permit coverage under the City's Storm Water Permit and/or Dry Well Approval.

C. Dry Well Approval. Underground injection control wells—commonly referred to as dry wells, sumps, or infiltration devices—are subsurface structures that allow storm water to flow into the ground under the force of gravity. A Dry Well Approval for new, redeveloped, or closed drywells is required to protect the Missoula aquifer and for the City to maintain an updated inventory for reporting to USEPA and MDEQ. The City's Dry Well Approval does not relieve an owner or operator of the responsibility to submit the required inventory information directly to USEPA.

1. Dry Well Approval is obtained under the City's Excavation Permit.

D. Notice of Termination (NOT). The City of Missoula requires notification that permit coverage under the Storm Water Permit and/or Dry Well Approvals should be terminated. Once permanent erosion control has been established on 70% or greater of the disturbed areas, the permittee shall complete a

permit-specific NOT and submit it to Development Services. Additionally, for NOT approval, all temporary BMPs shall be removed, all construction equipment and vehicles shall be removed, and all potential pollutant-generating actives due to construction activity shall be complete.

1. For post-construction storm water management, the Storm Water-NOT shall include a recorded covenant for maintenance, utility easement, and an accurate post-construction (as-built) plan of the system, signed and sealed by a Montana-licensed professional engineer.

2. When the Storm Water Utility concurs that the permit coverage conditions have been achieved, the permittee will be notified that the authorization is terminated. An NOT-SWC is required by MDEQ for activities covered under MDEQ's Construction General Permit and a copy shall be submitted to the City, along with the Storm Water-NOT.

13.27.410 Permit Application Fees

A. Storm Water Permit and Dry Well Approval fees are based on the average direct and indirect costs to provide plan reviews, permit administration, field inspection, and record management. The fee for obtaining a permit shall be established or amended by City Council resolution after conducting a public hearing.

B. These fees are provided on the Engineering Fee Schedule.

C. Revenue from these fees shall be credited to the general fund.

13.27.420 Permit Fee Exceptions

A. The Director may exempt any contractor doing work for the City from permit fees referred to in this chapter.

B. Work performed by the City is exempt from permit fees, but the City department shall submit and obtain permit approval prior to commencing work. The same guidelines for submitting and obtaining approval of a Storm Water Permit, Dry Well Approval, and Notice of Termination apply to all City departments.

13.27.430 Investigation Fees; Work Without a Permit

Whenever any work for which a permit is required by this ordinance has been commenced without first obtaining said permit, a special investigation shall be made before a permit may be issued for such work. An investigation fee, in addition to the permit fee, shall be collected whether or not a permit is then or subsequently issued. The investigation fee shall be equal to the amount of the permit fee required by this ordinance. The payment of such investigation fee shall not exempt any person from compliance with all provisions of this ordinance. MPDES permits shall also be subject to USEPA, MDEQ, and/or county air quality standards, penalties, and fines, as applicable.

13.27.440 Permit Fee Refunds

Refunds or credits of permit fees shall considered when permit errors or mistakes are caused by the City.

13.27.450 Repealed

12.27.460 Construction Requirements

Construction activity involving grading, erosion control, sediment control, or waterway crossing shall meet the design criteria set forth in the most recent versions of the Construction Site BMP Manuals and

administrative rules. The design criteria shall be adequate to prevent transportation of sediment from the site, to the satisfaction of the City.

A. Permittees shall follow the minimum standards described as Non-Numeric Technology-Based Effluent Limits in the most current Construction General Permit.

B. Concrete operations (e.g., washout and slurry) shall require BMPs that allow for the capture and disposal of generated pollutants.

C. Clearing and Grading Requirements
   1. Clearing and grading of natural resources, such as water bodies and wetlands, shall not be permitted, except when in compliance with all other required permits.
   2. Clearing techniques that retain natural vegetation and retain natural drainage patterns shall be used.
   3. Phasing shall be required on all sites disturbing equal to or greater than 30 acres, with the size of each phase to be established at plan review and as approved by the City.
   4. Clearing, except that necessary to establish sediment control devices, shall not begin until all sediment control devices have been installed and have been stabilized.

D. Construction Site Access Requirements
   1. Ingress and egress point BMPs shall mitigate the tracking of debris off site onto the right-of-way.
   2. At least one temporary access entrance shall be provided at all sites.
   3. Other measures may be required at the discretion of the City in order to ensure that sediment is not tracked onto public streets by construction vehicles, or washed into storm drains.

E. Erosion Prevention Requirements
   1. Soil must be stabilized using recommended methods described in the Construction Site BMP Manuals.
   2. Soil stockpiles shall be stabilized or covered at the end of each workday.
   3. Techniques shall be employed to prevent the blowing of dust or sediment from the site.
   4. Techniques that divert upland runoff past disturbed slopes shall be employed.

F. Noxious Weeds
   1. Disturbed areas shall be managed to prevent noxious weeds from becoming established in the short and long term. Per the Montana County Weed Control Act (§7-22-2101 to 2154, MCA), it is unlawful to permit noxious weeds to propagate.
   2. The City or County reserves the right to prioritize management of non-native species that are not listed as noxious weeds, for site-specific management.
   3. Permittees are responsible for ensuring their projects comply with state and local weed management regulations.

G. Removal of Temporary BMPs
   1. Upon establishing 70% or greater permanent ground cover, all temporary storm water management control devices shall be removed.

H. Sediment Control Requirements
   1. Where necessary, sediment controls shall be provided in the form of settling basins or sediment traps or tanks, temporary seeding, perimeter controls, or other methods described in the Construction Site BMP Manuals.
   2. Adjacent properties shall be protected by the use of a vegetative buffer, silt fence, fiber rolls, or other BMPs outlined in the Construction Site BMP Manuals.

I. Activity involving waterways and watercourses

1. When a watercourse must be crossed regularly during construction, a temporary stream crossing shall be provided and an approval obtained from the City and all other authorized permitting agencies.
2. When in-channel work is conducted, the channel shall be stabilized before, during and after work.
3. Stabilization adequate to prevent erosion must be provided at the outlets of all pipes and paved channels.
4. Stabilization methods shall follow those described in the Construction Site BMP Manuals or administrative rules.

J. Winterization Requirements
   1. Winterization BMPs shall be implemented on projects prior to seasonal shut downs or downtime of one month or longer.

13.27.470 Post-Construction Storm Water Management

The permittee shall create, manage, and maintain post-construction storm water controls in accordance with the Post-Construction BMP Design Manual and any other applicable administrative rules. The permittee shall also comply with MMC §20.50.030, when applicable.

A. When required, post-construction storm water management controls shall be designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measureable precipitation.
   1. For projects that cannot meet 100% of the runoff reduction requirement, the remainder of the runoff form the first 0.5 inches of rainfall must be either:
      a. Treated onsite using post-construction storm water management control(s) expected to remove 80% total suspended solids (TSS);
      b. Managed offsite within the same sub-watershed using post-construction storm water management controls designed to infiltrate, evapotranspire, and/or capture for reuse; or
      c. Treated offsite within the same sub-watershed using post-construction storm water management control(s) expected to remove 80% TSS.

B. Any new storm water outfalls to a named waterbody shall implement BMPs to reduce pollutant discharge to the maximum extent practicable.

C. Riparian resource buffer areas (MMC §20.50.030) shall be clearly defined in the Storm Water Management Site Plan.

D. A recorded utility easement, covenant for maintenance, and as-built plan for any required private storm water systems shall be provided in a form acceptable to the City with submission of the Storm Water-NOT.
   1. The utility easement shall provide sufficient space for vehicle or heavy machinery access for inspection and maintenance, as appropriate for the facility and determined by a Montana-licensed professional engineer.
   2. The covenant shall give the City the right to inspect the facilities and provide a guarantee to the City that the private storm water system will be maintained by the owner or operator, such that the facility will function as designed in perpetuity.

Article V. Inspection and Enforcement

Sections:

13.27.500 Inspections

An authorized agent may inspect—at a reasonable time and in a reasonable manner—the premises for which a permit application has been filed or the premises for which the City has issued a permit.

A. The City will conduct all inspections of any activities within its jurisdiction that require a Storm Water Permit, Dry Well Approval, and/or Construction General Permit; and the City will conduct them pursuant to adopted administrative rules.

B. During construction, sites will be inspected according to the Construction Inspection Frequency Determination.

C. Once construction activities are completed, post-construction storm water management controls shall be inspected annually according to the Post-Construction Inspection Frequency Determination. Annual inspections and periodic maintenance are required to ensure the storm water system continues to function as designed. The City shall have the right to inspect all private post-construction storm water management controls within the City limits but is not responsible for maintenance.
   1. Low- to medium- priority sites shall be self-inspected annually.
   2. High priority sites shall be inspected annually by the City.
   3. All sites shall require a renewal of their Storm Water Permit every five years; and the City will inspect all sites upon renewal.

13.27.510 Sampling, Testing, and Monitoring

All sampling, testing, and monitoring conducted on any portion of the storm water system shall be conducted in accordance with adopted administrative rules. With the consent of the owner or occupant or with authorization from a court of competent jurisdiction, any authorized agent may establish on any property such devices as are necessary to conduct sampling or metering operations. During all inspections as provided herein, the authorized agent may take any samples deemed necessary. Samples shall be collected, stored, and transported in conformance with accepted sampling and testing standards and protocols.

13.27.520 Violations

A. Whenever the City finds that any permit conditions, or other conditions required by this chapter, have been violated or that a discharge of pollutants within the City's jurisdiction is taking place or has occurred, which may result in or has resulted in pollutants entering storm water, the storm water system, or state waters, the City will do one or more of the following:
   1. Issue an NOV
      The NOV issued will notify the owner or operator of the violation and will describe what needs to be done to correct the violation, as well as the timeframe in which the correction is to be made. Storm Water Permit and/or Dry Well Approval violations shall result in the City issuing an NOV. The City shall determine the timeframe to correct the violation, based on the nature of the violation and the potential threat.

   2. Require Corrective Action

The City will notify the responsible owner or operator in writing and give him or her the opportunity to remediate the affected property in accordance with the provisions of this chapter using a remediation plan approved by the Director.

a. An authorized agent may issue a stop work order until the violation is corrected.
b. Owners or operators shall submit remediation plans to and have them approved by the Director before remediation begins. The plan shall include, but is not limited to, a remediation schedule, a course of action, a list of personnel performing remediation work, and a list of equipment to be used.
c. An authorized agent may enter private property, obtaining warrants when necessary, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.
d. Failure to take corrective action shall result in suspension of the relevant permit.
   (1) A suspended permit shall be reinstated without additional fees if it is resolved within seven days.
   (2) A suspended permit that is not resolved within seven days shall not be reinstated; the permittee shall re-apply and re-purchase permit and shall be subject to permit fees.
e. Failure to diligently pursue corrective action shall result in fines per the Storm Water Penalty Assessment and Escalation Table, which will be established by City Council resolution following a public hearing.

B. The owner or operator shall take appropriate preventive action to ensure a violation does not recur.

C. Whenever an authorized agent finds any potential pollutant—including but not limited to oil, earth dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, or waste—upon the sidewalk or right-of-way abutting or adjoining any parcel of land or upon any parcel of land that is in close proximity to any portion of the storm water system and may result in the pollutant entering the storm water system, an authorized agent may give notice to the owner or operator to remove and lawfully dispose of the material. The owner or operator shall undertake the activities described in the notice and within the time frames set forth therein. If the owner or operator fails to conduct the activities as described in the notice, the Director may cause the required activities to be performed and have the cost assessed and invoiced to the property owner, as set forth in this chapter and adopted administrative rules.

13.27.530 Enforcement and Penalties

A. If an owner or operator fails to take corrective actions on, or prior to, a required date on a reported or observed spill or the potential to release pollutants, including sediment, into the storm water system, the City, or a designated contractor, may remediate the affected property at the owner or operator's expense, if the owner or operator does not take corrective actions. The owner or operator shall reimburse the City for all expenditures pertaining to the corrective action.

B. In addition to the penalties herein provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter that the Director or designee considers to be an immediate threat to the public health, safety, and welfare and the environment may be summarily abated and/or restored by the City, or a designated contractor, with the owner or operator responsible to pay the costs of any abatement and restoration.

C. An authorized agent may enter private property, for the purpose of enforcing ordinances that affect the general welfare and public safety, as authorized in §7-1-4124(16), MCA.

D. Each day a violation continues shall constitute a new violation and fines will be assessed per the Storm Water Penalty Assessment and Escalation Table.

E. Failure to pay the costs to the City, or a designated contractor, as described in this chapter may result in the City placing a lien against the property. Continued non-payment may result in the City pursuing payment as outlined in §7-13-4309, MCA.

F. Any person convicted of violating any of the provisions of this chapter, with the exception of a late payment of a storm water utility bill, may be charged with a misdemeanor. The maximum fine imposed shall be $1000 per day and no imprisonment shall be imposed.

13.27.540 Violation of the Clean Water Act

Any owner or operator who violates any provision of this chapter or any provision of any permit issued pursuant to this chapter; discharges pollutants, waste, or wastewater, so as to cause an illicit discharge into the storm water system, or violates any cease and desist order, prohibition, or effluent limitation, may be in violation of the Clean Water Act and subject to the sanctions thereof, including civil and criminal penalties.

13.27.550 Concealment

Causing, permitting, aiding, abetting, or concealing a violation of any provision of this chapter shall constitute a violation of this chapter.

13.27.560 Civil Actions

In addition to any other remedies provided in this chapter, any violation of this chapter may be enforced by civil action brought by the City. In any such action, the City may seek, and the court shall grant, as appropriate, any or all of the following remedies:

A. A temporary and/or permanent injunction.

B. Assessment of the owner or operator in violation for the costs of any investigation, inspection, or monitoring survey which led to the establishment of the violation and for the reasonable costs of preparing and bringing legal action under this section.

C. Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

D. Compensatory damages for loss or destruction to water quality, wildlife, fish, and aquatic life. Assessments under this section shall be paid to the City to be used exclusively for costs associated with monitoring and establishing storm water discharge control systems and/or implementing or enforcing the provisions of this chapter.

E. Fines to be paid to the City for MPDES permit violations.

13.27.570 Administrative Enforcement Powers

The City will enforce the requirements under the Construction General Permit for storm water discharges associated with construction activity in whole or in part as determined by the authorized agent and in accordance with this chapter, administrative rules, and MMC §13.26.

13.27.580 Appeal

Any person notified of non-compliance with this chapter or required to perform monitoring, analysis, reporting, and/or corrective action, who is aggrieved by the decision of the City's authorized agent, may appeal such decision in writing to the Director within 10 business days following the effective date of the decision or written notice. Upon receipt of such request, the Director shall request a report and recommendation from the City's authorized agent and shall set the matter for administrative hearing at the earliest practical date. At said hearing, Director may hear additional evidence, and may revoke, affirm, or modify the authorized agent's decision. The decision shall be final.

13.27.590 Disclaimer of Liability

A. The degree of protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific, engineering, and other relevant technical considerations. The standards set forth here are minimum standards, and this chapter does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the state or the United States.

B. This chapter shall not create liability on the part of the City, any agent, or employee thereof for any damages that result from reliance on this chapter or any administrative decision lawfully made thereunder.

Severability. If any section, subsection, sentence, clause, phrase or word of this ordinance is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this ordinance. The council hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, phrase and words thereof, irrespective of the fact that any one or more sections, subsections, sentences, for any reason this ordinance should be declared invalid or unconstitutional, then the remaining ordinance provisions will be in full force and effect.

First reading and preliminary adoption on the _____ day of _____, 2019, by a vote of __
Ayes, _____; __ Nays, ___; _____
Abstain, _____; and __ Absent, _____

Second and final reading and on the _____ day of _____, 2019, by a vote of __
Ayes, _____; __ Nays, ___; _____
Abstain, _____; and __ Absent, _____

ATTEST: APPROVED:

_____ _____
Martha L. Rehbein, CMC John Engen
City Clerk Mayor

Storm Water Permit Violation - Penalty Assessment and Escalation

First Violation	Construction	Fine	Post-Construction	Fine
Minor	Track-off, dust control, unmanaged trash	$50	Failure of 1 BMP	$50
Moderate	Concrete washout, stockpile erosion	$125	Failure of 2-4 BMPs	$125
Major	Point source discharge, unprotected inlet	$250	Failure of 5 or more BMPs	$250
Second Violation				
Minor	Track-off, dust control, unmanaged trash	$100	Failure of 1 BMP	$100
Moderate	Concrete washout, stockpile erosion	$250	Failure of 2-4 BMPs	$250
Major	Point source discharge, unprotected inlet	$500	Failure of 5 or more BMPs	$500
Third Violation				
Minor	Track-off, dust control, unmanaged trash	$250	Failure of 1 BMP	$250
Moderate	Concrete washout, stockpile erosion	$500	Failure of 2-4 BMPs	$500
Major	Point source discharge, unprotected inlet	$1000	Failure of 5 or more BMPs	$1,000

Violations may apply to construction and post-construction, resulting in a cumulative penalty: for example,

First Violation for track-off (minor) = $50

Second Violation for failure of 2 BMPs (moderate) = $250

Cumulative penalty = $300

Appendix H
Draft City Permits and Checklists

MS4 Compliance Permits

Construction

STORM WATER PERMIT

Erosion Control Site Plan Review Checklist—by CITY

Construction Inspection Frequency Determination—by CONTRACTOR

TIER 1
2,500 sqft ≤ Disturbance <1 acre
Single Family or Duplex Residential

- Low
- Medium
- High

TIER 2
2,500 sqft ≤ Disturbance <1 acre
Multifamily/Commercial/Industrial

- Low
- Medium
- High

TIER 3—SWPPP*
Disturbance ≥ 1 acre
All projects with a SWPPP
*MDEQ documentation required

- Low
- Medium
- High

EXCAVATION PERMIT

DRY WELL APPROVAL

- NEW
- RECONDITIONED
- CLOSED

Post-Construction

- Medium
- High

Storm Water Management Site Plan Review Checklist

Assignable Maintenance Agreement with O&M manual

Post-Construction Inspection Frequency Determination—submitted by CONTRACTOR , **APPROVED** by CITY

Off-Site Treatment?

Yes

Off-Site Treatment Evaluation

Low to Medium → Annual Self-inspection by the owner or operator—5 year inspection by City

High → Annual Inspection by the City

Notice of Termination

Final Inspection

Schedule 5 Year Renewal

Public Works
THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

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Storm Water Permit Application

Construction activities that result in a total land disturbance of 2,500 square feet or greater, or which propose to alter the grade of a lot by 3 feet or more, must apply for coverage under a City Storm Water Permit. This permit application shall be submitted to Development Services, along with the relevant fee, no greater than 180 days and no less than 60 days from the start date of construction. Submittal and approval of this application is required before initiating construction activities, pursuant to §13.27, Missoula Municipal Code (MMC). Once permanent erosion control has been established on 70% or greater of the disturbed areas, the permittee shall complete a Storm Water Permit-Notice of Termination and submit it to Development Services.

Date:_____

Name of Applicant:_____

Mailing Address:_____

City:_____ State:_____ Zip Code:_____

Owner (if different than applicant):_____

Cell number:_____ Email:_____

Contractor Name (if applicable):_____ Company Name:_____

Cell number:_____ Email:_____

Project Name:_____

Total Disturbed Area (indicate units):_____

Project Address:_____

Latitude:_____ Longitude:

Project Type (e.g., subdivision, multifamily, commercial):_____

Start Date:_____ Anticipated End Date:_____

Erosion Control Site Plan

Please refer to the City's Erosion Control Site Plan Review Checklist, to ensure the plan has all the necessary information. Using the Construction Site Inspection Frequency Determination, if your project is a medium- or high-priority, please submit a Storm Water Management Site Plan.

☐Erosion Control Site Plan

Storm Water Management Site Plan

Please refer to the City's *Storm Water Management Site Plan Review Checklist* to ensure the plan has all the necessary information. City staff will rely on this checklist in their review.

☐Storm Water Management Site Plan ☐ Not Applicable

Additional Required Attachments for Storm Water Management Site Plan

☐Approved plat showing utility easement for inspection, maintenance, and repair

☐Maintenance Agreement (please use the template that accompanies this permit application)

☐As-Built plan of the system, signed and sealed by a Professional Engineer licensed in Montana

For guidance on this application, please refer to most current version of the *Montana Post-Construction Storm Water BMP Design Guidance Manual* produced for Montana's MS4 Municipalities.

1. **Your project must implement post-construction storm water management controls that are designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measureable precipitation. Does your project comply with this requirement?**

   ☐Yes ☐No (if no, stop and reassess your plans for compliance)

   Does your project capture 100% of runoff on site?

   ☐Yes ☐No

   If no, is the remainder of the runoff:

   ☐Treated onsite using post-construction storm water management control(s) expected to remove 80% total suspended solids;

   ☐Managed offsite within the same subwatershed using post-construction storm water management control(s) that are designed to infiltrate, evapotranspire, and/or capture for reuse; or

   ☐Treated offsite within the same subwatershed using post-construction storm water management control(s) expected to remove 80% total suspended solids

   If offsite treatment is chosen, why is it required? Explain. Determinations may not be based solely on the difficulty and/or cost of implementation.

   ☐Technical or logistic infeasibility ☐High groundwater ☐Poorly infiltrating soils

   ☐Prohibitive costs land use that is inconsistent with capture and reuse or infiltration of storm water

   ☐Other:_____

2. **What low-impact development principles does your project implement? Explain.**

   ☐Preserve natural site features ☐Minimize and disconnect impervious areas ☐Project phasing

   ☐Disperse small-scale integrated BMPs throughout the site ☐Create multifunctional landscapes

   ☐Control storm water as close to the source as possible

   ☐Other:_____

3. **What types of green infrastructure have you incorporated into the site plan?**

   ☐Downspout disconnection ☐Rainwater harvest ☐Rain garden(s) ☐Bioswales ☐Land conservation

   ☐Permeable pavers ☐Green roof ☐Green parking ☐Bioretention basin(s) ☐Urban tree canopy

   ☐Other:_____

4. **Describe the revegetation and weed management methods, using the *Missoula Parks and Recreation Design Manual*, as periodically updated, for guidance.**

I certify that I am the contractor/owner or an authorized agent. If acting as an authorized agent, I certify that I am authorized to act as the contractor/owner agent regarding the property at the above-referenced address for the purpose of filing applications for decisions, plans, or review under §13.27, MMC, and have full power and authority to perform, on behalf of the contractor/owner, all acts required to enable the City to process and review such applications. I certify that the information on this application is true, will be implemented, and maintained throughout the life of the project.

☐ By checking this box, I acknowledge that non-compliance with this Permit and §13.27, MMC may result in a stop work order, city withholding a certificate of occupancy, or a lien filed against the project for unpaid costs of abatement of violations.

Signature of Legally Responsible Person	Date
Printed Name	Title

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Dry Well Approval

Underground injection control wells—commonly referred to as dry wells, sumps, or infiltration devices—are subsurface structures that allow storm water to flow into the ground under the force of gravity. A Dry Well Approval for new, redeveloped, or closed drywells is required to protect the Missoula aquifer and for the City to maintain an updated inventory for reporting to the U.S. Environmental Protection Agency and Montana Department of Environmental Quality.

Applicant Name:_____ Phone:_____

Facility Name (if applicable):_____ Land Use Type:_____

Address of Facility:_____

Mailing Address (if different than above):_____

Property Owner (if different):_____ Phone:_____

Property Owner Address:_____

☐Please attach a diagram of the system and include the construction design.

How many square feet of green infrastructure does the facility incorporate for pretreatment?_____

☐Please attach a maintenance agreement for private sumps.

Operating Status (circle one)
Proposed, Active, Closed/Abandoned, Under Construction, Temporarily Closed/Abandoned

Latitude and Longitude:_____

Date of Construction/Closure (circle one):_____

Dry Well Depth (feet):_____

Average Maximum Volume of Storm Water Discharge (indicate units):_____

Depth to Groundwater:_____

I certify, under penalty of law, that this document was prepared under my guidance and supervision, and that I am assured that qualified personnel properly gathered and evaluated the information reported here to the best of my knowledge; the information presented above is true, accurate, and complete.

_____
Printed Name

_____ _____
Signature Date

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Storm Water Permit
Notice of Termination

The City of Missoula requires notification that permit coverage under the City's Storm Water Permit should be terminated once permanent erosion control has been established on 70% or greater of the disturbed areas. When this level of erosion control has been achieved, complete this form and submit it to Development Services within 30 days. When the Storm Water Utility concurs that the permit coverage conditions have been achieved, the permittee will be notified that the authorization is terminated, pursuant to §13.27, Missoula Municipal Code.

Date:_____

Name of Applicant:_____ **Permit No.:**_____

Mailing Address:_____

City:_____ State:_____ Zip Code:_____

Onsite Contact (if different than applicant):_____

Cell number:_____ Email:_____

Contractor Name (if applicable):_____ Company Name:_____

Cell number:_____ Email:_____

Project Name:_____ Disturbance Area (Square Feet):_____

Project Address:_____ Project Type:_____

Start Date:_____ Final Stabilization Date:_____

I certify that the site or facility covered under this permit has reached final stabilization as required per §13.27, Missoula Municipal Code.

_____

Signature of Legally Responsible Person Date

_____

Printed Name Title

Existing City Permits

Existing Permits	Description	Fee
SWPPP	≥1- to 5-acre development/parcel/lot	**$310**
	Greater than 5-, up to 10-acre, development/parcel/lot	**$363**
	Greater than 10-acre, up to 20-acre, development/parcel/lot	**$422**
	Greater than 20-acre development/parcel/lot:	**$508**
Grading, Drainage, and Erosion Control	Single family residence with slopes between 5% and 10%	**$376**
	Single family residence with slopes greater than 10%	**$434**
	Commercial/industrial/multifamily development	**$527**

New Storm Water Permit and Dry Well Approval

Forms and Checklists	Description	Fee
Construction Erosion Control Site Plan	**Tier 1** 2,500 square feet ≤ Disturbance Area < 1 acre Single Family Residential	**$209**
	Tier 2 2,500 square feet ≤ Disturbance Area < 1 acre Multifamily/Commercial/Industrial	**$258**
	Tier 3 Disturbance Area ≥ 1 acre All projects with a SWPPP	**$516**
Construction Site Inspection Frequency Determination	Low Priority	
	Medium Priority (need to submit Post-Construction Storm Water Management Plan)	
	High Priority (need to submit Post-Construction Storm Water Management Plan)	
Post-Construction Storm Water Management Site Plan	**Low- and Medium-Priority Sites**	**$258**
	High-Priority Sites	**$387**
Post-Construction Site Inspection Frequency Determination	Low- and medium-priority sites Annual inspection by Owner	
	High-priority sites Annual inspection by City	
Dry Well Approval	**Required for new, reconditioned, and closed sumps**	**$129**

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours: Last 48 hours:		
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial
☐ Ultra-Urban Residential (High Density)
☐ Suburban Residential
☐ Commercial
☐ Open Space
☐ Golf Course
☐ Institutional
Other: _____
Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☐ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Gallon	Bucket
	Time to fill		s	
☐Flow #2	Flow depth		inches	Tape measure
	Flow width	____' ____"	feet, inches	Tape measure
	Measured length	____' ____"	feet, inches	Tape measure
	Time of travel		s	Stop watch
Temperature			°C/°F	Multi-probe
pH			pH Units	Multi-probe
Conductivity/SPC			µs/cm	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	☐ Yes	☐ No	
2.	If yes, collected from:	☐ Flow	☐ Pool	
3.	Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM ☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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Construction Inspection Frequency Determination Form

Date:_____

Project Name:_____ **Permit No.:**_____

Address:_____ **Zip Code:** _____

Project Area (acres or square feet): _____ **Disturbance Area (acres or square feet):** _____

Applicant/Owner Representative:_____ **Phone number:**_____

Owner Name:_____ **Phone Number:**_____

Owner Address:_____

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—all *General Permits for Stormwater Discharges Associated with Construction Activity* shall be inspected by the City of Missoula based upon their priority ranking.

Evaluated by:_____ **Department/Division:**_____

Construction Site Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 3.

Total	Priority	Inspection Frequency	Project Priority
6 to 12	Low	1. Once at commencement of construction after BMPs have been implemented	
13 to 30	Medium	1. Once at commencement of construction after BMPs have been implemented	
		2. Once at the conclusion of the project prior to finalization	
31 to 53	High	1. Once at commencement of construction after BMPs have been implemented	
		2. Once within 48 hours, after one rain event of 0.25 inches or greater	
		3. Once within 48 hours, after runoff from snowmelt due to thawing conditions that cause visible surface erosion at the project site	
		4. Once at the conclusion of the project prior to finalization	

Construction Site Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Project Tier	Single Family Residential < 1 acre	1	
	Multifamily/Commercial/Industrial < 1 acre	2	
	Any project ≥ 1 acre	3	
Proximity to waterbody (surface or sump/aquifer)	1,500+ feet from site's outfall	1	
	200 to 1,499 feet from site's outfall	5	
	<200 feet from site's outfall	7	
	Direct discharge to waterbody	10	
Discharge to an impaired waterbody	No (sump/aquifer, Butler Creek, LaValle Creek, Pattee Creek, or Rattlesnake Creek)	1	
	Yes (Bitterroot River, Clark Fork River, Grant Creek, or Miller Creek)	10	
Steepness of project site slopes	Slopes < 20:1 (H:V) Slopes < 5%	1	
	20:1 ≤ Slopes < 10:1 (H:V) 5% ≤ Slopes < 10%	5	
	Slopes ≥10:1 (H:V) Slopes ≥ 10%	10	
History of operator compliance	No history of non-compliance	1	
	1 time non-compliant	5	
	2+ times non-compliant	10	
Risk of Hazardous Material Spills/Leaks	No hazardous materials stored on site	1	
	Non-liquid hazardous materials stored on site	5	
	Liquid hazardous materials stored on site	10	
		Total	
6 to 12 = Low	13 to 30 = Medium	31 to 53 = High	

Permittees found to be habitually non-compliant may be subject to one or more disciplinary actions: compliance through the Missoula Valley Water Quality District Enforcement Response Plan; increased inspection frequency; formal Notice of Violation (NOV), including fine(s); loss of access to project site; and/or suspension/revocation of City Business License.

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Construction Site Inspection Form

Project Name:_____ **Permit No.**:_____

Address or Latitude/Longitude:_____

Date of Inspection:_____ **Start/End Time:**_____

Inspected by:_____ **Title:**_____

City Department/Division:_____

Describe Present Phase of Construction:_____

Type of Inspection:

❑ Beginning of Construction ❑ Pre-storm event ❑ During rain event

❑ Post-rain event ❑ Conclusion of Project ❑ Response to violation or complaint

Weather Information

Has it rained since the last inspection? ❑Yes ❑No

If yes, provide:

Storm Start Date & Time: Storm Duration (hrs): Approximate Rainfall (in):

Weather at time of this inspection:

❑ Clear ❑ Cloudy ❑ Raining ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds

❑ Other: Temperature:

Do you suspect that discharges may have occurred since the last inspection?

❑Yes ❑No

Are there any storm water discharges at the time of inspection? ❑Yes ❑No

If yes, provide location(s) and a description of stormwater discharged from the site (presence of suspended sediment, turbid water, discoloration, and/or oil sheen:

Prohibited Discharges

Are there any prohibited discharges at the time of inspection? ❑Yes ■No

If yes, provide location(s) and a description:

Photos? ❑Yes ❑No

If yes, please attach and/or provide filepath:

	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Erosion Prevention and Sediment Control				
1	Are storm water volume and velocity controls being used to minimize soil erosion within the site? (e.g., check dams and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
2	Are storm water volume and velocity controls being used to minimize soil erosion at discharge locations? (e.g., stilling basins and fiber rolls)	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
3	Are efforts being made to minimize the amount of soil exposed throughout the site?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
4	Are efforts being made to minimize the disturbance of steep slopes?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
5	Are perimeter controls and sediment barriers (e.g., silt fence) adequately installed (keyed into substrate) and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
6	Are storm drain inlets properly protected?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
7	Are discharge points and receiving waters free of sediment deposits? If no, provide locations.	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
8	Is there evidence of sediment being tracked into the street?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
9	Are natural resource areas (e.g., streams, wetlands, and mature trees) protected by natural buffers, barriers, or similar BMPs?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
10	Are efforts being made to minimize soil compaction and preserve topsoil?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	

	BMP/Activity	Implemented	Maintained	Corrective Action & Notes
Soil Stabilization				
11	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Dewatering				
12	Are discharges from dewatering activities being managed by appropriate controls?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Pollution Prevention Measures				
13	Are non-storm water discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
14	Are materials that are potential storm water contaminants stored inside or under cover?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
15	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
16	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
17	Are vehicle and equipment fueling, cleaning, material storage, and maintenance areas free of spills, leaks, or other harmful materials?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Surface Outlets and Miscellaneous				
18	When discharging from basins and impoundments, are outlet structures that withdraw water from the surface being used?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
19	Are there locations where additional BMPs appear to be necessary?	❑Yes ❑No ❑ N/A	❑Yes ❑No ❑ N/A	
Describe any incidents of non-compliance not described above:				

Inspector's Signature _____ Date _____

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CONSTRUCTION SITE INSPECTION LOG

PROJECT NAME | **PROJECT FILE NO.** | **ADDRESS**

TOTAL PROJECT ACRES | **TOTAL DISTURBED ACRES**

LATITUDE: **LONGITUDE:**

SWPPP ADMINISTRATOR | **ADDRESS** | **PHONE NUMBER**

GENERAL PERMIT PERMIT/SWPPP NUMBER

Site Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

Supplemental Site Inspection Log

Date	Inspector	Inspection Type	Follow-Up Required?	Date of Follow-Up Inspection
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	
			❑Yes ❑No	

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Erosion Control Plan Checklist

Date: _____

Project Name: _____

Address: _____ **Zip Code:** _____

Project Area (acres or square feet): _____ **Disturbance Area (acres or square feet):** _____

Owner Name: _____ **Phone Number:** _____

Owner Address: _____

The City requires the submittal of an Erosion Control Plan for review and approval prior to the issuance of an Erosion Control Permit for any site disturbance greater than or equal to 2,500 square feet. This checklist shall be used by City personnel during plan review and should be utilized by the permittee to ensure their plan is complete prior to submitting an Erosion Control Permit application.

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—the City of Missoula is required to regulate runoff and the treatment of storm water into drainage systems and waterbodies, including the Missoula aquifer. The regulation of storm water includes construction storm water from project sites (Montana Code Annotated 75-5-401). Projects that involve 1 acre or more of land disturbance, or less than one acre but are part of a larger common plan of development, are required to demonstrate coverage under the Montana Pollutant Discharge and Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, prior to issuance of an Erosion Control Permit.

Evaluated by: _____ **Department/Division:** _____

A complete Erosion Control Plan should include the following (as applicable to the site and project).

			Delineation of Work Area
City	**Applicant**	**NA**	
			Separate plan sheets are required to show the measures to be implemented at the grading stage (e.g., grading, foundation/retaining walls) and at the construction stage.
			Show all areas of construction, including but not limited to: areas to be graded as shown on a grading plan, areas to be cleared, as well as structures, retaining walls, roads, drives, utilities, trenches, scaffolds, catch basins, etc. These areas should be consolidated and located outside steep or sensitive areas.
			Show boundary lines of the entire site and vicinity of the site in relation to the surrounding adjacent areas.
			The location of all existing buildings, structures, easements, or underground utilities.
			Accurate contours showing the topography of the existing ground extending at least 10 feet outside all boundary lines of the project site. The contour lines shall be at intervals sufficient to show the configuration of the ground before disturbance.
			Location, width, direction of flow and approximate location of top and toes of banks of any waterbodies.
			Protect surface water locations, providing primary control measures (e.g., silt fence along outer buffer zone of creek; do not disturb riparian areas) and secondary control measures (e.g., fiber rolls) in disturbed areas sloping toward a waterbody.

City	Applicant	NA	Delineation of Work Area (continued)
			Protect storm drain inlets using fiber rolls, permeable rock sacks, or other measures that keep sediment from entering the drain. Show inlet locations and protection measure details. Include that filter fabric or filter baskets shall be installed in the drains and cleaned out after each rain event, or as needed, to function properly. Do not use sand bags, as these tear and can result in sand entering the storm drains.
			Location and types of existing vegetation on the site. Within 25 feet of any cut or fill, the plan shall identify the location, diameter, species, and appropriate elevation at the base of all trees over 12 inches in diameter measured at 4.5 feet above ground level.
			Maximize and protect areas to be undisturbed (including sensitive areas and buffer zones), using a vegetative buffer strip or 6-foot fence/barrier. Show the "limits of work" and barriers along the "limit". Forbid work, storage, earth moving, vegetation clearing, and other disturbances outside of the "limit". Do not use hay bales as these can easily fall apart.
			Prevent runoff to off-site areas using perimeter controls (diversion berms, silt fencing, and/or fiber rolls). Silt fencing is preferred, but fiber rolls may work in some instances. Where the site is flat or the slope is gentle, installing these measures on the property line should be adequate. On slopes greater than 3:1, the measures must be installed along contour lines.
			Prevent Erosion of Unstable or Bare Areas
			Areas of the site currently experiencing or susceptible to erosion problems.
			Existing drainage patterns and direction of flow.
			Show all areas that will be used for stockpiling earth and storing construction materials.
			Indicate the location and method for stabilizing disturbed bare earth areas. Use seeding and/or mulching and the following, as necessary: i) For slopes less than 3:1, provide silt fencing or fiber rolls along contour lines. ii) For slopes greater than 3:1, anchored erosion blankets (rice, straw, or coconut) and fiber rolls or silt fencing at the crest are required. Jute netting is preferred when used with seeding.
			Use diversion berms to divert water from unstable or denuded areas (e.g., top and base of a disturbed slope, grade breaks where slopes transition to a steeper slope).
			Direct water from construction areas to designated temporary filtration/detention areas. Show any temporary detention areas for storm water and stabilization of those areas.
			Location and details of all proposed drainage systems, walls, cribbing, or other erosion protection devices to be constructed in connection with, or as a part of, the proposed work.
			Location of proposed vegetative erosion control measures (e.g., seeding and landscaping), including type, quantity, planting schedule, and irrigation.
			Show Locations of Logistics Areas
			Show location of office trailer(s), storage sheds, temporary power pole, scaffold footprint, and other temporary installations. Show how they will be accessed and show protection of the access routes.
			Show location of utility trenches, indicate utility types, and identify timing of installation.
			Construction Access Routes
			Use stabilized designated access points for entrance onto the property using 3-6" fractured aggregate over geo-textile fabric over the first 20 feet of the property. If using an existing paved driveway, identify it. Where vehicles or equipment will travel from an existing paved driveway to unpaved areas within the property, a stabilized transition point is required that meets the above standards.
			Provide designated area(s) for parking of construction vehicles, using aggregate over geo-textile fabric.

City	Applicant	NA	Construction Access Routes (continued)
			Show all access roads/ramps and access points used by excavation equipment, trucks, or fork lifts/crane access (second floor construction). For unpaved routes, use ridges running diagonally across the road that run to a stabilized outlet. The type of materials used for stabilization and their locations shall be indicated. Materials for this purpose are required to be stored on-site.
			Containment of Construction Materials and Waste
			Show location, installation, and maintenance of a concrete mixer, washout, and pits. No concrete, mortar, or stucco washout shall be placed directly on the soil/ground. Specify the method used to contain the washout.
			Show location of portable toilets away from surface water locations and storm drain inlets.
			Show storage location and containment of construction materials during work, as well as afterhours/weekends. Show the location of lumber, gravel, and materials storage areas. Show how they will be accessed and show protection of the access routes.
			Show areas and proposed protection of temporary stockpiles using anchored-down plastic sheeting in dry weather. Alternatively, in wet weather, or for longer storage, use seeding and mulching, soil blankets, or mats.
			Indicate the location of refuse piles and debris box locations. Show how they will be accessed and show protection of the access routes.
			Construction Schedule
			Provide an anticipated construction schedule and/or construction duration (in weeks or months).
			Add the Following Standard Comments
			Point of contact. (Please provide a point of contact including name, title/qualification, email, and phone number. The point of contact will be the City's main point of contact if corrections are required).
			Perform clearing and earth-moving activities only during dry weather. Measures to ensure adequate erosion prevention and sediment control shall be installed prior to earth-moving activities and construction.
			Measures to ensure adequate erosion prevention and sediment control are required year-round. Stabilize all denuded areas and maintain erosion prevention measures continuously between from March 1 through November 1.
			Store, handle, and dispose of construction materials and wastes properly, to prevent their contact with storm water. No materials shall be stored on the street.
			Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, wash water, or sediments, and non-storm water discharges to storm drains and watercourses.
			Use sediment controls or filtration to remove sediment when dewatering site and obtain federal and state permits, as necessary.
			Avoid cleaning, fueling, or maintaining vehicles on site, except in a designated area where wash water is contained and treated. Limit and time applications of pesticides and fertilizers to prevent polluted runoff.
			Limit construction access routes to stabilized, designated access points.
			Avoid tracking dirt or other materials off site; clean off-site paved areas and sidewalks using dry sweeping methods.
			Train and provide instruction to all employees and subcontractors regarding the current version of the Montana Department of Environmental Quality Field Guide for Best Management Practices.
			Placement of erosion prevention materials at these locations is required on weekends and during rain events: (List locations)

Standard Comments (continued)			
City	**Applicant**	**NA**	
			The areas delineated on the plans for parking, grubbing, storage, etc., shall not be enlarged or "run over."
			Construction sites are required to have erosion prevention and sediment control materials on site during the "off-season."
			Erosion prevention and sediment control materials shall be stored on site.
			Tree protection shall be in place before any demolition, grading, excavating, or grubbing is started.

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Off-Site Storm Water Treatment Evaluation

Project Information

Project name:

Description of work:

Subdivision name (if applicable):

Site area (acres): Impervious surface created or altered (acres):

Runoff reduction volume (acre feet): Runoff reduction flow (cfs):

Project classification (check all that apply):

❑ New Development ❑ Redevelopment ❑ Residential ❑ Commercial

Regional Facility Considerations

Basin name:

Regional treatment facility to be utilized:

Design capacity of regional treatment facility:

Does the regional treatment facility have adequate capacity? ❑Yes ❑No

Technical Considerations

These criteria must be addressed in the technical report to support offsite treatment

Topography (Steep Slopes)	❑Yes	❑No	Space available	❑Yes	❑No
Soil infiltration rate	❑Yes	❑No	Shallow bedrock	❑Yes	❑No
Contaminated soils	❑Yes	❑No	Prohibitive costs	❑Yes	❑No
High groundwater	❑Yes	❑No	Down-gradient structures	❑Yes	❑No
City code/ordinance	❑Yes	❑No	Community development rules	❑Yes	❑No
Water quality benefits	❑Yes	❑No	Other	❑Yes	❑No

Additional Information

Evaluated by:_____ Date:_____

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Post-Construction Inspection Frequency Determination Form

Date:_____

Project Name:_____ **Permit No.:**_____

Address:_____ **Zip Code:**_____

Storm Water Management Control Type:_____ **Drainage Area Treated (acres):**_____

Owner Name:_____ **Phone Number:**_____

Owner Address:_____

In compliance with the Clean Water Act and the National Pollutant Discharge and Elimination System permit program—administered by the Montana Department of Environmental Quality as authorized by the U.S. Environmental Protection Agency—post-construction storm water management controls for all projects that required a *General Permit for Stormwater Discharges Associated with Construction Activity* shall be inspected by the City of Missoula, based upon their priority ranking.

Evaluated by:_____ **Department/Division:**_____

Post-Construction Storm Water Management Control Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 3.

Total	Priority	Inspection Frequency	Project Priority
6 to 20	Low	1. Annual self-inspection by the owner/operator 2. Five-year inspection by the City, with renewal fee	
21 to 60	Medium to High	1. Annual inspection by the City 2. Five-year inspection by the City, with renewal fee	

Post-Construction Storm Water Management Control Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Operation and Maintenance Needs (measured as the time between O&M activities for the control to function as designed)	Greater than or equal to five years	1	
	Once every one to five years	5	
	Annual or more often	10	
Proximity to waterbody (surface or sump/aquifer)	1,500+ feet	1	
	200 to 1,499 feet	5	
	<200 feet	10	
Location within an impaired waterbody watershed	No (sump/aquifer, Butler Creek, LaValle Creek, Pattee Creek, or Rattlesnake Creek)	1	
	Yes (Bitterroot River, Clark Fork River, Grant Creek, or Miller Creek)	10	
Land use type	Rural Agricultural/Residential	1	
	Urban Residential/Commercial	5	
	Industrial	10	
History of owner/operator non-compliance	No history of non-compliance	1	
	1 time non-compliant	5	
	2+ times non-compliant	10	
		Total	
6 to 20 = Low	21 to 40 = Medium	41 to 60 = High	

Permittees found to be habitually non-compliant may be subject to one or more disciplinary actions: compliance through the Missoula Valley Water Quality District Enforcement Response Plan; increased inspection frequency; formal Notice of Violation (NOV), including fine(s); loss of access to project site; and/or suspension/revocation of City Business License.

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POST-CONSTRUCTION STORM WATER MANAGEMENT CONTROL INSPECTION FORM

General Information	
Site Name (if Applicable):	Type of Control:
Location:	
Site Owner:	Phone Number:
Responsible Party:	Phone Number:
Date of Inspection:	Start/End Time:
Inspector's Name:	Inspector's Title:
Inspector's Contact Information (phone):	
Type of Inspection: ❑ Routine, Dry Weather ❑ Routine, Wet Weather ❑ Complaint Response ❑ Other _____	

Weather Information
Weather at time of this inspection: ❑ Clear ❑ Cloudy ❑ Raining ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:
Do you suspect that any physical changes or damages to the storm water management control may have occurred since the last inspection? ❑Yes ❑No
Are there any stormwater discharges at the time of inspection? ❑Yes ❑No If yes, provide location(s) and a description of stormwater discharged from the site (presence of suspended sediment, turbid water, discoloration and/or oil sheen, odor, etc…)

Prohibited Discharges
Are there any prohibited discharges at the time of inspection and/or any signs of prohibited discharges since the last inspection? ❑Yes ❑No If yes, provide location(s) and a description: Photos? ❑Yes ❑No If yes, please attached and/or provide filepath:

	Desired Conditions	Findings	Corrective Action Needed & Notes
1	There is no excessive sediment deposition.	❑Yes ❑No ❑N/A	
2	Slopes are well stabilized and are not contributing sediment to the stormwater management control.	❑Yes ❑No ❑N/A	
3	There is no scour in swales or other vegetated areas.	❑Yes ❑No ❑N/A	
4	Trash racks, inlets, outlets, and low flow orifices are clear of trash, debris, and sediment.	❑Yes ❑No ❑N/A	
5	There is no woody vegetation impeding the performance of any structural component of the stormwater management control.	❑Yes ❑No ❑N/A	
6	Outfall structures do not show signs of settling, cracking, bulging, misalignment or other structural deterioration.	❑Yes ❑No ❑N/A	
7	Embankments, emergency spillways, side slopes or inlet/outlet structures show no signs of erosion.	❑Yes ❑No ❑N/A	
8	Pipes going into and/or out of any stormwater management control are unclogged and unobstructed.	❑Yes ❑No ❑N/A	
9	There is no evidence of animal burrows, nesting, or other habitation.	❑Yes ❑No ❑N/A	
10	There is no trash or debris in the stormwater management control.	❑Yes ❑No ❑N/A	

	Desired Conditions	Findings	Corrective Action Needed & Notes
11	There are no encroachments on the stormwater management control.	❑Yes ❑No ❑N/A	
12	All necessary repairs to safety devices such as fences, gates, covers or locks are complete.	❑Yes ❑No ❑N/A	
13	There is not excessive algae or vegetation in the pond/ditch.	❑Yes ❑No ❑N/A	
14	The ground surface stabilization is retaining any highly erosive or unstable soils, seed germination is being properly facilitated, and any netting or blankets are properly fastened to obtain full contact with the ground.	❑Yes ❑No ❑N/A	
15	Storm water controls appear to be functioning as designed.	❑Yes ❑No ❑N/A	
16	Are there locations where additional stormwater management controls appear to be necessary?	❑Yes ❑No ❑N/A	
17	(Other)	❑Yes ❑No ❑N/A	

Describe any incidents of non-compliance or need for maintenance not described above:

Follow-up inspection required? ❑Yes ❑No	If yes, then date:

Inspector's Signature _____ Date _____

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DATE RECEIVED

POST-CONSTRUCTION STORM WATER MANAGEMENT PLAN REVIEW CHECKLIST

PROJECT NAME	Permit Number	ADDRESS
TOTAL PROJECT AREA		TOTAL DISTURBED AREA

Latitude: **Longitude:**

APPLICANT	ADDRESS	PHONE NUMBER
OWNER *(If different from Applicant)*	ADDRESS	PHONE NUMBER

Review History

First Review

Plan Received on: _____ **Approved/Denied:** _____
Review Completed on: _____ **Comments:** _____
Reviewed by: _____ _____

Second Review

Plan Received on: _____ **Approved/Denied:** _____
Review Completed on: _____ **Comments:** _____
Reviewed by: _____ _____

Third Review

Plan Received on: _____ **Approved/Denied:** _____
Review Completed on: _____ **Comments:** _____
Reviewed by: _____ _____

TECHNICAL REVIEW

____ The Post-Construction Storm Water Management Plan **includes** the necessary post-construction components, to comply with the State and local post-construction storm water requirements (identified in the attached checklist).

____ The Post-Construction Storm Water Management Plan **does not include** the necessary components (identified in the attached checklist), to comply with State and local post-construction storm water requirements through failure to include the following:

Reviewed by: _____

Signature: _____ **Date:** _____

Project Name: Applicant:

General Information	Complete	Incomplete	N/A
1. Location	☐	☐	☐
a. Address, subdivision name, legal description, etc…	☐	☐	☐
2. Type of development (residential, commercial, etc...)	☐	☐	☐
3. Areas (ac)	☐	☐	☐
a. Total disturbed area	☐	☐	☐
b. Existing impervious area	☐	☐	☐
c. Post-development impervious area	☐	☐	☐
4. Drainage basin maps are provided which clearly label the following:	☐	☐	☐
a. Existing basin boundaries	☐	☐	☐
b. Existing time of concentration flowpaths for each basin	☐	☐	☐
c. Post-development basin boundaries	☐	☐	☐
d. Post-development time of concentration flowpaths for each basin	☐	☐	☐
e. Discharge location(s)	☐	☐	☐
f. Receiving waters within 200 feet of project are identified	☐	☐	☐
5. Montana Licensed Engineer Stamp	☐	☐	☐
Drainage Plan Content			
1. Topographic map of existing and finished grade contours at 2-foot max intervals	☐	☐	☐
2. Location of each permanent storm water control	☐	☐	☐
3. Plan and profile of each permanent storm water control	☐	☐	☐
4. Invert elevations, slopes, and lengths of storm drain facilities	☐	☐	☐
5. Size, types, invert elevations and lengths of all culverts and pipe systems	☐	☐	☐
6. Discharge points clearly labeled	☐	☐	☐
7. Receiving surface waters identified	☐	☐	☐
8. Existing on-site natural resources identified and protected	☐	☐	☐
9. FEMA floodplains identified	☐	☐	☐
Calculations and Design Documentation			
1. Hydrology calculations	☐	☐	☐
a. State runoff method used (rational, SCS, etc…)	☐	☐	☐
b. State modeling constants and assumptions	☐	☐	☐
c. Description of design storms (frequency, depth, duration)	☐	☐	☐
d. Existing and post-development land uses	☐	☐	☐
e. Existing and post-development peak runoff rate for each design storm	☐	☐	☐
f. Existing and post-development runoff volume for each design storm	☐	☐	☐

Project Name: Applicant

Calculations and Design Documentation (Continued)			Complete	Incomplete	N/A
2.	Post-construction BMP sizing calculations		☐	☐	☐
a.	State design requirements (0.5-inch requirement, TSS removal, or other)		☐	☐	☐
b.	Required permanent controls capacities, flow rates, and operating levels		☐	☐	☐
c.	Sizing calculations with results		☐	☐	☐
d.	A statement documenting compliance with design requirements		☐	☐	☐
e.	If 0.5-inch or TSS removal requirements are not met, provide documentation showing the impracticability of infiltration, evapotranspiration, capture for reuse, and treatment.		☐	☐	☐
3.	Culvert and pipe system capacities and outlet velocities		☐	☐	☐
4.	Ditch capacities and velocities		☐	☐	☐
Additional Information					
1.	Permits, easements, setbacks, and discharge agreements		☐	☐	☐
2.	Floodplain maps		☐	☐	☐
3.	Operations and Maintenance Manual for each permanent storm water control		☐	☐	☐
a.	Identify the owner		☐	☐	☐
b.	Identify the party responsible for long-term O&M		☐	☐	☐
c.	A schedule of inspection and maintenance for routine and non-routine maintenance tasks to be conducted		☐	☐	☐
d.	System failure and replacement criteria to define the structure's performance requirements		☐	☐	☐
4.	Geotechnical Report		☐	☐	☐

Public Works
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MISSOULA
HUB OF FIVE VALLEYS
Storm Water Utility

Appendix I
Water Sampling Plan

Storm Water Utility

Water Sampling Plan

City of Missoula
Public Works Department
Storm Water Utility Division
435 Ryman Street
Missoula, Montana 59802-4297

December 2019

Contents

TABLES

FIGURES

ABBREVIATIONS

BMPs	best management practices
City	City of Missoula
HDS	hydrodynamic separator
MDEQ	Montana Department of Environmental Quality
MPDES	Montana Pollution Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
SWMP	Storm Water Management Program
TMDL	total maximum daily load
WLA	wasteload allocation

1 INTRODUCTION

The City of Missoula (City) operates its storm water system under the authorization of the Montana Pollution Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s), hereafter referred to as the MS4 General Permit. The current MS4 General Permit, issued by the Montana Department of Environmental Quality (MDEQ), is effective from January 1, 2017 through December 31, 2021.

In accordance with Part III of the MS4 General Permit, the City is required to develop a sampling plan for total maximum daily load (TMDL)-related monitoring and include a TMDL section in its Storm Water Management Program (SWMP). The results from the TMDL-related monitoring will be used in conjunction with the TMDL section of the SWMP to address applicable TMDLs. Similarly, Part IV of the MS4 General Permit requires semi-annual monitoring (self-monitoring) that may be satisfied entirely or in part by the TMDL-related monitoring required under Part III.

1.1 Purpose

The purpose of this sampling plan is to describe the City's storm water quality monitoring program for the 2017 through 2021 permit term.

- The City has selected TMDL-related monitoring Option 2; therefore, this plan will be implemented to track and evaluate effectiveness of best management practices (BMPs) selected for reducing MS4 loading to impaired waterbodies.
- In accordance with the MS4 General Permit requirements, this plan will ultimately become part of the TMDL section of the City's SWMP.
- The City has selected self-monitoring Option 2 (see Part IV of the MS4 General Permit). The TMDL-related monitoring locations identified in this plan will also be used to fulfill the self-monitoring requirements.
- This document, when implemented, will fulfill the requirements of Part III.B of the MS4 General Permit for completing a sampling plan for TMDL-related monitoring.

2 MS4 Outfalls

The City is situated within the Middle Clark Fork and Bitterroot Subbasins, with eight subwatersheds intersecting the City limits (Table 1). Four of these subwatersheds have MS4 outfalls to a surface water. Within these four subwatersheds, 60 outfalls discharge storm water to one of eight waterbodies: five

streams and three irrigation ditches. Three of these five streams are listed as impaired (MDEQ, 2018a and b).

Table 1. City of Missoula storm water outfalls per subwatershed and waterbody

HUC[1] 8 Subbasin	HUC 12 Subwatershed	Waterbody	Outfalls
Middle Clark Fork (17010204)	Butler Creek (170102040201)	Butler Creek	0
	Grant Creek (170102040103)	Flynn Lowney Ditch	1
		Grant Creek[IMP]	5
	La Valle Creek (170102040202)	La Valle Creek	0
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	13
	Marshall Creek-Clark Fork (170102040104)	Clark Fork River[IMP]	28
		Orchard Homes Ditch Company	6
		Missoula Irrigation District	1
	Martin Gulch-Clark Fork (170102040205)	Clark Fork River[IMP]	0
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)	Bitterroot River[IMP]	1
		Pattee Creek	5
	Miller Creek (170102051601)	Miller Creek[IMP]	0
		Total	**60**

[1]U.S. Geological Survey Hydrologic Unit Code
[IMP]Impaired surface water per *Montana Department of Environmental Quality Water Quality Integrated Report* (MDEQ, 2018a and b).

2.1 TMDL Overview

Three impaired waterbodies receive storm water discharge from the City's MS4 outfalls:

- Bitterroot River
- Clark Fork River
- Grant Creek

MDEQ has assigned some wasteload allocations (WLAs) to the City's MS4, per TMDLs for the Bitterroot River (MDEQ and USEPA, 2014); Clark Fork River metals (MDEQ, 2014c); Clark Fork River non-metals (Tri-State Implementation Council, 1998); and Grant Creek (MDEQ, 2014a and b) (Table 2). A map of the subwatersheds that intersect the City's boundary is provided in Figure 1.

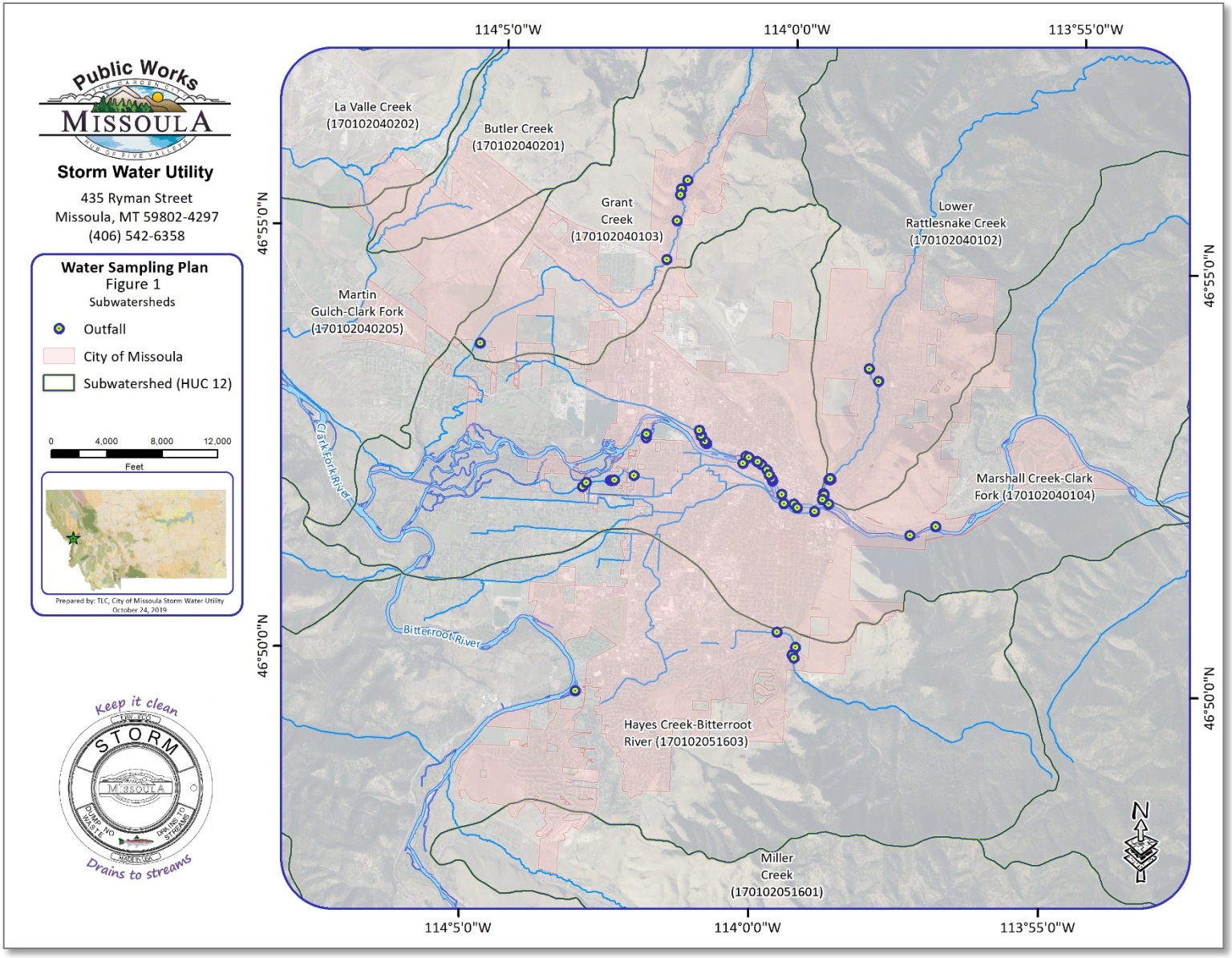

Figure 1. Subwatersheds that intersect the City of Missoula

Table 2. Wasteload allocations (WLAs) for the City of Missoula's MS4[1]

Surface Water	Waterbody ID	Pollutant	TMDL[2]	MS4 WLA
Bitterroot River	MT76H001_030	Lead	9.23 to 27.0 lbs/day[3]	0.08 lbs/day
		Temperature	1,853 kcal/sec	*
Clark Fork River, Blackfoot River to Rattlesnake Creek	MT76M001_030	Arsenic	136.08 to 626.4 lbs/day[3]	**
		Cadmium	4.24 to 14.47 lbs/day[3]	**
		Chlorophyll-a	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	149.41 to 487.04 lbs/day[3]	0.009 lbs/day
		Iron	13,608 to 62,640 lbs/day[3]	**
		Lead	55.19 to 151.93 lbs/day[3]	0.0045 lbs/day
		Total Nitrogen	300 µg/L	***
		Total Phosphorus	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
		Zinc	1,916 to 6,265 lbs/day[3]	0.00004 lbs/day
Clark Fork River, Rattlesnake Creek to Fish Creek	MT76M001_020	Chlorophyll α	100 mg/m^2 (summer mean) and 150 mg/m^2 (peak)	***
		Copper	219.9 to 747.9 lbs/day[3]	1.1 lbs/day
		Iron	30,915 to 129,600 lbs/day[3]	**
		Lead	65.7 to 201.6 lbs/day[3]	0.51 lbs/day
		Total Nitrogen	300 µg/L	***
		Total Phosphorus	20 µg/L (upstream of Reserve Street bridge) and 39 µ/L (downstream)	***
Grant Creek	MT76M002_130	Total Nitrogen	31.72 lbs/day	0 lbs/day
		Sediment	1,440.2 tons/year	7.8 tons/year
		Temperature	470 kcal/sec	0 kcal/sec

[1]municipal separate storm sewer system
[2]Total Maximum Daily Load
[3]Low to high flow
*Because there are no point sources, there is no WLA (MDEQ and USEPA, 2014).
**Insufficient data were available to provide numeric load estimates (MDEQ, 2014c).
***The TMDL was established prior to the creation of WLAs (Tri-State Implementation Council, 1998).

2.2 TMDL Strategy

Part III.B of the MS4 General Permit specifies that the City shall develop and implement a section of their SWMP to address TMDLs. More specifically, the City shall identify the storm water control measures and BMPs it plans to implement, describe the City's impairment priorities and long-term strategy, and outline interim milestones for managing the discharge of the pollutants of concern. The City will evaluate existing and potential monitoring locations in watersheds where future BMPs are aimed at reducing pollutants of impairment for its receiving waterbodies. Additional discussion of target pollutants and impairment priorities will be provided within the TMDL section of the SWMP.

3 Monitoring Locations and Strategies

The city has selected six locations for sampling (Figure 2). Two sites contribute flow to the Bitterroot River, two to the Clark Fork River, one to Grant Creek, and one is on the Clark Fork River, upstream of the MS4. The outfall site IDs concur with the City's Public Works Department infrastructure asset IDs. We chose to use these IDs because it facilitates long-term tracking and comparative analysis, since these IDs are static. Once we have sufficient data, we will calculate site-specific long-term medians.

3.1 Detention Basin Performance in a Residential Area

Due to significant flooding in the Pattee Creek and South Hills area, the City invested in major storm water infrastructure improvements—South Hills Storm Drain System—from the late 70s and early 2000s. Steep roads in the Pattee Canyon area necessitate the use of sand and gravel during the winter. This has the potential to enter Pattee Creek and cause negative impacts from increased sedimentation. Sediment is the most common pollutant in waterbodies across the U.S., accelerating erosion and degrading ecosystems. Thus, to prevent the excess sediment from entering Pattee Creek and the Bitterroot River, the City constructed several settling ponds in 2003: Bancroft Ponds, Cattail Corner, and Pattee Creek Grit Chamber. These detention basins slow the flow of water and allow particulates to settle to the bottom. The depth of the sediment in the ponds is measured annually and the ponds are excavated when necessary to ensure these BMPs function as designed. The South Hills Storm Drain System terminates at the Bitterroot River. Figure 3 depicts the storm water infrastructure connected to these outfalls; the inlets and sumps are not shown because they would overwhelm the map.

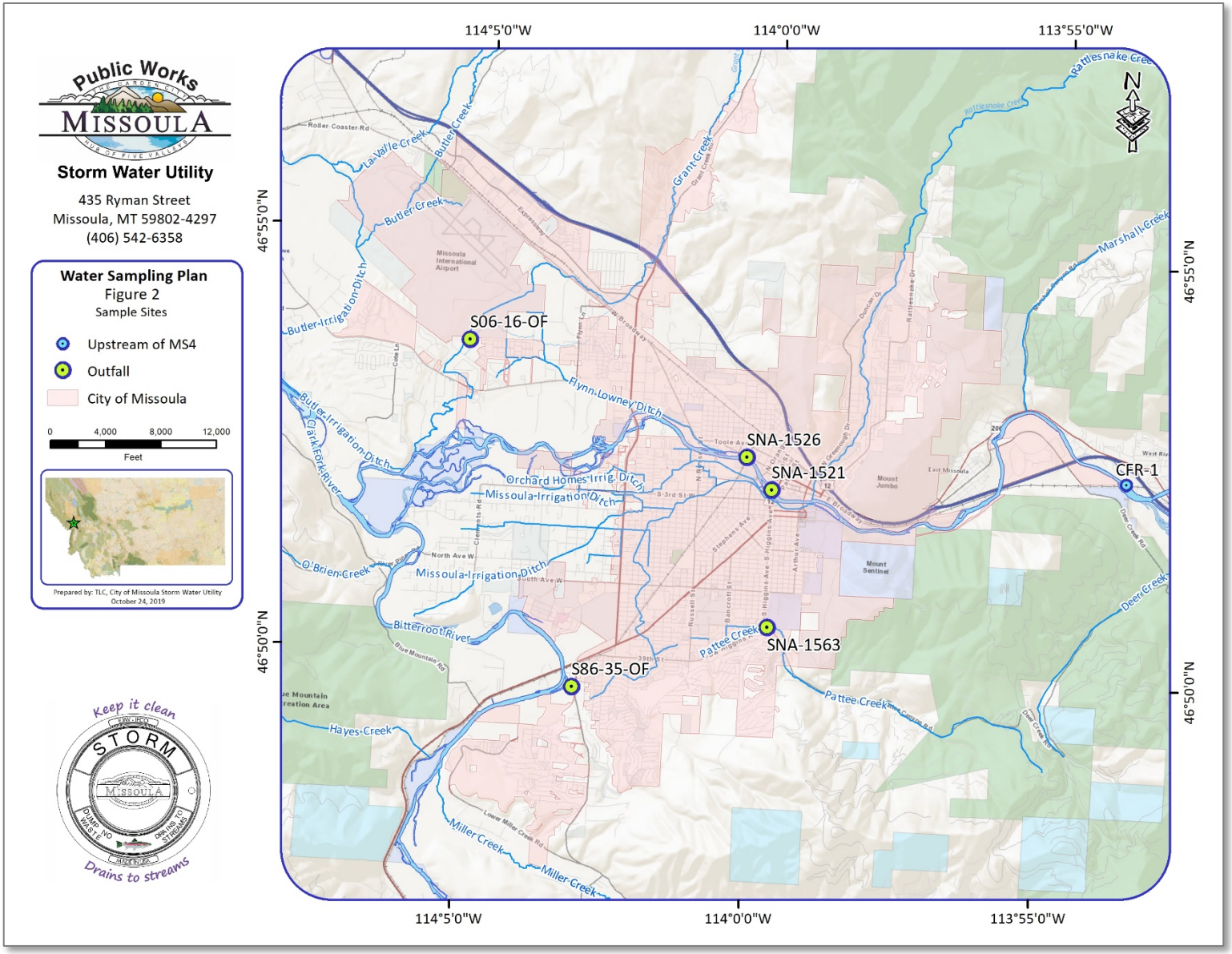

Figure 2. City of Missoula storm water monitoring sites

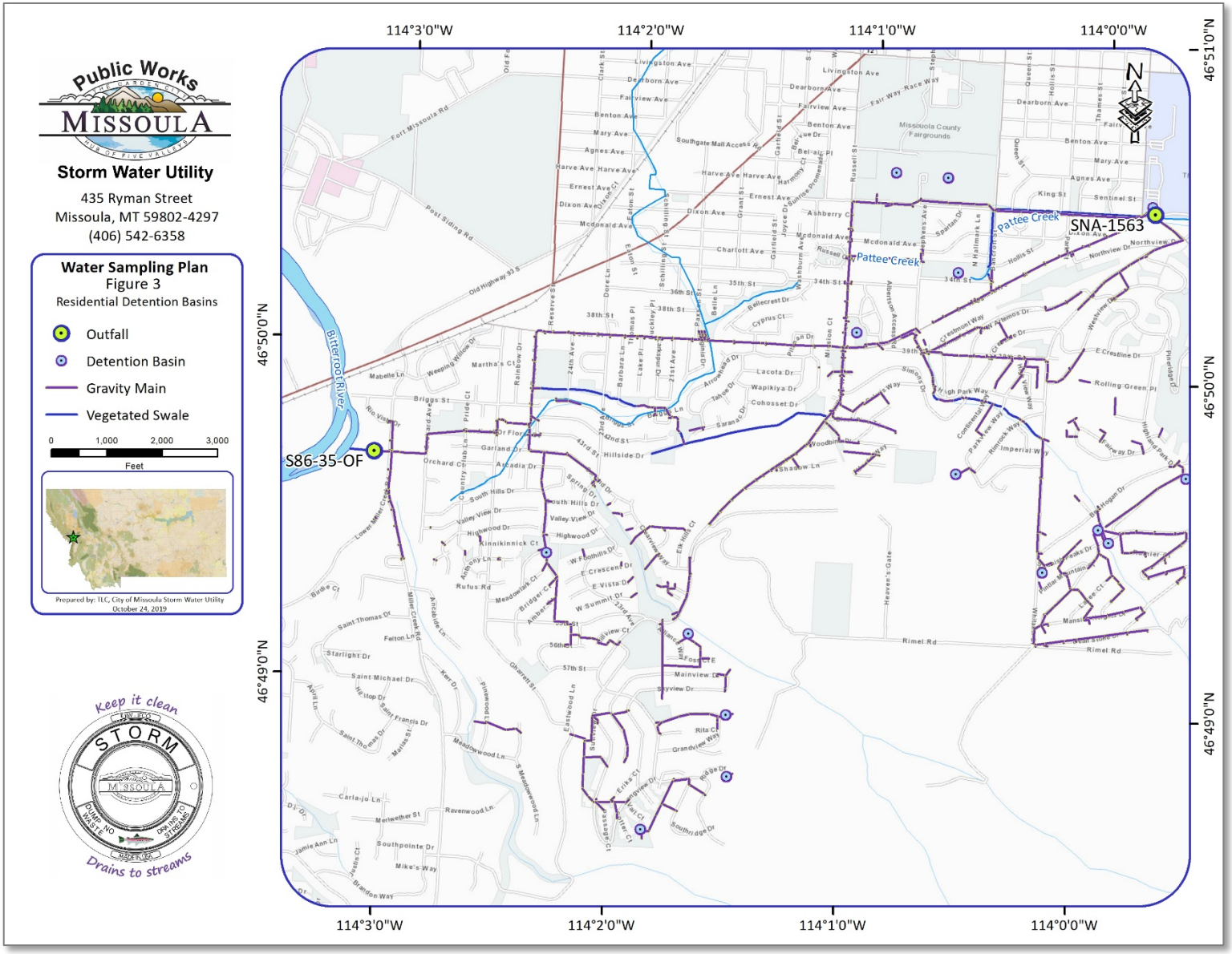

Figure 3. Sample sites for evaluating detention basin performance in a residential area

While sediment is not considered a pollutant of impairment for the Bitterroot River, without these settling ponds, it has greater potential to enter the river and cause negative impacts. Thus, it is important to monitor the effectiveness of these BMPs. In the City's MS4 area, there are approved TMDLs for temperature and lead for the Bitterroot River. Artificially induced water-temperature changes in streams, caused by the release of water from upstream impoundments, may adversely affect downstream aquatic ecosystems. Moreover, the age of the pipes in this system may contribute to lead loads. Thus, we chose two sites in the South Hills Storm Drain System: upstream of the detention basins (SNA-1563) and at the system's terminus at the Bitterroot outfall (S86-35-OF). Site SNA-1563 enters Pattee Creek above the Grit Chamber and the Bitterroot outfall (Site S86-35-OF) flows into a 450-foot-long vegetated swale before reaching the river. The predominant land use that contributes to flows is residential.

These sites fulfil both TMDL-related monitoring and self-monitoring requirements. Thus, in addition to the TMDL parameters for the Bitterroot River (temperature and lead), the samples will also be analyzed in accordance with Table 1 in Part IV.A of the MS4 General Permit. The results of this evaluation will be used to assist the City in making informed decisions about installing detention ponds, or similar BMPs, in other locations.

Table 3. Site Summary: Evaluation of Detention Pond Performance in a Residential Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
SNA-1563	22.8	3,870	22
S86-35-OF	1,969	110,608	523

3.2 Hydrodynamic Separator Performance in a Commercial Area

The City installed a hydrodynamic separator (HDS) at Caras Park in 2017, to screen, separate, and trap debris, sediment, and hydrocarbons from storm water runoff before it enters the Clark Fork River. To evaluate its effectiveness, we will sample the outfall that is connected to the HDS: SNA-1521 and an outfall without an HDS: SNA-1526. Both sites drain commercial areas in downtown Missoula, in the reach from Rattlesnake Creek to Fish Creek. Figure 4 depicts the storm water infrastructure connected the outfalls, in addition to showing sumps within the vicinity.

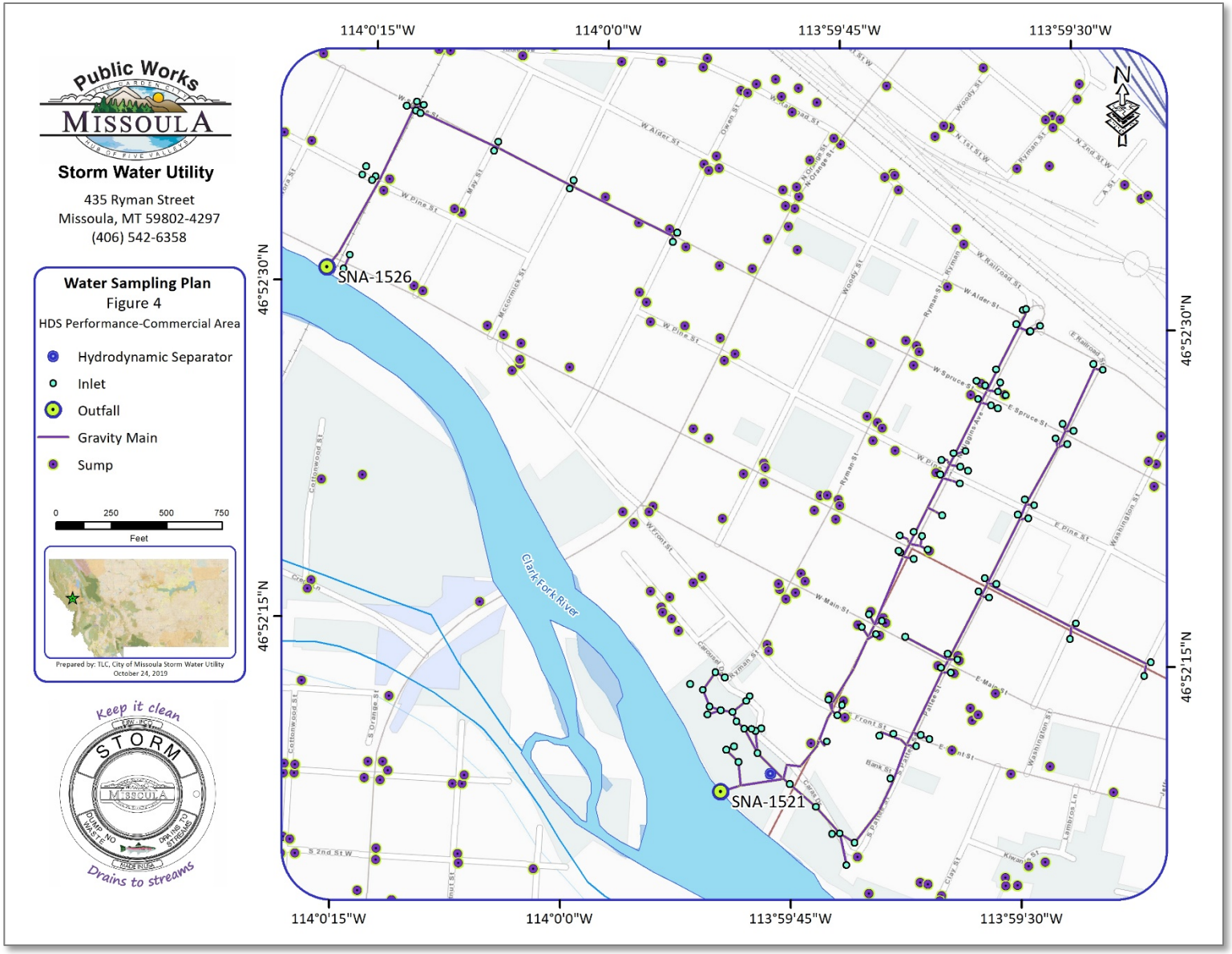

Figure 4. Sample sites for evaluating hydrodynamic separator performance in a commercial area

The samples will be analyzed for the TMDL parameters in this reach and for the reach from the Blackfoot River to Rattlesnake Creek: arsenic, cadmium, copper, iron, lead, zinc, total nitrogen, total phosphorus, and chlorophyll α. There are few City outfalls in the upstream reach; and of the few that exist, they drain small, residential areas and do not provide meaningful data for comparison. Thus, we have chosen to apply these TMDLs to all samples within the Marshall Creek-Clark Fork River subwatershed (HUC 170102040104). Further, the samples will be analyzed in accordance with Table 1 in Part IV.A of the MS4 General Permit; these sites fulfill both the TMDL-related monitoring and self-monitoring requirements. The results of this evaluation will be used to assist the City in making informed decisions about installing an HDS, or similar BMPs, in other commercial locations.

Table 4. Site Summary: Evaluation of Hydrodynamic Separator Performance in a Commercial Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
SNA-1521	59.5	10,456	92
SNA-1526	20	2,519	17

3.3 Hydrodynamic Separator Performance in a Residential Area

The City installed an HDS at the 44 Ranch outfall in 2006, to treat storm water before it enters Grant Creek. To evaluate its effectiveness, we will sample the outfall that is connected to the HDS: S06-16-OF. Figure 5 depicts the storm water infrastructure connected to this outfall. In addition to TMDL parameters for Grant Creek (temperature, total nitrogen, and total suspended solids), the samples will also be analyzed in accordance with Table 1 in Part IV.A of the MS4 General Permit. This site fulfills the TMDL-related monitoring requirements for Grant Creek. The results of this evaluation will be used to assist the City in making informed decisions about installing an HDS, or similar BMPs, in other residential locations.

Table 5. Site Summary: Evaluation of Hydrodynamic Separator Performance in a Residential Area

Facility ID	Drainage Area (acres)	Pipe (feet)	Inlets
S06-16-OF	106	15,644	88

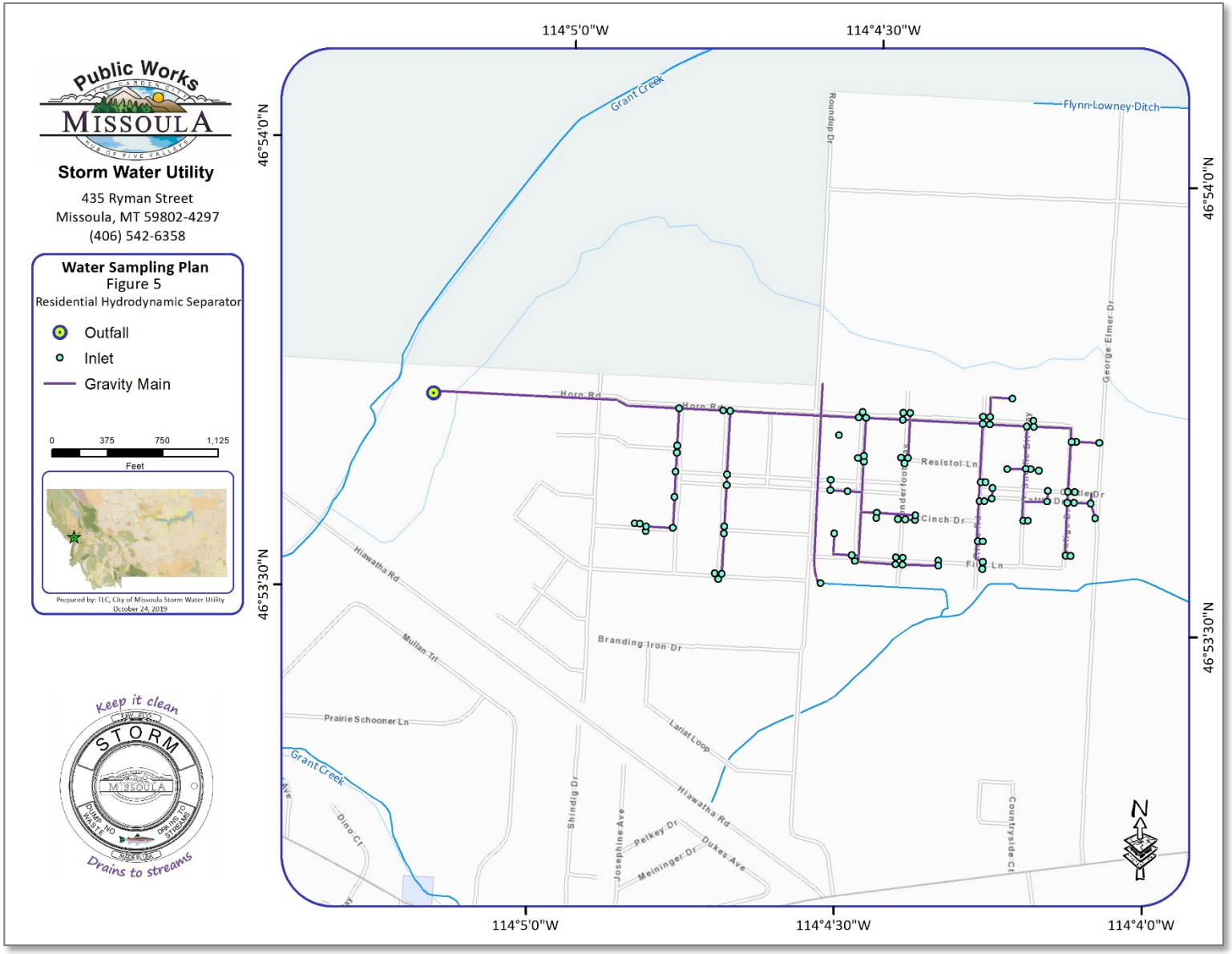

Figure 5. Sample site for evaluating hydrodynamic separator performance in a residential area

3.4 Water Quality Upstream of the City of Missoula

Per self-monitoring requirement for Monitoring Option 2, the City must sample at least one location upstream, outside the MS4 boundary. We have chosen a sampling location on the Clark Fork River, from the Blackfoot River to Rattlesnake Creek, off Juniper Drive at the Milltown State Park Confluence Area (Site CFR-1, Figure 2). The samples will be analyzed for the TMDL parameters identified for both reaches of the Clark Fork River in the City's MS4 boundary. In addition to TMDL parameters, the samples will also be analyzed in accordance with Table 1 in Part IV.A of the MS4 General Permit. This site fulfills the self-monitoring requirements of the MS4 General Permit. The purpose of these samples is to evaluate water quality entering the City of Missoula.

4 Monitoring Requirements

Quality assurance/quality control (QA/QC) is critical for accurate sampling. This section provides details of sampling methods, laboratory analytical methods, and QA/QC procedures for sampling.

4.1 Field Sampling Methods

The City will use manual sample collection techniques to conduct monitoring activities at each site in the immediate future. In the coming years, automated samplers may be used to collect composite samples. Each of these methods is described below.

4.1.1 Manual Sample Collection

Manual techniques will be used to collect grab samples by field personnel during rainfall events. Grab samples are collected at one location, at one point in time. Rainfall events will be monitored using on-site conditions and data provided by the National Oceanic and Atmospheric Administration's Nation Weather Service for the Missoula International Airport weather station. Thus, field personnel can determine when to be present in the watershed during active events to obtain manual samples. The samples will be collected in clean, labeled bottles provided by Energy Laboratories, Inc. (Billings, MT). If necessary, an extension pole, rope, or other apparatus can be used to aid the field crew in safe sample collection, especially during high flow conditions.

4.1.2 Automated Sample Collection

If installed, automated sampling devices will be used to collect composite samples: multiple grab samples taken over time throughout a runoff event. Composite sampling provides an event mean concentration of pollutants during a runoff event. However, additional experience and understanding of site-specific conditions is needed prior to installing sampling devices. Our long-term goal is to effectively and accurately collect and analyze composite samples.

If automated sampling is implemented, the City expects that flow-weighted sampling would be used by collecting multiple aliquots (small samples) over the duration of the storm in one bottle, which will be shipped to Energy Laboratories for analysis following the storm event.

4.1.3 Sampling Equipment Decontamination

Decontaminated sample collection bottles and lids will be provided by Energy Laboratories.

4.2 Sampling Parameters and Analytical Methods

The water quality samples will be analyzed for the listed pollutants of impairment in the specific receiving waterbody, as well as the parameters listed in Table 1 of Part IV.A in the MS4 General Permit (Small MS4 Monitoring Requirements). Table 6 shows the parameters and standard analytical methods that will be used.

Table 6. Sampling parameters and analytical methods

Parameter	Reporting Limit (mg/L)	Method	Sample Container	Preservative
Total Suspended Solids	1	A2540 D	1 L plastic	None
Chemical Oxygen Demand	1	E410.4	500 mL plastic	H_2SO_4
Phosphorus, Total	0.01	E365.1	250 mL plastic	H_2SO_4
Nitrogen, Total Kjeldahl (TKN)	0.2	E351.2		
Nitrogen, Nitrate + Nitrite (NO_3+NO_2)	0.01	E353.2		
Nitrogen, Total (TKN+NO_3+NO_2)	0.21	Calculation		
Total Recoverable Metals		E200.8	250 mL plastic	HNO_3
Arsenic (As)	0.001			
Cadmium (Cd)	0.00003			
Copper (Cu)	0.002			
Iron (Fe)	0.02			
Lead (Pb)	0.0003			
Zinc (Zn)	0.008			
Oil & Grease	1	E1664A	1 L glass (×2)	H_2SO_4
Phosphorus, Orthophosphate	0.01	E365.1	120 mL plastic, filtered	None
Chlorophyll α	0.98 mg/m^3	A10200 H	1 L amber glass, aluminum foil	None
Estimated Flow	NA	varies	Field Analysis	None
Temperature	NA	YSI ProDSS	Field Analysis	None
pH	NA	YSI ProDSS	Field Analysis	None
Conductivity	NA	YSI ProDSS	Field Analysis	None
Total Dissolved Solids	NA	YSI ProDSS	Field Analysis	None

All data shall meet the precision, recovery, and accuracy requirements specified in the laboratory method. Additionally, the laboratory will use a combination of blanks, laboratory control spikes, surrogates, and duplicates to evaluate the analytical results.

4.3 Sample Handling and Documentation

Where applicable, automatic samplers will be serviced immediately following a storm event. Chain of custody forms will accompany all samples that are submitted for analysis. An Outfall Reconnaissance/Sample Collection form will be kept for each sampling site with the date, time, personnel, and purpose of visit, weather, and conditions observed, samples collected, and actions performed.

4.4 Storm Events and Sample Frequency

Sampling will be attempted for measurable runoff events: ≥ 0.10 inch within 24 hours. In accordance with Part IV.a.6.a. of the MS4 General Permit, a minimum of one sample will be collected at each site between January 1st and June 30th and a minimum of one sample will be collected at each site between July 1st and December 31st of each year.

Precipitation will be monitored using a combination of on-site conditions and precipitation data provided by the National Oceanic and Atmospheric Administration's Nation Weather Service for the Missoula International Airport weather station. These data may be used to delineate storm characteristics, if necessary (timing, duration, intensity, and relative total rainfall).

4.5 Analysis of Results

Using Microsoft Excel, we will amalgamate the results for comparative analysis. After we have collected at least one full year of samples, we will compare percent changes in pollutant concentration to analyze detention basin performance in a residential area (SNA-1563 and S86-35-OF).

$$\%\triangle = [(\alpha - \beta)/\alpha] \times 100$$

α = pollutant-specific concentration (mg/L) at S86-35-OF

β = pollutant-specific concentration (mg/L) at SNA-1563

To evaluate HDS performance in a commercial area, we will use the same formula. Where α is the concentration at the site without an HDS (SNA-1526) and β is the concentration at the site with an HDS (SNA-1521). The calculated percent change for each sample collected will be presented on a graph (sample date vs. percent change) to assess the long-term performance of the BMP.

For the other samples (CFR-1 and S06-16-OF), graphs will be generated showing sample date and pollutant-specific concentration for each parameter. These graphics will show the trend in water quality data over time.

5 Reporting

The results from TMDL-related monitoring will be presented and discussed in each year's MS4 annual report. The discussion will focus on the evaluation of the effectiveness of BMPs being implemented to address pollutants of impairment within each local watershed as well as changes in water quality over time.

6 REFERENCES

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Appendix A - Photographs

SNA-1563, Pattee Creek above the Grit Chamber (November 19, 2019, wet weather)

S86-35-OF, Bitterroot Outfall (September 19, 2019, dry weather)

SNA-1521, Caras Park Outfall (September 5, 2019, dry weather)

SNA-1526, Clark Fork River downstream of railroad bridge (November 19, 2019, wet weather)

S06-16-OF, Grant Creek outfall at 44 Ranch (November 19, 2019, wet weather)

CFR-1, Clark Fork River upstream of the City of Missoula MS4 (October 22, 2019, wet weather)

Appendix B – Sampling Results

Pattee Creek above Grit Chamber (MS4 Asset ID SNA-1563)

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

	Parameter	Method	April 13, 2017	September 15, 2017	April 12, 2018	October 4, 2018	April 8, 2019	November 19, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	1.15	5.600	41.800	21.000	152.20	80
	Chemical Oxygen Demand (mg/L)	E410.4	<3	32.640	29.940	58.370	35.730	101
	Total Phosphorus (mg/L)	E365.1	<0.15	0.15	<0.10	0.275	0.160	0.527
	Total Nitrogen (mg/L)	Calculation	2.9	2.43	1.902	1.874	1.530	1.6
	pH (standard units)	Field Probe	8.23	7.87	7.87	7.85	7.3	7.89
	Copper (mg/L)	E200.8	ND	0.003	0.004	0.005	0.01	0.007
	Lead (mg/L)	E200.8	ND	0.0004	0.0016	0.0009	0.0043	0.0027
	Zinc (mg/L)	E200.7	ND	0.018	0.026	0.032	0.048	0.047
	Estimated Flow (gpm)	Field Measurement	20	9.89	33	30	60	74.8
	Oil and Grease (mg/L)	E1664A	1.95	1.2	1.63	0.586	1.79	2
	Temperature (°C)	Field Probe	9.3	12.8	7.4	10.2	8.2	6.7
TMDLs	**Lead (mg/L)**	E200.8	ND	0.0004	0.0016	0.0009	0.0043	0.0027
	Temperature (°C)	Field Probe	9.3	12.8	7.4	10.2	8.2	6.7

Bitterroot Swale Inflow (MS4 Asset ID S86-35-OF)

Receiving Water - Bitterroot River (MT76H001_030)

	Parameter	Method	November 19, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	62
	Chemical Oxygen Demand (mg/L)	E410.4	108
	Total Phosphorus (mg/L)	E365.1	0.396
	Total Nitrogen (mg/L)	Calculation	1.4
	pH (standard units)	Field Probe	7.89
	Copper (mg/L)	E200.8	0.009
	Lead (mg/L)	E200.8	0.0024
	Zinc (mg/L)	E200.7	0.058
	Estimated Flow (gpm)	Field Measurement	1987.54
	Oil and Grease (mg/L)	E1664A	1
	Temperature (°C)	Field Probe	5.9
TMDLs	**Lead (mg/L)**	E200.8	0.0024
	Temperature (°C)	Field Probe	5.9

Caras Park Outfall (MS4 Asset ID SNA-1521)

Receiving Water - Clark Fork River (MT76M001_020)

	Parameter	Method	October 22, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	ND
	Chemical Oxygen Demand (mg/L)	E410.4	8
	Total Phosphorus (mg/L)	E365.1	0.049
	Total Nitrogen (mg/L)	Calculation	1.3
	pH (standard units)	Field Probe	7.43
	Copper (mg/L)	E200.8	0.002
	Lead (mg/L)	E200.8	0.0003
	Zinc (mg/L)	E200.7	0.015
	Estimated Flow (gpm)	Field Measurement	62.5
	Oil and Grease (mg/L)	E1664A	ND
	Temperature (°C)	Field Probe	9.8
TMDLs	**Arsenic (mg/L)**	E200.8	ND
	Cadmium (mg/L)	E200.8	ND
	Iron (mg/L)	E200.7	0.07
	Chlorophyll-a (mg/m^3)	A10200 H	ND
	Orthophosphate (mg/L)	E365.1	0.042
	Nitrate/nitrite (mg/L)	E353.2	1.31

Clark Fork River outfall, downstream of RR Bridge (MS4 Asset ID SNA-1526)

Receiving Water - Clark Fork River (MT76M001_020)

	Parameter	Method	November 19, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	90
	Chemical Oxygen Demand (mg/L)	E410.4	119
	Total Phosphorus (mg/L)	E365.1	0.284
	Total Nitrogen (mg/L)	Calculation	1.5
	pH (standard units)	Field Probe	8.07
	Copper (mg/L)	E200.8	0.011
	Lead (mg/L)	E200.8	0.005
	Zinc (mg/L)	E200.7	0.123
	Estimated Flow (gpm)	Field Measurement	20.1
	Oil and Grease (mg/L)	E1664A	2
	Temperature (°C)	Field Probe	6.8
TMDLs	**Arsenic (mg/L)**	E200.8	0.001
	Cadmium (mg/L)	E200.8	0.00005
	Iron (mg/L)	E200.7	2.6
	Chlorophyll-a (mg/m^3)	A10200 H	3.4
	Orthophosphate (mg/L)	E365.1	0.123
	Nitrate/nitrite (mg/L)	E353.2	0.36

44 Ranch Hiawatha Outfall (MS4 Asset ID S06-16-OF)

Receiving Water - Grant Creek (MT76M002_130)

	Parameter	Method	November 19, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	31
	Chemical Oxygen Demand (mg/L)	E410.4	68
	Total Phosphorus (mg/L)	E365.1	0.208
	Total Nitrogen (mg/L)	Calculation	1
	pH (standard units)	Field Probe	7.71
	Copper (mg/L)	E200.8	0.008
	Lead (mg/L)	E200.8	0.0014
	Zinc (mg/L)	E200.7	0.031
	Estimated Flow (gpm)	Field Measurement	40
	Oil and Grease (mg/L)	E1664A	1
	Temperature (°C)	Field Probe	5.2
TMDLs	**Nitrate/nitrite (mg/L)**	E353.2	0.21
	Temperature (°C)	NA	5.2

Confluence State Park (CFR-1, upstream of MS4)

Receiving Water - Clark Fork River (MT76M001_030)

	Parameter	Method	October 22, 2019
Self-reporting requirements	**Total Suspended Solids (mg/L)**	A2540 D	ND
	Chemical Oxygen Demand (mg/L)	E410.4	ND
	Total Phosphorus (mg/L)	E365.1	0.005
	Total Nitrogen (mg/L)	Calculation	ND
	pH (standard units)	Field Probe	8.3
	Copper (mg/L)	E200.8	ND
	Lead (mg/L)	E200.8	ND
	Zinc (mg/L)	E200.7	ND
	Estimated Flow (gpm)	USGS Stream Gage	866,184
	Oil and Grease (mg/L)	E1664A	ND
	Temperature (°C)	Field Probe	5.7
TMDLs	**Arsenic (mg/L)**	E200.8	ND
	Cadmium (mg/L)	E200.8	ND
	Iron (mg/L)	E200.7	0.04
	Chlorophyll-a (mg/m^3)	A10200 H	1.1
	Orthophosphate (mg/L)	E365.1	ND
	Nitrate/nitrite (mg/L)	E353.2	0.02

Appendix C – Data Sheets

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Grant Creek		Outfall ID: S06-16-OF	
Today's date: 11/19/2019		Time (Military): 0930	
Investigators: Tracy Campbell, Marie Noland		Form completed by: TLC	
Temperature (°F): 41°	Rainfall (in.): Last 24 hours: .21	Last 48 hours: .21	
Latitude: 114°5'11.963"W	Longitude: 46°53'43.394"N	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Development in progress in the vicinity

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 42"	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume	2 gal	Gallon	Bucket
	Time to fill	3.023s	sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		5.2°	°C	Multi-probe
pH		7.71	pH Units	Multi-probe
Conductivity		187.1 SPC	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		122	mg/L	Multi-probe

Estimated flow = 40 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☒ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☒	☐ Clear ☒ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☒ 3 – Clearly visible in outfall flow
Turbidity	☒	See severity	☐ 1 – Slight cloudiness	☒ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	☐ Potential (presence of two or more indicators)	■ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1.	Sample for the lab?	■ Yes	☐ No		
2.	If yes, collected from:	■ Flow	☐ Pool		
3.	Intermittent flow trap set?	☐ Yes	■ No	If Yes, type: ☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: S86-35-OF	
Today's date: 11/19/2019		Time (Military): 1040	
Investigators: Tracy Campbell, Marie Noland		Form completed by: TLC/MN	
Temperature (°F): 41°	Rainfall (in.): Last 24 hours: .21	Last 48 hours: .21	
Latitude: 114°3'5.642"W	Longitude: 46°49'40.282"N	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 48"	In Water: ☐ No ☒ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
■ Flow #2	Flow depth	.52'	In	Tape measure
	Flow width	5 ' 8.4 " feet	Ft, In	Tape measure
	Measured length	35 ' 0 "	Ft, In	Tape measure
	Time of travel	18.68	S	Stop watch
Temperature		5.9°	°C	Multi-probe
pH		7.89	pH Units	Multi-probe
Conductivity		511.3 SPC	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		332	mg/L	Multi-probe

Estimated flow = 1987.5 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☒ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☒	☐ Clear ☒ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☒	See severity	☐ 1 – Slight cloudiness	☒ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☒	☐ Sewage (Toilet Paper, etc.) ☒ Suds ☐ Petroleum (oil sheen) ☐ Other:	☒ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	■ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall/Clark Fork		Outfall ID: SNA-1526	
Today's date: 11/19/2019		Time (Military): 0850	
Investigators: Tracy Campbell, Marie Noland		Form completed by: TLC/MN	
Temperature (°F): 39°	Rainfall (in.): Last 24 hours: .21	Last 48 hours: .21	
Latitude: 114°0'17.513"W	Longitude: 46°52'30.679"N	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☐ RCP ☒ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 18"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume	2.75	Gallon	Bucket
	Time to fill	8.2	sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	5 ' ____ "	Ft, In	Tape measure
	Measured length	____ ' ____ "	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		6.8°	°C	Multi-probe
pH		8.07	pH Units	Multi-probe
Conductivity		256.6 SPC ms/cm	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		167	mg/L	Multi-probe

Estimated flow = 20.1 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☒ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☒	☐ Clear ☒ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☒ 3 – Clearly visible in outfall flow
Turbidity	☒	See severity	☐ 1 – Slight cloudiness	☒ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☒	☐ Sewage (Toilet Paper, etc.) ☒ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☒ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	■ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Hayes Creek-Bitterroot		Outfall ID: SNA-1563	
Today's date: 11/19/2019		Time (Military): 1115	
Investigators: Tracy Campbell, Marie Noland		Form completed by: TLC/MN	
Temperature (°F): 42°	Rainfall (in.): Last 24 hours: .21	Last 48 hours: .21	
Latitude: 113°59'46.725"W	Longitude: 46°50'30.216"N	GPS Unit: ArcMap	GPS LMK #:
Camera: Pixel 3XL		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☒ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 36"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume	3.5	Gallon	Bucket
	Time to fill	2.81	sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	5 ’ ____ ”	Ft, In	Tape measure
	Measured length	____ ’ ____ ”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		6.7°	°C	Multi-probe
pH		7.89	pH Units	Multi-probe
Conductivity		422.1 SPC	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		274	mg/L	Multi-probe

Estimated flow = 74.8 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☒ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☒	☐ Clear ☒ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☒	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☒ 3 – Opaque
Floatables -Does Not Include Trash!!	☒	☐ Sewage (Toilet Paper, etc.) ☒ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☒ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☒ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

☐ Unlikely	■ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek/Clark Fork		Outfall ID: CFR-1	
Today's date: 10/22/2019		Time (Military): 0931	
Investigators: Tracy Campbell, Marie Noland		Form completed by: Marie Noland	
Temperature (°F): 39°	Rainfall (in.): Last 24 hours: .10	Last 48 hours: .17	
Latitude: 46°52'17"N	Longitude: 113°53'22"W	GPS Unit: iphone XR	GPS LMK #:
Camera: iphone XR		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☐ Commercial
- ☑ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: Recreational
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): River Sample - upstream of MS4

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☑ **In-Stream**					
Flow Present?	☑ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☑ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	5 ' ____ "	Ft, In	Tape measure
	Measured length	____ ' ____ "	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		5.7°	°C	Multi-probe
pH		8.3	pH Units	Multi-probe
Conductivity		376.5 ms/cm	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		358	mg/L	Multi-probe

USGS Stream Gage 12340500 Clark Fork above Missoula
1930cfs = 866.184 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Marshall Creek/Clark Fork		Outfall ID: SNA-1521	
Today's date: 10/22/2019		Time (Military): 1020	
Investigators: Tracy Campbell, Marie Noland, Bob Hayes		Form completed by: TLC	
Temperature (°F): 45°	Rainfall (in.): Last 24 hours: .10	Last 48 hours: .17	
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
- ☐ Suburban Residential
- ☒ Commercial
- ☐ Open Space
- ☐ Golf Course
- ☐ Institutional
- Other: _____
- Known Industries: _____

Notes (e.g.., origin of outfall, if known): Caras Park outfall

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☒ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☒ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☒ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: 36"	In Water: ☒ No ☐ Partially ☐ Fully With Sediment: ☒ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**					
Flow Present?	☒ Yes ☐ No	***If No, Skip to Section 5***			
Flow Description (If present)	☐ Trickle ☒ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
■ Flow #1	Volume		Gallon	Bucket
	Time to fill		sec	
☐ Flow #2	Flow depth		In	Tape measure
	Flow width	5 ’ ____ ”	Ft, In	Tape measure
	Measured length	____ ’ ____ ”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		9.8°	°C	Multi-probe
pH		7.43	pH Units	Multi-probe
Conductivity		347.6 ms/cm	µg/L	Multi-probe
Dissolved Oxygen			mg/L	Multi-probe
Total Dissolved Solids		351	mg/L	Multi-probe

Estimated flow = 62.53 gpm

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OUTFALL RECONNAISSANCE INVENTORY/SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ■ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ■ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization for Illicit Discharge

■ Unlikely	☐ Potential (presence of two or more indicators)	☐ Suspect (one or more indicators with a severity of 3)	☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	■ Yes	☐ No			
2. If yes, collected from:	■ Flow	☐ Pool			
3. Intermittent flow trap set?	☐ Yes	■ No	If Yes, type:	☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?