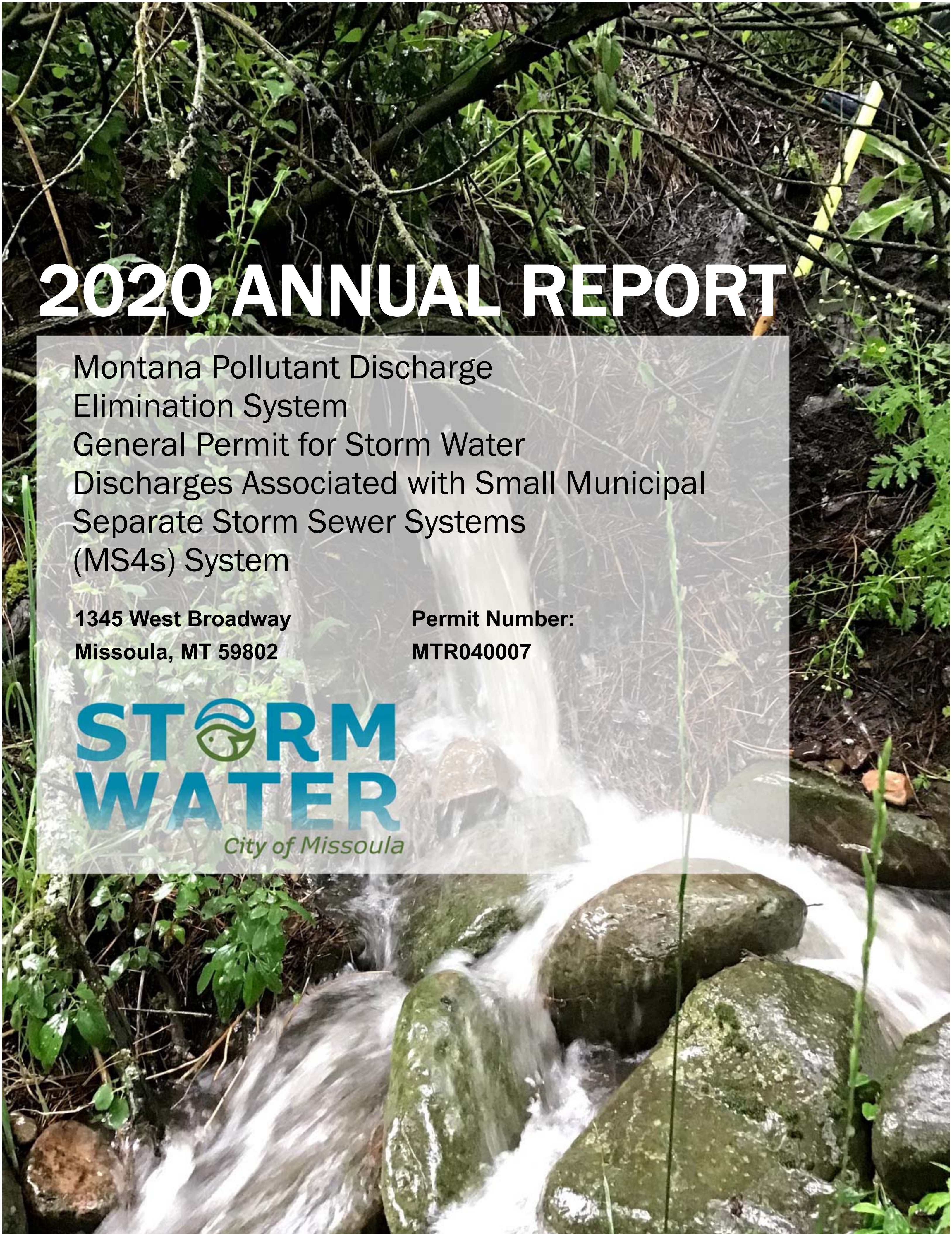


2020 ANNUAL REPORT

Montana Pollutant Discharge Elimination System
General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s) System

1345 West Broadway
Missoula, MT 59802

Permit Number:
MTR040007

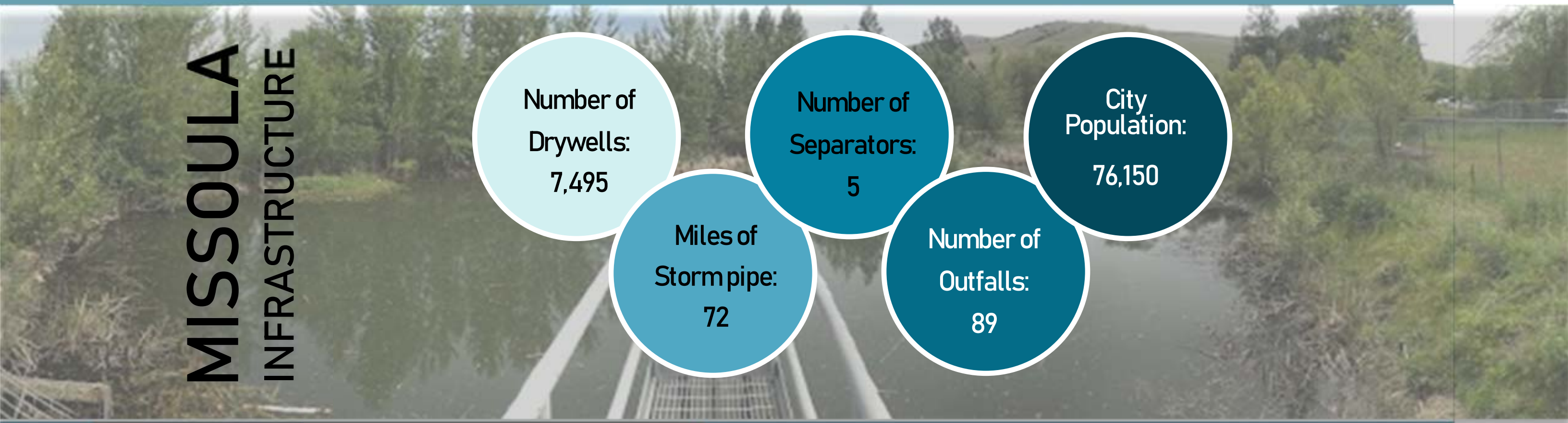
STORM WATER
City of Missoula

Table Of Contents

2020 ANNUAL REPORT

Mission Statement

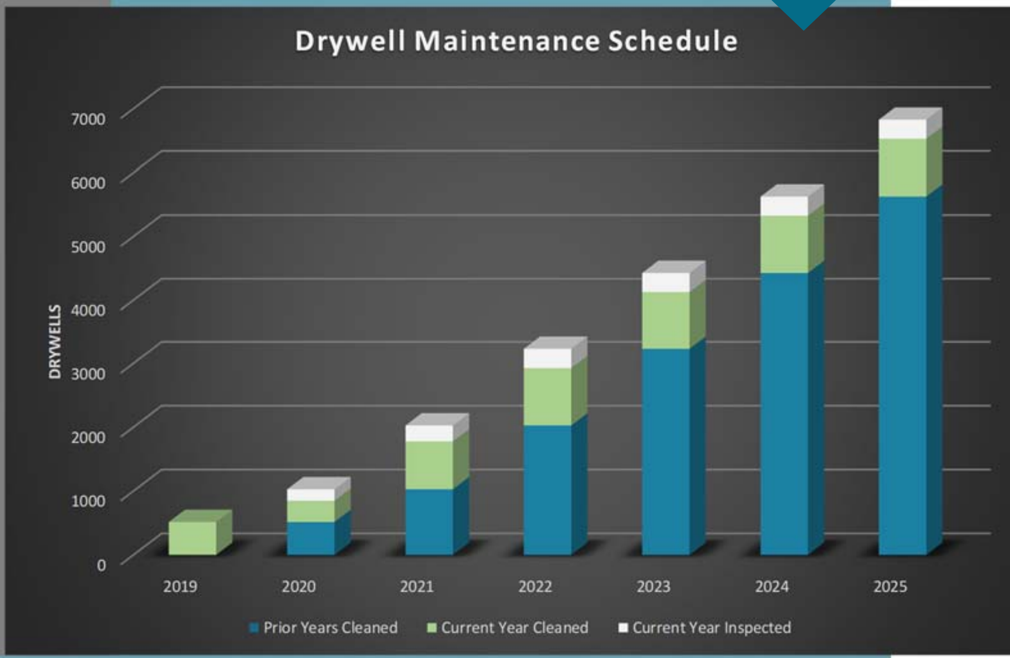
The Storm Water Utility is committed to protecting public health and safety, natural resources, waterways, and our aquifer, while meeting or exceeding state and federal environmental quality regulations.



MAINTENANCE

- **2020 posed significant challenges. Our Storm Water maintenance crew was reassigned to assist our Streets Dept for several months due to Covid-19 quarantine related staff absences.**
- **As of year end 2020, we have cleaned and inspected more than 344 drywells and 179 storm inlets.**
- **Our five storm separators were inspected and cleaned in the Fall. Prior to cleaning we measured the sludge depth. This data will be gathered annually to help provide measureable data on quantity of sediment/debris removal and overall effectiveness of these pre-treatment devices.**
- **Maintenance Goals for 2021: Asset management software, ARC Field Maps, will be rolled out March 1, 2021 to our field maintenance crew.**

While we fell short of our 2020 maintenance goal, we are confident that with the addition of the asset management software and proactive inspections we can improve our efficiency and be on track for our maintenance schedule.

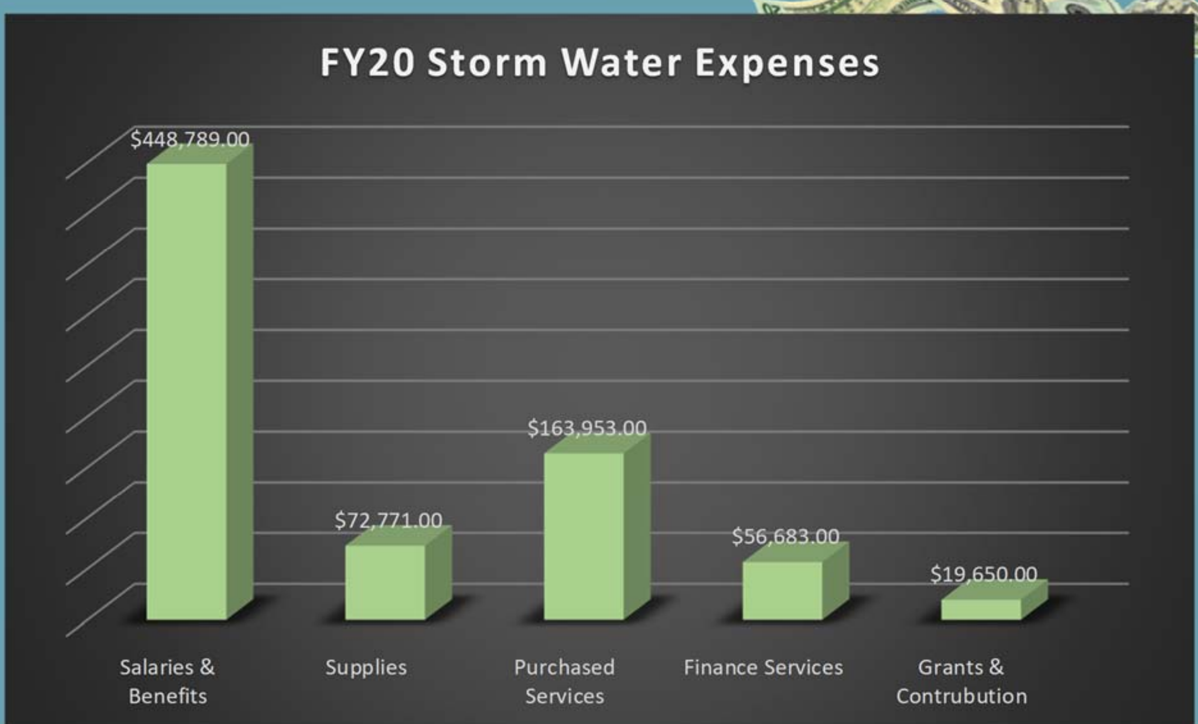


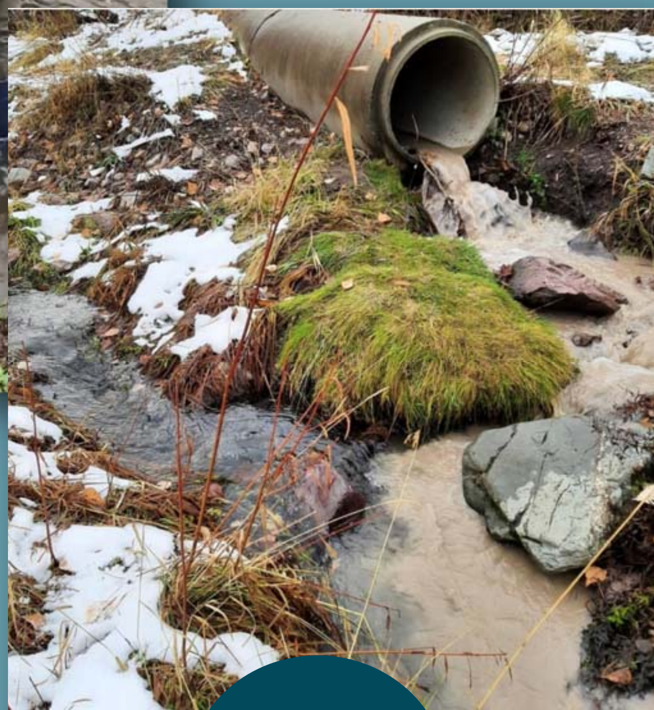
STORM WATER 2020 BUDGET

The Storm Water Utility is funded almost entirely from storm water rate fees.

Due to the significant amount of projects and maintenance necessary within the City of Missoula, we are continually looking for additional funding sources to supplement our revenue which allows us to subsidize much needed improvements to our storm water infrastructure.

The Storm Water Utility is currently working towards obtaining approval for a special state loan to supplement funds for our Caras Park Phase 2—Infiltration Gallery. "The State Revolving Fund (SRF) offers affordable loan options to cities and towns to improve water supply infrastructure and drinking water safety; and to help them to comply with federal and state water quality requirements that deal with wastewater treatment plants and collection systems, while addressing issues such as watershed management priorities, stormwater management, and green infrastructure."





Tracy Campbell, Regulatory Compliance Manager for Missoula Storm Water, has developed a comprehensive Water Sampling Plan that will produce consistent monitoring, tracking, and analysis of our vulnerable waterways.

39

Outfalls Inspected

5

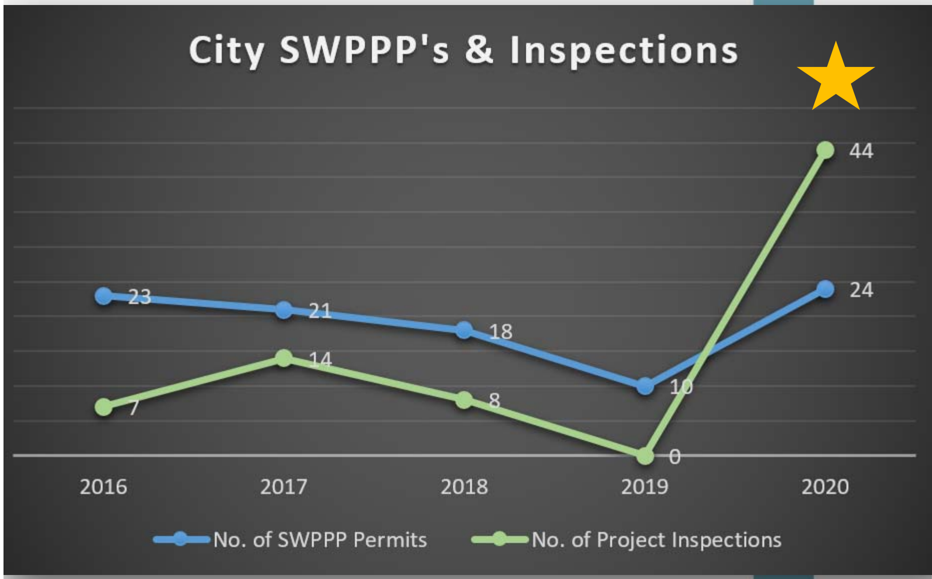
Outfalls Sampled

SAMPLE PARAMETERS

- TEMPERATURE
- COPPER
- ARSENIC
- CADMIUM
- TOTAL PHOSPHORUS
- SEDIMENT
- LEAD
- CHLOROPHYLL-A
- TOTAL NITROGEN
- ZINC

RAMPING UP INSPECTIONS

In 2020, a renewed effort was made to complete construction site storm water management inspections. With the extra assistance of City Storm Water Pollution Prevention Plan (SWPPP) Administrators; Tracy Campbell, Marie Noland, Andy Schultz, Triston Firth, and Carver Butterfield—we were able to review and inspect 44 construction sites, which also included a backlog of projects from 2019.



Onsite at a SWPPP inspection, concrete washout into open gravel. These SWPPP inspections are valuable opportunities to educate our building community on the dangers of water pollution created by insufficient BMP's.

NEW

STORM WATER PERMITS

New Storm Water Permits were approved by City Council on September 21, 2020. The Dry Well Approval permit went into effect October 1, 2020. The new Storm Water Permit requires project disturbances greater than 2,500 square feet to provide site priority evaluations and erosion control plans, as well as other documentation if the priority level deems it necessary. This new permit which resides within the City Building Permit process went live January 1, 2021.

This new permitting process creates the approved methodology and checklists for consistent reviews that are required by our MS4 Permit to better protect our valuable water resources; rivers, creeks, streams, and our sole-source aquifer.

In an effort to assist our building community to adapt to these new permits, we hosted a SWPPP Administrator Certification course with an accompanying FREE 2-day BMP Workshop. Several community members and city employees took advantage of this free class to become more familiar with BMP's (Best Management Practices) that are commonly used on construction sites to protect their disturbance area from erosion and potential water pollution. It was a great success and more educational opportunities for the public are already in the works for 2021.

PUBLIC OUTREACH

2020 posed several challenges with public outreach and education. Almost all in-person events were cancelled, so we came up with new methods to reach the public.

Three bus ads ran for three months, encouraging citizens to appropriately dispose of pet waste, lawn clippings, and maintain their vehicles to avoid leaks.

We were grateful to have the assistance of two excellent interns from the Montana Conservation Corps, Carver Butterfield and James Moxley. Their combined efforts made a significant impact on our ability to fulfill many of the conditions in our MS4 Permit.

MONTANA CONSERVATION CORPS

93

Storm Water Markers

Storm Water markers were DAP-cemented near inlets and dry wells noting their proximity to creeks, rivers, and groundwater. These markers are UV coated and will last many years before needing replacement.

4,116

Street Sweeper Loads of Road Debris Collected

DEQ Montana Department of Environmental Quality WATER PROTECTION BUREAU	**Agency Use**
	MTR04_____________
	Date Rec'd:
	Amount Rec'd:
	Check No.:
	Rec'd By:

FORM **MS4-AR**	**MPDES Storm Water Small MS4 Annual Report Form**				
	Reporting period is for the calendar year, January 1st through December 31st. Check one. Annual Report is due by March 1st of the following year.				
	○ 2017	○ 2018	○ 2019	● 2020	○ 2021

Instructions: This Annual Report Form is to be completed by each permittee and co-permittee authorized to discharge storm water under the General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Water Sewer Systems (MS4s). All authorized permittees and co-permittees are required to complete this Annual Report Form for each calendar year reporting period. For co-permittees authorized under one permit authorization or for co-permittees with multiple authorizations, you are required to complete this form and submit separate required documents/information exclusively for your respective regulated Small MS4 area(s). This completed Annual Report Form must be electronically submitted to the Montana Department of Environmental Quality, Water Protection Bureau. Electronic submission is required through the web-based tool: NetDMR. Additional information is located on DEQ's website: http://deq.mt.gov/Water/WQINFO/ctss/netdmr.

Small MS4 Authorization Number: MTR04 040007

Small MS4 Classification	● **Traditional**	○ **Non-Traditional**

Small MS4 Name: City of Missoula

Small MS4 Mailing Address: 1345 W. Broadway St.

City, State, and Zip Code: Missoula, MT, 59802

Small MS4 Contact Person (and Title): Tracy Campbell, Regulatory Compliance Manager

Mailing Address: 1345 W. Broadway St.

City, State, and Zip Code: Missoula, MT, 59802

Phone Number: (406)552-6364	**E-mail address:** CampbellTL@ci.missoula.mt.us

Storm Water Management Team: Attach an organizational chart identifying a primary SWMP coordinator and the positions responsible for implementing each minimum measure.			
Requested above chart:	(●) Attached Attachment A-SWMP	( ) Not Attached	

Has the permittee established and executed a formalized mechanism for regular communication between storm water management team members?	(●) Yes	( ) No

Permittee's SWMP Resources:
How many FTEs does the permittee designate to the MS4 permit? 6.5 If needed, provide an explanation. Five FTEs dedicated to Storm Water (compliance, maintenance, engineering, GIS & Admin/Billing) and two field maintenance crew available 9 months of the year.

If more space is needed, submit on an additional page with corresponding reference or on a data storage device.

Answer the following five (5) questions on an additional page with corresponding reference or on a data storage device. Attachment B

(1) What are the source(s) of funding for implementation of the MS4 permit and the estimated percentage of the total budget allocated from each source listed?

(2) Specific to the annual reporting calendar year, how did the permittee justify commitment of resources or budget allocations to the implementation of the MS4 permit to decision-makers and the public? Provide a summary of meetings and outcomes held with decision-makers and the public.

(3) Has the permittee demonstrated program effectiveness to obtain budget allocations for this annual reporting calendar year or previous years? Why or why not? If so, what program effectiveness metrics were presented?

(4) How was this annual reporting calendar year's approach to allocate resources different than the previous year's approach?

(5) Was the permittee successful in their request for budget allocations? Describe the outcome and factors that affected or resulted in that outcome.

Illicit Discharge Detection & Elimination: Per the IDDE MCM requirement (Part II (3)(c.i)), has the permittee reviewed, and updated if needed, the storm sewer map during the calendar year?	(●) Yes	( ) No
Per the IDDE MCM requirement (Part II (3)(e.i)), has the permittee dry weather inspected and screened outfalls during the calendar year?	(●) Yes	( ) No

Fill in the blanks with numbers. The permittee has inspected 39 outfalls during this calendar year. Since authorization under the 2017 General Permit, the permittee has inspected 53 total outfalls out of the 89 total MS4 outfalls.

Per the Illicit Discharge Detection & Elimination MCM (Part II (3)(e.i)), the permittee will complete the requirement to inspect and screen all outfalls during dry weather by the end of the permit cycle.	◉ Yes	○ No
Construction Site Storm Water Management: During the calendar year, how many construction storm water management plan reviews were completed (Part II (4)(b))? 24		
During the calendar year, how many construction projects were inspected for their storm water management controls (Part II (4)(c))? 44		
Pollution Prevention/Good Housekeeping for Permittee Operations: Has the permittee reviewed, and updated if needed, the inventory of permittee-owned/operated facilities and activities (Part II (6)(a.i))?	◉ Yes	○ No
Has the permittee reviewed, and updated if needed, the map that identifies the locations of facilities and known locations of activities (Part II (6)(a.ii))?	◉ Yes	○ No
Has the permittee conducted annual storm water pollution prevention training for permittee staff during the next permit year after development of each standard operating procedure (Part II (6)(a.v))? ***Not applicable during calendar year 2017, 2018, and 2019. Check "No" during these years.***	◉ Yes	○ No
Training: According to Part II (B) Training requirements, has the permittee conducted applicable training during the 1st and 4th calendar years? ***Not required during calendar year 2018, 2019, and 2021. Check "No" during these years.***	◉ Yes	○ No
According to Part II (B) Training requirements, has the permittee conducted applicable new employee training within 90 days of the hire date?	◉ Yes	○ No
Special Conditions: Per **Pre-TMDL Approval (Part III.A) requirements**, attach the required information regarding identification of all outfalls that discharge to impaired waterbodies, the impaired waterbodies, and the associated pollutants of impairments. Summarize the BMPs implemented over the reporting period and a schedule of BMPs planned for the following year.		
◉ Attached Attachment A - SWMP	○ Not Attached	○ Not Applicable
Special Conditions: Approved TMDLs (Part III.B) requirements per calendar year below.		
Calendar Year 2017: The permittee has attached a Sampling Plan that includes strategy rationale, monitoring frequency, monitoring parameters, and monitoring locations.		
○ Attached	○ Not Attached	○ Not Applicable

Calendar Year 2017: The permittee has attached all outfalls that discharge to impaired waterbodies and the associated pollutants of impairment.		
○ Attached	○ Not Attached	○ Not Applicable
Calendar Year 2018: The permittee has attached all outfalls that discharge to impaired waterbodies and the associated pollutants of impairment.		
○ Attached	○ Not Attached	○ Not Applicable
Calendar Year 2019: The permittee has attached all outfalls that discharge to impaired waterbodies and the associated pollutants of impairment.		
☐ Attached	☐ Not Attached	☐ Not Applicable
Calendar Year 2020: The permittee has attached all outfalls that discharge to impaired waterbodies and the associated pollutants of impairment.		
◉ Attached Attachment A-SWMP	○ Not Attached	○ Not Applicable
Calendar Year 2020: The permittee has attached the TMDL section of the SWMP that identifies the measures and BMPs it plans to implement, describes the MS4's impairment priorities and long term strategy, and outlines interim milestones for controlling the discharge of the pollutants of concern and making progress towards meeting the TMDL.		
◉ Attached Attachment A-SWMP	○ Not Attached	○ Not Applicable
Calendar Year 2021: The permittee has attached all outfalls that discharge to impaired waterbodies and the associated pollutants of impairment.		
○ Attached	○ Not Attached	○ Not Applicable
Calendar Year 2021: The permittee has evaluated the TMDL section of the SWMP based on monitoring results. The section has been revised, if needed, and is attached.		
○ Attached	○ Not Attached	○ Not Applicable
Monitoring: Per requirements in Part IV (B), has the permittee attached monitoring results, calculations, and evaluations?		
◉ Attached Attachment A-SWMP	○ Not Attached	○ Not Applicable

INSTRUCTIONS: The permittee will only fill out the Annual Report Attachments section below that corresponds to the calendar in which an Annual Report is being submitted for. Attach the requested documents/information.

2017 Annual Report Attachments (1st Calendar Year)		
Public Education and Outreach:		
Per requirements a.i in the referenced MCM, attach the required information regarding key target audiences and associated pollutants.		
☐Attached	☐ Not Attached	
Public Involvement and Participation:		
Per requirements a.i in the referenced MCM, attach the required information regarding the public involvement approach and schedule of each key audience.		
◯Attached	◯ Not Attached	
Illicit Discharge Detection & Elimination:		
Per requirements a.i in the referenced MCM, attach the required information regarding categories of non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◯Attached	◯ Not Attached	
Per requirements b.i in the referenced MCM, attach the required information regarding occasional non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◯Attached	◯ Not Attached	
Per requirements f.i in the referenced MCM, attach the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
◯Attached	◯ Not Attached	
Construction Site Storm Water Management:		
Per requirements a.iii in the referenced MCM, attach progress towards an Enforcement Response Plan and associated documents.		
◯Attached	◯ Not Attached	
Specific to Traditional MS4s and per requirements b.i in the referenced MCM, attach the construction storm water management plan review checklist.		
◯Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements b.iii in the referenced MCM, attach the construction storm water management plan review checklist.		
◯Attached	◯ Not Attached	◯ Not applicable
Specific to Traditional MS4s and per requirements c.i in the referenced MCM, attach the construction storm water management inspection form or checklist.		
◯Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements c.ii in the referenced MCM, attach the construction storm water management inspection form or checklist.		
◯Attached	◯ Not Attached	◯ Not applicable

Post-Construction Site Storm Water Management in New and Redevelopment		
Specific to Traditional MS4s and per requirements b.i in the referenced MCM, attach the post-construction storm water management plan review checklist.		
◯ Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements b.ii in the referenced MCM, attach the post-construction storm water management plan review checklist.		
◯ Attached	◯ Not Attached	◯ Not applicable
Per requirements in b.iii in the referenced MCM, attach the performance standards and associated documents.		
◯ Attached	◯ Not Attached	

2018 Annual Report Attachments (2nd Calendar Year)		
Public Education and Outreach:		
Per requirements b.i in the referenced MCM, attach the required information regarding outreach messages.		
◯ Attached	◯ Not Attached	
Per requirements c.i in the referenced MCM, attach the required information regarding a description of formats, distribution channels and schedule for key target audiences.		
◯ Attached	◯ Not Attached	
Public Involvement and Participation:		
Per requirements a.ii in the referenced MCM, attach the required information regarding participation and key target audience feedback on approaches.		
◯ Attached	◯ Not Attached	
Illicit Discharge Detection & Elimination:		
Per requirements a.i in the referenced MCM, attach the required information regarding categories of non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◯ Attached	◯ Not Attached	
Per requirements b.i in the referenced MCM, attach the required information regarding occasional non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◯ Attached	◯ Not Attached	
Specific to Traditional MS4s and per requirements d.i in the referenced MCM, attach the adopted ordinance or other regulatory mechanism to prohibit illicit discharges.		
◯ Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements d.ii in the referenced MCM, attach the summary of legal authority to prohibit illicit discharges.		
◯ Attached	◯ Not Attached	◯ Not applicable
Per requirements d.iii in the referenced MCM, attach the required summary of the cooperative agreements.		

◯ Attached	◯ Not Attached	
Per requirements d.iv in referenced MCM, attach the Enforcement Response Plan and associated documents.		
◯ Attached	◯ Not Attached	
Per requirements e.ii in referenced MCM, attach the list of high priority outfalls.		
◯ Attached	◯ Not Attached	
Specific to Traditional MS4s and per requirements f.iii in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
◯ Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements f.iv in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
◯ Attached	◯ Not Attached	◯ Not applicable
Post-Construction Site Storm Water Management in New and Redevelopment		
Specific to Traditional MS4s and per requirements c.i in the referenced MCM, attach the post-construction storm water management inspection form or checklist.		
◯ Attached	◯ Not Attached	◯ Not applicable
Specific to Non-Traditional MS4s and per requirements c.ii in the referenced MCM, attach the post-construction storm water management inspection form or checklist.		
◯ Attached	◯ Not Attached	◯ Not applicable
Per requirements in c.iii in the referenced MCM, attach the inventory of all new permittee-owned and private post-construction storm water management controls.		
◯ Attached	◯ Not Attached	
Per requirements in c.vi in the referenced MCM, attach an inspection frequency protocol.		
◯ Attached	◯ Not Attached	
Specific to Traditional MS4s and per requirements c.vii, attach the developed inspection program.		
◯ Attached	◯ Not Attached	◯ Not applicable
Pollution Prevention/Good Housekeeping for Permittee Operations		
Per requirements in a.iii in the referenced MCM, attach completed Standard Operating Procedures.		
◯ Attached	◯ Not Attached	

2019 Annual Report Attachments (3rd Calendar Year)		
Public Education and Outreach:		
Per requirements c.ii in the referenced MCM, attach the required information regarding outreach materials distributions.		
☐Attached	☐ Not Attached	
Public Involvement and Participation:		
Per requirements a.ii in the referenced MCM, attach the required information regarding participation and key target audience feedback on approaches.		
☐Attached	☐ Not Attached	
Illicit Discharge Detection & Elimination:		
Per requirements a.i in the referenced MCM, attach the required information regarding categories of non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
☐Attached	☐ Not Attached	
Per requirements b.i in the referenced MCM, attach the required information regarding occasional non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
☐Attached	☐ Not Attached	
Per requirements e.ii in referenced MCM, attach the list of high priority outfalls.		
☐Attached	☐ Not Attached	
Per requirements e.iii in referenced MCM, attach the required summary of screening results.		
☐Attached	☐ Not Attached	
Specific to Traditional MS4s and per requirements f.iii in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
☐Attached	☐ Not Attached	☐ Not applicable
Specific to Non-Traditional MS4s and per requirements f.iv in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
☐Attached	☐ Not Attached	☐ Not applicable
Construction Site Storm Water Management:		
Specific to Traditional MS4s and per requirements a.i in the referenced MCM, attach the adopted ordinance or other regulatory mechanism to require construction storm water controls.		
☐Attached	☐ Not Attached	☐ Not applicable
Specific to Non-Traditional MS4s and per requirements a.ii in the referenced MCM, attach the legal authority summary.		
☐Attached	☐ Not Attached	☐ Not applicable
Per requirements a.iii in the referenced MCM, attach the adopted Enforcement Response Plan and associated documents.		
☐Attached	☐ Not Attached	
Post-Construction Site Storm Water Management in New and Redevelopment		

Per requirements in c.viii in the referenced MCM, attach findings and compliance actions regarding inspections of high priority post-construction storm water management controls.		
☐Attached	☐ Not Attached	
Specific to Traditional MS4s and per requirements c.ix, attach the findings and resulting actions regarding inspections of high priority privately-owned post-construction storm water management controls.		
☐Attached	☐ Not Attached	☐ Not applicable
Pollution Prevention/Good Housekeeping for Permittee Operations		
Per requirements in a.iii in the referenced MCM, attach the completed Standard Operating Procedures.		
☐Attached	☐ Not Attached	

2020 Annual Report Attachments (4th Calendar Year)		
Public Education and Outreach:		
Per requirements c.ii in the referenced MCM, attach the required information regarding outreach materials distributions.		
◉Attached Attachment C	○Not Attached	
Public Involvement and Participation:		
Per requirements a.ii in the referenced MCM, attach the required information regarding participation and key target audience feedback on approaches.		
◉Attached Attachment D	○Not Attached	
Illicit Discharge Detection & Elimination:		
Per requirements a.i in the referenced MCM, attach the required information regarding categories of non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◉Attached Attachment A	○Not Attached	
Per requirements b.i in the referenced MCM, attach the required information regarding occasional non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
◉Attached Attachment A	○Not Attached	
Per requirements e.ii in referenced MCM, attach the list of high priority outfalls.		
◉Attached Attachment A	○Not Attached	
Per requirements e.iii in referenced MCM, attach the required summary of screening results.		
◉Attached Attachment A	○Not Attached	
Specific to Traditional MS4s and per requirements f.iii in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
◉Attached Attachment A	○Not Attached	○Not applicable
Specific to Non-Traditional MS4s and per requirements f.iv in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge		

Investigation and Corrective Action Plan and any associated documents.		
(●) Attached Attachment A	( ) Not Attached	( ) Not applicable
Post-Construction Site Storm Water Management in New and Redevelopment		
Specific to Traditional MS4s and per requirements a.i in the referenced MCM, attach the adopted ordinance or other regulatory mechanism to require post-construction storm water controls.		
(●) Attached Attachment A	( ) Not Attached	( ) Not applicable
Specific to Non-Traditional MS4s and per requirements a.ii in the referenced MCM, attach the legal authority summary.		
( ) Attached	( ) Not Attached	(●) Not applicable
Per requirements in a.iii in the referenced MCM, attach the Enforcement Response Plan and associated documents.		
( ) Attached	(●) Not Attached	
Per requirements in c.viii in the referenced MCM, attach findings and compliance actions regarding inspections of high priority post-construction storm water management controls.		
(●) Attached Attachment A	( ) Not Attached	
Specific to Traditional MS4s and per requirements c.ix, attach the findings and resulting actions regarding inspections of high priority privately-owned post-construction storm water management controls.		
(●) Attached Attachment A	( ) Not Attached	( ) Not applicable
Per requirements in d.i in the referenced MCM, attach a summary of the discussion outcomes.		
(●) Attached Attachment A	( ) Not Attached	
Pollution Prevention/Good Housekeeping for Permittee Operations		
Per requirements in a.iii in the referenced MCM, attach the completed Standard Operating Procedures.		
( ) Attached	(●) Not Attached	

2021 Annual Report Attachments (5th Calendar Year)	
Public Education and Outreach:	
Per requirements c.ii in the referenced MCM, attach the required information regarding outreach materials distributions.	
( ) Attached	( ) Not Attached
Public Involvement and Participation:	
Per requirements a.ii in the referenced MCM, attach the required information regarding participation and key target audience feedback on approaches.	
( ) Attached	( ) Not Attached
Illicit Discharge Detection & Elimination:	
Per requirements a.i in the referenced MCM, attach the required information regarding categories of non-storm water discharges or flows, associated pollutants, and local controls or conditions.	

Attached	Not Attached	
Per requirements b.i in the referenced MCM, attach the required information regarding occasional non-storm water discharges or flows, associated pollutants, and local controls or conditions.		
Attached	Not Attached	
Per requirements e.ii in referenced MCM, attach the list of high priority outfalls.		
Attached	Not Attached	
Per requirements e.iii in referenced MCM, attach the required summary of screening results.		
Attached	Not Attached	
Specific to Traditional MS4s and per requirements f.iii in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
Attached	Not Attached	Not applicable
Specific to Non-Traditional MS4s and per requirements f.iv in the referenced MCM, attach the summary of investigations conducted and corrective actions taken per the required Illicit Discharge Investigation and Corrective Action Plan and any associated documents.		
Attached	Not Attached	Not applicable
Post-Construction Site Storm Water Management in New and Redevelopment		
Per requirements in c.viii in the referenced MCM, attach findings and compliance actions regarding inspections of high priority post-construction storm water management controls.		
Attached	Not Attached	
Specific to Traditional MS4s and per requirements c.ix, attach the findings and resulting actions regarding inspections of high priority privately-owned post-construction storm water management controls.		
Attached	Not Attached	Not applicable
Pollution Prevention/Good Housekeeping for Permittee Operations		
Per requirements in a.iii in the referenced MCM, attach completed Standard Operating Procedures.		
Attached	Not Attached	

Attach any updates, changes, or improvements to the Small MS4 Storm Water Management Program per requirements in Part IV (E).		
Attached	Not Attached	Not applicable

Annual Report Form Signature	
This Annual Report Form must be completed, signed, and certified as follows: • **For a corporation, by a principal officer of at least the level of vice president;** • **For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or** **For a municipality, state, federal, or other public facility, by either a principal executive officer or rankir elected official.**	
All Permittees Must Complete the Following Certification: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information; including the possibility of fine and imprisonment for knowing violations. [75-5-633, MCA]. ***Certification of this form indicates conformance with the 2017 General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer Systems and the required Annual Reporting upon receipt of permit coverage.***	
Name (Type or Print) John Engen	
Title (Type or Print) Mayor	**Phone Number** (406) 552-6001
Signature	**Date Signed** 2/23/2021

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

City of Missoula
Public Works and Mobility Department
Storm Water Utility Division
1345 West Broadway
Missoula, Montana 59802

February 2021

CONTENTS

TABLES

FIGURES

APPENDICES

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.

<u>MCM 1 Public Education and Outreach</u> – 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.

<u>MCM 2 Public Involvement and Participation</u> – The City must continue to comply with all state and local notice requirements when implementing a public involvement/participation program.

<u>MCM 3 Illicit Discharge Detection and Elimination</u> – 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 post-construction storm water management 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)
			City[3]	Other[4]	City	Other	City	Other	City	Other	City	City
Middle Clark Fork (17010204)	Okeefe Creek (170102040204)	—	—	—	—	13,176	—	10	—	1	—	—
	Butler Creek (170102040201)	Butler Creek	—	1	1,932	12,201	—	83	17	19	—	—
	Grant Creek (170102040103)				47,575	23,471	201	381	10	21	2,764	—
		Flynn Lowney Ditch	2	2								
		Grant Creek[IMPAIRED]	5	2								
	La Valle Creek (170102040202)	—	—	—	—	500	—	27	1	1	—	—
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	5	13	4,881	2,091	207	84	—	—	—	—
	Marshall Creek-Clark Fork (170102040104)				36,597	53,351	2,970	1,512	9	20	4,192	898
		Clark Fork River[IMPAIRED]	13	14								
		Orchard Homes Ditch	6	1								
		Missoula Irrigation District	2	9								
	Martin Gulch-Clark Fork (170102040205)	—	—	—	18,249	2,838	2	17	9	11	—	—
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)				116,478	45,406	1,355	516	21	6	6,060	—
		Bitterroot River[IMPAIRED]	1	2								
		Pattee Creek	6	—								
		Unnamed drainage	2	3								
	Miller Creek (170102051601)	Miller Creek[IMPAIRED]	—	—	819	1,360	101	29	—	—	—	—
		Subtotal	**42**	**47**	**226,531 (43 mi)**	**154,394 (29 mi)**	**4,836**	**2,659**	**67**	**79**	**13,016**	**898**
		Total	**89**		**380,925 (72 mi)**		**7,495**		**146**		**13,016**	**898**

[1]municipal separate storm sewer system
[2]U.S. Geological Survey Hydrologic Unit Code
[3]Assets owned and managed by the City of Missoula
[4]Assets owned and managed by Montana Department of Transportation, private, or unknown
[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)
Bitterroot Subbasin	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
Middle Clark Fork Subbasin	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
Middle Clark Fork Subbasin	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: 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 August 9, 2016, City Council adopted the first *Storm Water Specifications and Design Standards Manual*. Then, 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. The ordinance and standards address the protection of water quality, preservation of natural drainage systems, flood mitigation, site grading, and protection of property.

Big Changes in 2020

In 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 and a public hearing occurred on March 9, 2020. The City Council unanimously approved the new code and it became effective on April 8, 2020. Chapter 13.27 also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code. A public hearing for the new Storm Water Permit and Dry Well Approval fees was held on September 14, 2020 and approved by council on September 21, 2020. The *Storm Water Specifications and Design Standards Manual* was rescinded and replaced with the *Public Works Standards and Specifications Manual*. The new manual became effective on November 18, 2020 and codifies City standards for construction and post-construction storm water management.

Utility Rates

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

The newly established storm water rate structure provides approximately $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	$380,000
Operations and Maintenance	$450,000
Capital Improvements	$370,000
Total	**$1.2 million**

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 using a dotted line to illustrate the relationship. The team meets regularly on the last Monday of each quarter. During the first meeting on March 30, 2020, key responsibilities were identified per MCM (Table 6).

Storm Water Management Team Organizational Chart

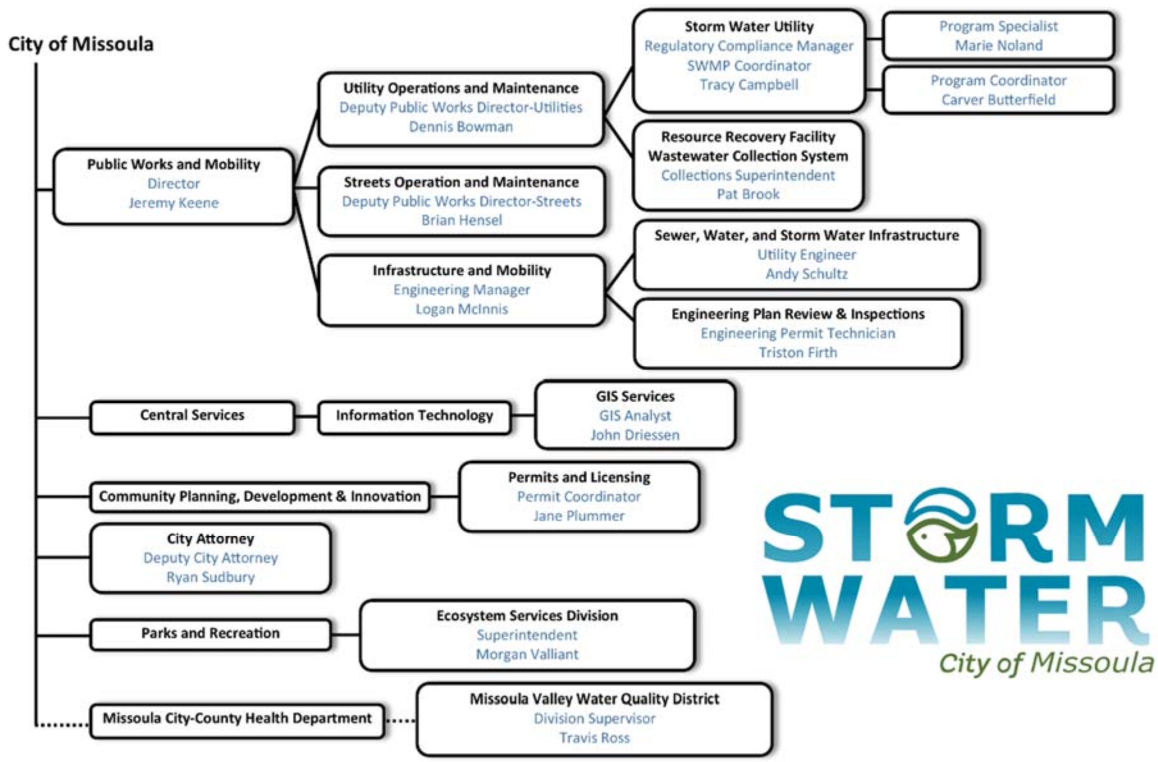


Figure 1. City of Missoula Storm Water Management Program Team Organizational Chart

Table 6. Key 2020 goals and Storm Water Management Team responsibilities

MCM[1]	Description	2020 Goal	Lead(s)	Progress
1	Public Education and Outreach	General Public: At least one employee from the Storm Water Utility will attend at least four neighborhood council meetings.	Tracy	Incomplete; Most meetings cancelled due to COVID
1	Public Education and Outreach	Contractors: Host one storm water pollution prevention and construction BMP training for at least five local contractors in fall/winter 2020.	Tracy	Complete; Hosted SWPPP Training and BMP Workshop on October 14-15, 2020
1	Public Education and Outreach	Municipal Employees: Educate at least 50 City employees about storm water pollution prevention using ProProfs.	Tracy	Complete; 144 employees

MCM[1]	Description	2020 Goal	Lead(s)	Progress
1	Public Education and Outreach	Update the banner on the website at least once a month	Marie	Incomplete; the website banner is primarily used for City-wide updates and newsflash items controlled by the City Communications Specialist.
1	Public Education and Outreach	Publish banners on Mountain Line buses by June 1, 2020	Marie	Complete; 3 buses, 3 banner messages, for 3 months. We addressed pet waste, auto leaks, and yard waste.
1	Public Education and Outreach	Establish a partnership with at least two local non-profits by May 1, 2020	Marie	Complete; Working Dogs for Conservation (WDC), Clark Fork Coalition (CFC), Watershed Education Network; and SpectrUM.
2	Public Involvement and Participation	Support at least two community events with non-profit partners	Marie	Incomplete; most community events cancelled due to COVID; MT Conservation Corps members hosted table at UM; community pet waste pick up with WDC.
2	Public Involvement and Participation	With the assistance of the Public Works Communication Specialist, establish a Public Works account on Facebook and Instagram	Carver	Complete; Instagram @missoulacitypublicworks
2	Public Involvement and Participation	Implement citizen relationship management software and smartphone app	John	Not started
2	Public Involvement and Participation	Solicit input on SWMP	Tracy	SWMP published to Engage Missoula (https://www.engagemissoula.com/storm-water-management-program-review)
2	Public Involvement and Participation	Link to partner websites and community events	Marie	Ongoing; most community events cancelled due to COVID; provided volunteer and training links to the main City Calendar, Parks Volunteer Opportunities, WDC, and CFC.
3	Illicit Discharge Detection and Elimination	Review municipal operations for compliance with the *General Permit for Disinfected Water and Hydrostatic Testing*	Tracy	In progress
3	Illicit Discharge Detection and Elimination	Use an app, such as ArcGIS Collector, to collect field data and update the GIS database	John and Carver	Complete and ongoing
3	Illicit Discharge Detection and Elimination	MVWQD will provide quarterly reports on illicit discharges to the Storm Water Utility	Travis	Complete

MCM[1]	Description	2020 Goal	Lead(s)	Progress
3	Illicit Discharge Detection and Elimination	Draft formal agreement with MDT	Jeremy	Incomplete
3	Illicit Discharge Detection and Elimination	The SWMP Coordinator will be a member of the University of Montana's Team	Tracy	Complete
3	Illicit Discharge Detection and Elimination	The MVWQD Division Supervisor will be a member of the City's Team	Travis	Complete
3	Illicit Discharge Detection and Elimination	Review the Enforcement Response Plan with the Team on June 29, 2020, per MS4 Permit conditions	Travis and SWMP Team	Complete
3	Illicit Discharge Detection and Elimination	Map illicit discharges, enforcement responses, and investigations	Tracy and Carver	Complete
3	Illicit Discharge Detection and Elimination	Inspect 25 outfalls during dry weather in 2020 and 20 in 2021	Carver	Complete
3	Illicit Discharge Detection and Elimination	Develop screening procedure for identifying high-priority outfalls	Carver	Complete
3	Illicit Discharge Detection and Elimination	Identify high-priority outfalls by July 1, 2020	Carver	Complete
3	Illicit Discharge Detection and Elimination	Inspect the high-priority outfalls in 2020	Carver	Complete
3	Illicit Discharge Detection and Elimination	Review the Illicit Discharge Investigation and Corrective Action Plan with the Team on June 29, 2020, per MS4 Permit conditions	Travis and SWMP Team	Complete
3	Illicit Discharge Detection and Elimination	Receive quarterly reports on suspected illicit discharges from the MVWQD	Travis	Complete
4	Construction Site Storm Water Management	Implement City Storm Water Permit by June 1, 2020	Jane	Complete; Dry Well Approval became effective 10/1/2020 and Storm Water Permit on 1/1/2021

MCM[1]	Description	2020 Goal	Lead(s)	Progress
4	Construction Site Storm Water Management	Revise and publish City storm water standards and specifications before January 2021	Jeremy	Complete; PW Manual effective 11/18/2020
4	Construction Site Storm Water Management	Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code	Travis	Need to follow up with Travis
4	Construction Site Storm Water Management	Implement Erosion Control Site Plan Review Checklist by June 1, 2020	Triston	Complete; effective 1/1/2021
4	Construction Site Storm Water Management	Hire two FTEs for inspections	Jeremy	Semi-complete; 1 FTE hired on Troy's team and team will rotate duties with 1 FTE always focused on storm water inspections
4	Construction Site Storm Water Management	Conduct construction inspections using the City's inspection form by June 1, 2020	Triston	Complete
4	Construction Site Storm Water Management	Implement Construction Inspection Frequency Determination by June 1, 2020	Triston	Complete; effective 1/1/2021
5	Post-Construction Site Storm Water Management	Track and document Riparian Resource Management Plans (MMC 20.50.030)	Tracy	Not started
5	Post-Construction Site Storm Water Management	Implement the City Storm Water Permit by June 1, 2020	Jane	Complete; effective 1/1/2021
5	Post-Construction Site Storm Water Management	Review and update the MVWQD's ERP with the Team on June 29, 2020, per the conditions in the MS4 Permit	Travis and SWMP Team	Complete
5	Post-Construction Site Storm Water Management	Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code	Travis	Need to follow up with Travis
5	Post-Construction Site Storm Water Management	Implement Storm Water Management Site Plan Review Checklist by June 1, 2020	Triston	Complete; effective 1/1/2021

MCM[1]	Description	2020 Goal	Lead(s)	Progress
5	Post-Construction Site Storm Water Management	Create an inventory of projects that utilize off-site treatment by the end of 2020	Tracy	Not started
5	Post-Construction Site Storm Water Management	Hire two full-time employees to conduct inspections	Jeremy	Semi-complete; 1 FTE hired on Troy's team and team will rotate duties with 1 FTE always focused on storm water inspections
5	Post-Construction Site Storm Water Management	Conduct post-construction inspections using the City's inspection form by August 1, 2020	Triston	Semi-complete; Storm Water Permit effective 1/1/2021
5	Post-Construction Site Storm Water Management	Review completed developments from January 1, 2017 through the present date	Tracy	Semi-complete; MT Conservation Corps members mapped a significant amount of private post-construction from May to Oct 2020
5	Post-Construction Site Storm Water Management	Digitize and field-reconcile the post-construction storm water control by November 1, 2020	Carver and John	Ongoing; MT Conservation Corps members mapped a significant amount of private post-construction from May to Oct 2020; Carver hired in January 2021 as Program Coordinator to continue this mapping effort
5	Post-Construction Site Storm Water Management	Implement Post-Construction Inspection Frequency Determination by June 1, 2020	Triston	Complete; effective 1/1/2021
5	Post-Construction Site Storm Water Management	Conduct post-construction inspections by August 1, 2020	Triston	Semi-complete; Storm Water Permit effective 1/1/2021
5	Post-Construction Site Storm Water Management	Revise and publish City storm water standards and specifications before January 2021	Jeremy and Andy	Complete; PW Manual effective 11/18/2020
5	Post-Construction Site Storm Water Management	Update standard drawings to incorporate low impact development and green infrastructure methods before January 2021	Andy	Complete; standards provided in updated PW Manual effective 11/18/2020

MCM[1]	Description	2020 Goal	Lead(s)	Progress
6	Pollution Prevention/Good Housekeeping for Permittee Operations	Compile all department/division-specific SOPs by June 1, 2020	Tracy and Carver	Semi-complete and ongoing
6	Pollution Prevention/Good Housekeeping for Permittee Operations	Draft a City Pollution Prevention/Good Housekeeping Guidance Manual by the end of 2020	Tracy and Carver	Semi-complete and ongoing
	Training	Develop and implement training on the MS4 Permit and SWMP for the Team by June 1, 2020	Tracy	Complete; effective March 30, 2020
	Training	Develop and implement construction site storm water management training for plan reviewers and inspectors by June 1, 2020	Tracy	Complete; SWPPP training February 14, 2020
	Training	Develop and implement post-construction site storm water management training for plan reviewers and inspectors by June 1, 2020	Tracy	Not started
	Training	Using ProProfs, train at least 50 employees in storm water pollution prevention	Tracy	Complete; 144 employees
	Sampling and Monitoring	Sample six locations twice annually	Tracy	Complete
	Sampling and Monitoring	Evaluate existing and potential sampling sites, focus on BMP performance, and include results in the 2021 SWMP	Tracy	Complete

[1]Minimum Control Measure per the Montana Department of Environmental Quality Small Municipal Separate Storm Sewer System (MS4) Permit

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, design-build community, and municipal employees. Each group has specific activities contributing to storm water quality degradation and ways in which the City 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. The design-build community includes engineer consultants and building contractors. Construction 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.
  - 2020 – The Storm Water Utility did not attend any neighborhood council meetings. Due to COVID, these meetings were cancelled.
    - Physically distanced outreach via storm drain markers: 93 storm drain markers were installed at 49 dry wells and 44 inlets
- Design-Build: Host one storm water pollution prevention and construction BMP training for at least five local contractors and/or consultants in fall/winter 2020.
  - 2020 – The City collaborated with Clean Water Technologies (CWT, LLC) to host an MDEQ Construction General Permit Stormwater Pollution Prevention Plan (SWPPP) Administrator training and BMP workshops on October 14-15, 2020.
    - 22 contractors and consultants became certified SWPPP Administrators.
    - 17 contractors and consultants attended the BMP workshops.
- Municipal Employees: Educate at least 50 City employees about storm water pollution prevention using ProProfs.
  - 2019 – Five employees completed the training.
  - 2020 –144 employees completed the training by the end of 2020.
    - Seven employees participated in the BMP workshop on October 14-15, 2020

1.1.1.2 2021 Goals

- General Public: Install 100 storm drain markers at 50 dry wells and 50 inlets
- Design-Build: Host SWPPP Administrator trainings in spring and fall 2021
  - 20 local contractors and/or consultants attend the trainings
  - Host a free BMP Workshop for at least 20 contractors and/or consultants
  - Solicit participation via Notify Me and Contractor listserv from Permits and Licensing Division

- o 20 local contractors become certified SWPPP Administrators
- Municipal Employees: Ensure ProProfs training module is incorporated into new employee onboarding protocol.

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
  - o We were not able to accomplish this goal. The website banner is primarily used for City-wide updates and newsflash items controlled by the City Communications Specialist.
  - o Main Storm Water website was visited 2,150 times, with subpage visits as follows: Flood Information Center (896), Designs & Drawings (325), and Construction Permits (327).

2021 Goals

- Update main Storm Water page with relevant news articles regarding green infrastructure, new storm water technology, water quality, etc. at a minimum of six times annually.
- Increase website traffic visits by 10% in all categories from 2020.

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
  - o Three different educational banners were published on three buses for three months: June 1 through September 30, 2020. Photos shown in Annual Report, Attachment C.

1.2.1.2 2021 Goals

- Targeted neighborhood outreach (e.g., door hangers) explaining their location in proximity to an impaired water body. Example: Pattee Creek neighborhood and the Bitterroot River.
- Targeted pet owner outreach. First test location will be our largest dog park, Jacob's Island. We will install multiple (10-20) temporary pet waste informational signs to encourage bagging and disposing of pet waste.

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
  - Partnerships established or maintained with five local non-profits
    - Montana Conservation Corps: Hosted two Montana Conservation Corps Fellows from May 18 to October 2, 2020
    - Watershed Education Network: Contributed photos, graphics, and consultation towards WEN's development of a new online educational platform to be used in elementary through high school.
    - Working Dogs for Conservation: Community pet waste pickup at Blue Mountain Recreation Area on July 2, 2020
      - Fifteen 39-gallon garbage bags of waste collected and properly disposed of by the U.S. Forest Service
    - Clark Fork Coalition: Contributed to the Clark Fork Clean Up annual event and planned to host a table with Storm Water information. Due to Covid-19, this event was cancelled.
      - Zoom classroom education with Lily Haines (CFC) at Missoula International School. This included a field presentation with Storm Water stenciling at various locations near/around the school. 24 Students participated.
    - SpectrUM: Designed and funded a water table and aquifer model for the new

Missoula Public Library

- Library opening delayed; projected to open Spring 2021
- Water table has been installed at the library and they are working on signage
- Projected to open in Spring 2021

1.2.2.2 2021 Goals

- Establish partnership with at least one new educational non-profit and one environmental non-profit by May 1, 2021.

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 markers, 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
  - Most community events cancelled due to COVID
  - Montana Conservation Corps members hosted table at the University of Montana
    - Engaged with 23 community members
  - Community pet waste pick up with Working Dogs for Conservation at Blue Mountain Recreation Area. Fifteen 39-gallon garbage bags of pet waste were collected and disposed of by the U.S. Forest Service.

- With the assistance of the Public Works Communication Specialist, establish a Public Works account on Facebook and Instagram
    - Instagram account created and regularly updated: @missoulacitypublicworks
        - 40 Posts
        - 661 Followers

2.1.1.2 2021 Goals

- Support at least two community events with non-profit partners
- Update Instagram account at least weekly: 52 Posts and 1,000 Followers

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
    - The GIS Services Division undertook a massive data migration to Portal, which affected their ability to work on new services
- Solicit input on SWMP
    - The SWMP was published to Engage Missoula: https://www.engagemissoula.com/storm-water-management-program-review
- Link to partner websites and community events
    - Provided links to the main City Calendar, Parks Volunteer Opportunities, Working Dogs for Conservation, and Clark Fork Coalition.

2.2.1.2 2021 Goals

- Implement citizen relationship management software and smartphone app

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 7).

Table 7. 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
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

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
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*
  - Most activities are exempt since standard operating procedures are to discharge to open land or a dry well
  - Need to document and publish municipal SOPs; to determine which activities are most likely to require coverage

3.2 Occasional Incidental Non-Storm Water Discharges

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

Table 8. 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	A free “Clean Suds’ Car Wash Kit” is available from the MVWQD.

Category	Suspected Significant Contributor of Pollutants (yes/no)	Potential Associated Pollutants	Local Controls or Conditions
		Nitrogen Phosphorus	
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*
    - Most activities are exempt since standard operating procedures (SOPs) are to discharge to open land or a dry well
    - Need to document and publish municipal SOPs; to determine which activities are most likely to require coverage

3.2.1.2 2021 Goals

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: https://www.ci.missoula.mt.us/2682/Storm-Water-Map.

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 2020 Goals

- Use an app, such as ArcGIS Collector, to collect field data and update the GIS database
  - Using a Trimble R2 and smartphone with Collector, we added a lot of newly recorded assets to our inventory: 23 outfalls, 1,126 dry wells, 9 miles of pipe, and 79 detention basins.

3.3.1.2 2021 Goals

- Use the Trimble R2 and Collector to update Storm Water inventory
  - Reconcile storm water assets in the urban core

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
    - MVWQD provided quarterly reports

3.4.1.2 2021 Goals

- MVWQD will continue to 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 for the City to assume maintenance of MDT storm water infrastructure within the City limits
    - A request for a Memorandum of Understanding was presented to MDT (Steve Felix, Maintenance Chief: Missoula District) on April 17, 2020.
    - MDT stated that they did not have the funds necessary to compensate the City for managing their storm water infrastructure within the City limits (Table 9).

Table 9. Estimated labor and equipment costs for the City of Missoula to manage Montana Department of Transportation storm water infrastructure within the city limits

Structure	Total	Quantity/Yr	Labor Cost ($82/hour)	Equipment Cost ($260/hour)	Subtotal
Dry Wells	612	102	$8,380	$26,520	*$34,900*
Inlets	306	51	$4,190	$13,260	*$17,450*
Storm Lids	178	15	$1,232	$3,900	*$5,132*
Pipes	37,918 ft	6,320 ft	$12,981	$41,080	*$54,061*
		Subtotal	*$26,784*	*$84,760*	**$111,544**

- The SWMP Coordinator will be a member of the University of Montana's Team
    - The City's SWMP Coordinator is a member of the University of Montana's SWMP Team
- The MVWQD Division Supervisor will be a member of the City's Team
    - The MVWQD Division Supervisor is a member of the City's SWMP Team

3.4.2.2 2021 Goals

- Draft formal agreement with MDT

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 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 days. 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. 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
    - Reviewed with Team on June 29, 2020
- Map enforcement responses and investigations
    - Maps provided in Appendix D

3.4.3.2 2021 Goals

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. In 2019, we identified 59 outfalls within the City's MS4 jurisdiction and 14 were inspected during dry weather. In 2020, we continued to field-reconcile our inventory and the number of outfalls was revised to 89. 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

- The total number of outfalls within the City's MS4 was revised from 59 to 89
    - The City is responsible for 42 are
- 100% of the City's outfalls were inspected by the end of 2020

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 (Appendix C). 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
    - Screening procedure developed and implemented; described in *Outfall Priority and Reconnaissance* (Appendix C)
- Identify high-priority outfalls by July 1, 2020
    - High-priority outfalls identified and described in *Outfall Priority and Reconnaissance* (Appendix C)
- Inspect the high-priority outfalls in 2020
    - All high-priority outfalls were inspected in 2020 (Appendix C)

3.5.2.2 2021 Goals

- Inspect all high-priority outfalls

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
    - Reviewed with the Team on June 29, 2020
- Receive quarterly reports on suspected illicit discharges from the MVWQD
    - Quarterly reports received
- Map illicit discharges and investigations
    - Maps provided in Appendix D

3.6.2 2021 Goals

- 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 first City *Storm Water Specifications and Design Standards* was adopted on August 9, 2016. Construction and post-construction storm water standards were updated in 2020 and are provided in Chapters 6 and 8 within the *Public Works Standards and Specifications Manual* (Appendix E). Standard drawings were also updated in 2020 and are provided in Appendix F; they can be accessed via the City website and through a link provided on the Storm Water Utility homepage: http://www.ci.missoula.mt.us/2711/Standard-Drawings.

4.1.1 Revisions to Chapter 13.27, Missoula Municipal Code

In 2020, Chapter 13.27 was revised to create a regulatory framework for construction site storm water permitting and inspections. The revision—renamed Storm Water Management—was presented to the City Council Public Works Committee on February 12, 2020 and a public hearing occurred on March 9, 2020. The City Council unanimously approved the new code and it became effective on April 8, 2020 (Appendix G). Chapter 13.27 also establishes a fee structure, penalties for commencing work without a permit, and penalties for violation of the code. A public hearing for the new Storm Water Permit and Dry Well Approval fees was held on September 14, 2020 and approved by council on September 21, 2020. The *Storm Water Specifications and Design Standards Manual* was rescinded and replaced with the *Public Works Standards and Specifications Manual*. The new manual became effective on November 18, 2020 and codifies City standards for construction and post-construction storm water management, to comply with MS4 Permit conditions.

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 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 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.

4.1.1.1 2020 Goals

- Implement City Storm Water Permit by June 1, 2020
    - Storm Water Permit implemented January 1, 2021
- Revise and publish City storm water standards and specifications before January 2021
    - *Public Works Standards and Specifications Manual* became effective on November 18, 2020

4.1.1.2 2021 Goals

- Using the Site Evaluation Form to determine site priority, inspect 25% of sites with a City Storm Water Permit
    - 100% of high-priority sites
    - 10% of medium-priority sites
    - 1% of low-priority sites

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. The City is responsible for enforcing construction site requirements per MMC Chapter 13.27. Therefore, the City must develop and implement an ERP for violations of these regulations, apart from MVWQD's ERP.

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
    - Reviewed the ERP with the Team on June 29, 2020
    - Determined that City must draft its own ERP for construction storm water site management

- Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code

4.1.2.2 2021 Goals

- Draft and implement ERP for violations of construction site requirements in MMC Chapter 13.27

4.2 Erosion Control Site Plan

The City requires a Storm Water Permit for projects that disturb 2,500 square feet of land or more or propose 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. Erosion Control Site Plans are reviewed by City staff prior to project approval.

4.2.1 Erosion Control Site Plan Review Checklist

In 2020, the City updated MMC Chapter 13.27, to regulate construction site storm water management. The Storm Water Permit replaced 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. The applicant completes the Erosion Control Site Plan Review Checklist, to ensure their plan meets the City's requirements. This checklist is 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.
    - Checklist implemented January 1, 2021

4.2.1.2 2021 Goals

- Track and document Erosion Control Site Plans

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 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 intends to hire two full-time employees (FTEs).

4.3.1.1 2020 Goals

- Hire two FTEs for inspections
  - One additional FTE—Engineering Permit Tech—was hired in Engineering Plan Review & Inspections
    - Four Engineering Permits Techs will rotate duties every 3 months, with one FTE always dedicated to storm water inspections
- Conduct construction inspections using the City's inspection form by June 1, 2020
  - Inspections are completed using the form and then they are logged in Accela, the City's permitting and inspection software

4.3.1.2 2021 Goals

- Track and document construction site inspections
- Inspect 25% of sites with a Storm Water Permit
- Evaluate compliance by documenting the total number inspections and how many sites passed or failed
- Evaluate workload capacity, to determine if additional inspection staff are needed to improve compliance

4.3.2 Inspection Frequency Determination

The Storm Water Permit applicant shall complete the Site Evaluation Form 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 Site Evaluation Form by June 1, 2020
  - Form implemented on January 1, 2021

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.

MMC 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 describe how the community benefits of the proposed development supersede those of 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.

MMC §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 was revised in 2020. The revisions addressed performance standards, permitting, site plan submittal, preservation of natural drainage systems, flood mitigation, site grading, and protection of property. It also established a permit fee structure and penalties for violations. Under these 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, per the Site Evaluation Form. Medium- to high-priority sites must also submit a post-construction Storm Water Management Site Plan with the Storm Water Permit application (Appendix H). Post-construction storm water management criteria are described in the City's *Public Works Standards and Specifications Manual*. The manual became effective on November 18, 2020 and codifies City standards for storm water management.

5.1.1.1 2020 Goals

- Track and document Riparian Resource Management Plans
    - This task was not completed; this is managed by another department
    - The Storm Water Utility will focus on plans and permits that they administer
- Implement the City Storm Water Permit by June 1, 2020
    - Implemented January 1, 2021

5.1.1.2 2021 Goals

- Track and document Storm Water Permits

5.1.2 Enforcement Response Plan

The MVWQD implements a formal ERP to investigate suspected illicit discharges (Appendix B). The ERP does not address post-construction storm water controls. The City is responsible for enforcing post-construction site storm water management requirements per MMC Chapter 13.27. Therefore, the City must develop and implement an ERP for violations of these regulations, apart from MVWQD's ERP.

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
  - Reviewed with team on June 29, 2020
  - Determined that City must draft its own ERP for post-construction storm water site management
- Update the ERP to include reference to Chapter 13.27, Missoula Municipal Code
  - Updated to include reference to Chapter 13.27

5.1.2.2 2021 Goals

- Draft ERP to ensure compliance with the installation, operation, and maintenance of post-construction storm water management controls

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 Site Plan Review Checklist

Per MMC 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 Site Plan is required for medium- to high-priority projects, per the Site Evaluation Form (for determining construction site inspection frequency).

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
    - Implemented January 1, 2021

5.2.1.2 2021 Goals

- Track and document Storm Water Management Site Plans

5.2.2 Performance Standards

MMC Chapter 13.27 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
    - No inventory was completed.
    - City regulations state that developments must retain all storm water on site; specifically, they must retain the difference between pre- and post-development runoff.
    - Use of dry wells means that few sites require off-site treatment
    - 2020 staff time focused on implementing the Storm Water Permit
        - Creating new work flows and significant backend development within the Accela permitting software system

5.2.2.2 2021 Goals

- Create an inventory of projects that utilize off-site treatment by the end of 2021

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
  - One FTE—Program Coordinator—was hired by the Storm Water Utility in 2021 to help with post-construction inspections
- Conduct post-construction inspections using the City's inspection form by August 1, 2020
  - The Storm Water Permit became effective January 1, 2021
  - When post-construction inspections begin under the new permit, the inspector will use the form and log inspections in Accela

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
  - This has been started and will be ongoing
  - 23 outfalls, 1,126 dry wells, 9 miles of pipes, and 79 detention basins were newly recorded in 2020
- Digitize and field-reconcile the post-construction storm water control by November 1, 2020
  - This has been started and will be ongoing
  - 23 outfalls, 1,126 dry wells, 9 miles of pipes, and 79 detention basins were newly

recorded in 2020

5.3.2.2 2021 Goals

- Digitize and field-reconcile storm water facilities within the MS4 boundary

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
    - Implemented January 1, 2021

5.3.3.2 2021 Goals

- Inspect 80% of high-priority post-construction facilities

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
    - The City's Storm Water Permit was scheduled to become effective on June 1, 2020. This was not accomplished because significant backend programming was required to implement the new permit into the City's permitting software. A consultant was hired to assist with implementation and the Storm Water Permit became effective on January 1, 2021. This permit outlines the process for conducting post-construction inspections.

Once projects are given a priority rank per the Storm Water Permit, they will be inspected by the City.

5.3.4.2 2021 Goals

- Conduct and track post-construction inspections by August 1, 2021

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 (LID) standards.

5.4.1 Evaluate and Implement Low Impact Development Requirements

The City *Public Works Standards and Specifications Manual* includes post-construction design standards, including design storm data for calculating runoff. It also offers information on LID and green infrastructure design methods.

5.4.1.1 2020 Goals

- Revise and publish City storm water standards and specifications before January 2021
    - The *Public Works Standards and Specifications Manual* became effective on November 18, 2020. Chapters 6 and 8 provide detailed information for post-construction and construction site storm water management. These chapters are provided in Appendix E.
- Update standard drawings to incorporate LID and green infrastructure methods before January 2021
    - The standard drawings were updated in 2020. They are included in the City's *Public Works Standards and Specifications Manual* and provided in Appendix E.
- Convene appropriate staff and conduct a discussion to evaluate existing barriers to implementing LID infrastructure in codes, ordinances, and policies
    - The SWMP Team discussed barriers to LID on September 28, 2020 (Table 10). The major issues related to implementing LID and green infrastructure surround conflicting demands for space in the right-of-way, cost, and local expertise. Multiple demands for space in the ROW, like bicycle and pedestrian facilities, lead to diminished availability for storm water detention. There are also questions about maintenance responsibilities that need to be clarified prior to construction. In many areas, boulevards are

maintained by private property owners or homeowners associations. There can be significant variability between parcels. If using the boulevard for storm water management, there needs to be more consistency across the landscape.

Table 10. Barriers to low impact development and green infrastructure in Missoula

Barrier	Reasons		
Right-of-Way	• Conflicting demands for space: biking and pedestrian facilities	• Questions about maintenance responsibility	• Inadequate space to meet all the demands
Cost	• May cost more to construct and maintain	• Too few designs for comparative analysis	• Maintenance costs have not been tracked, hard to estimate future costs
Local expertise	• Lack of demonstration areas	• Novel approaches, lack of experience	• Few time-tested systems for Montana weather

5.4.1.2 2021 Goals

- Collaborate with UM on a green infrastructure demonstration project

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
    - This task has been started and will be ongoing into 2021.
- Draft a City Pollution Prevention/Good Housekeeping Guidance Manual by the end of 2020
    - This was not completed this year.

6.1.1.2 2021 Goals

- Compile all department/division-specific SOPs by June 1, 2021
- Draft a City Pollution Prevention/Good Housekeeping Guidance Manual by the November 1, 2021

7 Training

City personnel participate in various trainings and workshops throughout the year, but these activities have not been routinely tracked or documented. The Storm Water Utility will be responsible for maintaining documentation on employee training for storm water pollution prevention. Training will be implemented using a combination of ProProfs courses, SWPPP Administrator trainings, and BMP field workshops.

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
    - The SWMP Coordinator presented a PowerPoint presentation to the Team in June 1,2020
    - The presentation is also provided on our website: https://www.ci.missoula.mt.us/DocumentCenter/View/52258/City-of-Missoula-MS4-Permit-Overview.
- Develop and implement construction site storm water management training for plan reviewers and inspectors by June 1, 2020
    - Eight City plan reviewers and inspectors became certified SWPPP Administrators in February 2020

- Seven City employees participated in the BMP Workshop in October 2020

- Develop and implement post-construction site storm water management training for plan reviewers and inspectors by June 1, 2020
  - The City focused on construction site storm water management in 2020 and did not implement post-construction storm water management training.
- Using ProProfs, train at least 50 employees in storm water pollution prevention
  - 144 employees completed the training by the end of 2020

7.1.1.2 2021 Goals

- Implement spill prevention, response, and small works erosion control training for Streets Division by May 1, 2021
- Develop and implement post-construction site storm water management training for plan reviewers and inspectors by June 1, 2021

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
  - Results provided in the Water Sampling Plan (Appendix I)
- Evaluate existing and potential sampling sites, focus on BMP performance, and include results in the 2021 SWMP
  - Six supplemental sampling sites identified to monitor detention basin performance: temperature, total nitrogen, total phosphorus, and total suspended solids
  - Results provided in the Water Sampling Plan (Appendix I)

8.1.1.2 2021 Goals

- Collect a sample upstream of the hydrodynamic separator at Caras Park

- Add a new sampling site for monitoring detention basin performance in a residential area
- Continue green infrastructure performance monitoring and collect at least two samples per site

9 REFERENCES

Center for Watershed Protection. (2004). Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments. https://www3.epa.gov/npdes/pubs/idde_manualwithappendices.pdf

Hall, M. (2019, April 17). New effort focuses on restoration of Clark Fork River tributaries in central basin. *Missoula Current*. https://www.missoulacurrent.com/outdoors/2019/04/clark-fork/

HydroSolutions. (2014). Clark Fork River Water Quality Trends Report 1998–2012. Helena, MT. Prepared for Montana Department of Environmental Quality, Helena, MT and Avista Corporation, Spokane, WA. http://clarkfork.org/wp-content/uploads/2016/03/1998-2012-Nutrient-Trend-Report-.pdf

Montana Department of Environmental Quality. (2011). Bitterroot Temperature and Tributary Sediment Total Maximum Daily Loads and Framework Water Quality Improvement Plan. Helena, MT. https://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-03a.pdf

Montana Department of Environmental Quality. (2014a). Final Central Clark Fork Basin Tributaries TMDL and Water Quality Improvement Plan. Helena, MT. http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/COL-TMDL-01a.pdf

Montana Department of Environmental Quality. (2014b). Final Central Clark Fork Basin Tributaries TMDL and Water Quality Improvement Plan. TMDL Summary Table. Helena, MT. https://deq.mt.gov/Portals/112/Water/WQPB/TMDL/Approval%20Letters/COL-TMDL-01a_EPA.pdf

Montana Department of Environmental Quality. (2014c). Final–Silver Bow Creek and Clark Fork River Metals TMDLs. Helena, MT. http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf

Montana Department of Environmental Quality. (2017). DEQ-7 Montana Numeric Water Quality Standards. Helena, MT. https://deq.mt.gov/Portals/112/Water/WQPB/Standards/PDF/DEQ7/DEQ-7_Final_May2017.pdf

Montana Department of Environmental Quality. (2018a). Final 2018 Water Quality Integrated Report. http://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/Reports/IRs/2018/2018_IR_Final.pdf

Montana Department of Environmental Quality. (2018b). Final 2018 Water Quality Integrated Report. Appendix A–Impaired Waters. http://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/Reports/IRs/2018/Appendix_A.pdf

Montana Department of Environmental Quality and U.S. Environmental Protection Agency Region 8. (2014). Bitterroot Watershed Total Maximum Daily Loads and Water Quality Improvement Plan. Helena, MT. http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-04a.pdf

Montana Department of Natural Resources and Conservation. (2014). Clark Fork & Kootenai River Basins Water Plan 2014. http://dnrc.mt.gov/divisions/water/management/docs/state-water-plan/clarkfork_kootenai_basins/river-basin-plan/clark_fork_kootenai_basin_report_final.pdf

Neville, M. and V. Watson. (2018a). Summary of Central Clark Fork Tributaries TMDLs & Water Quality Improvement Plan. https://clarkfork.org/wp-content/uploads/2019/02/1-Central-Clark-Fork-tribs-TMDL-summary-6-p-plus-appendices.pdf

Neville, M. and V. Watson. (2018b). Summary of Silver Bow Creek and Clark Fork River Metals TMDL and Bonita-Superior Metals TMDL. https://clarkfork.org/wp-content/uploads/2019/02/3-SBC-CF-metals-TMDL-and-Bonita-Superior-metals-TMDL-summary-7-p-1.pdf

Tri-State Implementation Council. (1998). Clark Fork River Voluntary Nutrient Reduction Program. https://clarkfork.org/wp-content/uploads/2016/03/VNRP-Agreement.pdf

U.S. Environmental Protection Agency. (2016). Nation Nonpoint Source Program. EPA 841-R-16-009. https://www.epa.gov/sites/production/files/2016-10/documents/nps_program_highlights_report-508.pdf

Watson, V. (1985). A Synthesis of Water Quality Problems in the Clark Fork River Basin. Clark Fork Symposium. http://hs.umt.edu/clarkforksymposium/past-symposia/1985-symposium/papers/watson.php

Watson, V. (2018). Summary of the Clark Fork River Voluntary Nutrient Reduction Program 1998–2008. https://clarkfork.org/wp-content/uploads/2019/02/2-CFR-VNRP-1998-summary-followed-by-1998-2012-trends-report-2p-1.pdf

Appendix A
Infrastructure Maps

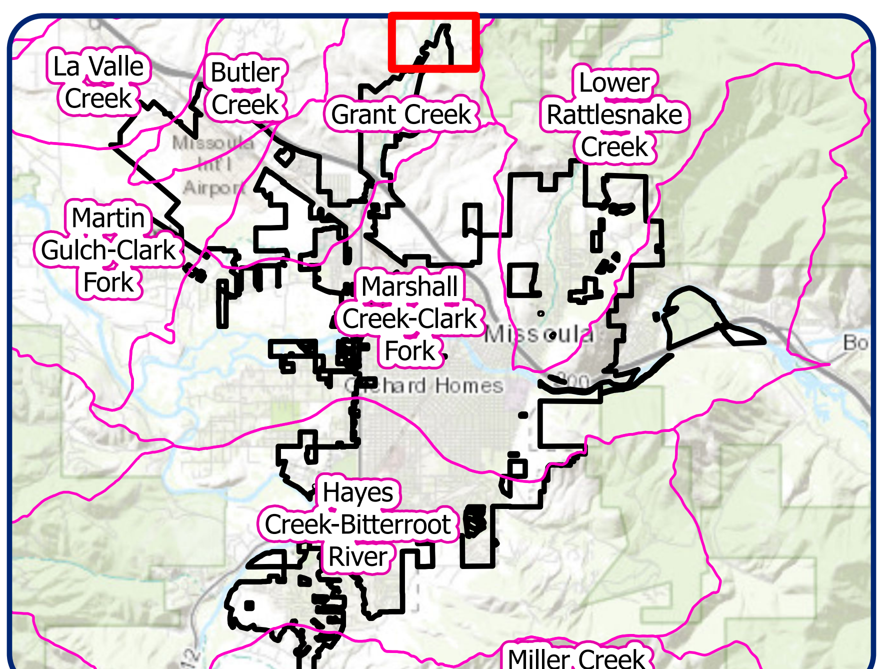
STORM WATER
City of Missoula

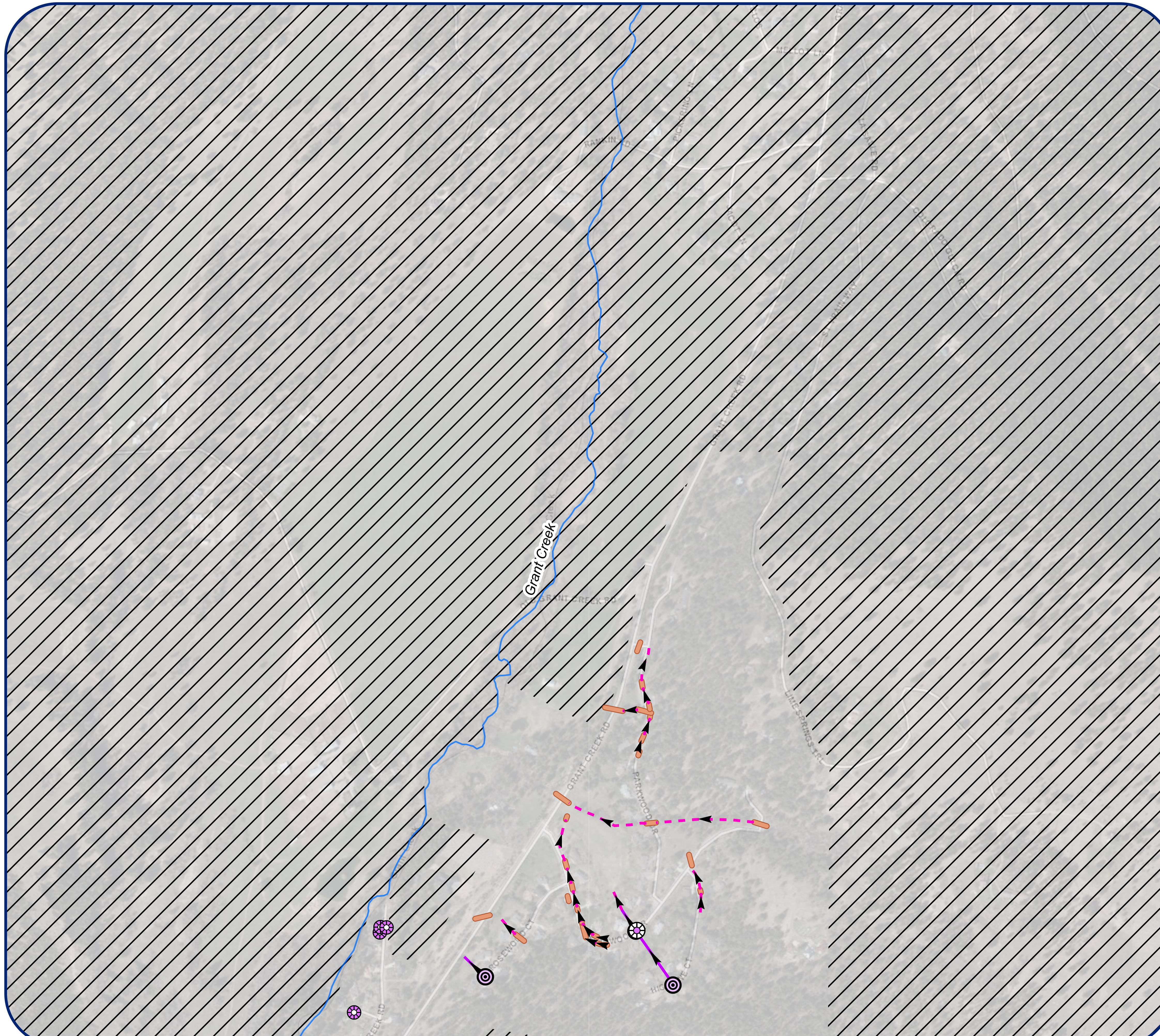
0 500 1,000 2,000 Feet

N

City Infrastructure:	Other Infrastructure:
Drywell	Drywell
Inlet	Inlet
Manhole	Manhole
Discharge Point	Discharge Point
Gravity Main	Gravity Main
Open Channel / Swale	Open Channel / Swale
Infiltration Chamber	Infiltration Chamber
Culvert	Culvert
Storm Flood Control	Storm Flood Control
Treatment Structure	Irrigation Ditch
Detention Basin	Basin
Retention Basin	
Basin	

Reference Layers:
- Non-City Property
- Sub-Watershed Boundary
- River
- Stream





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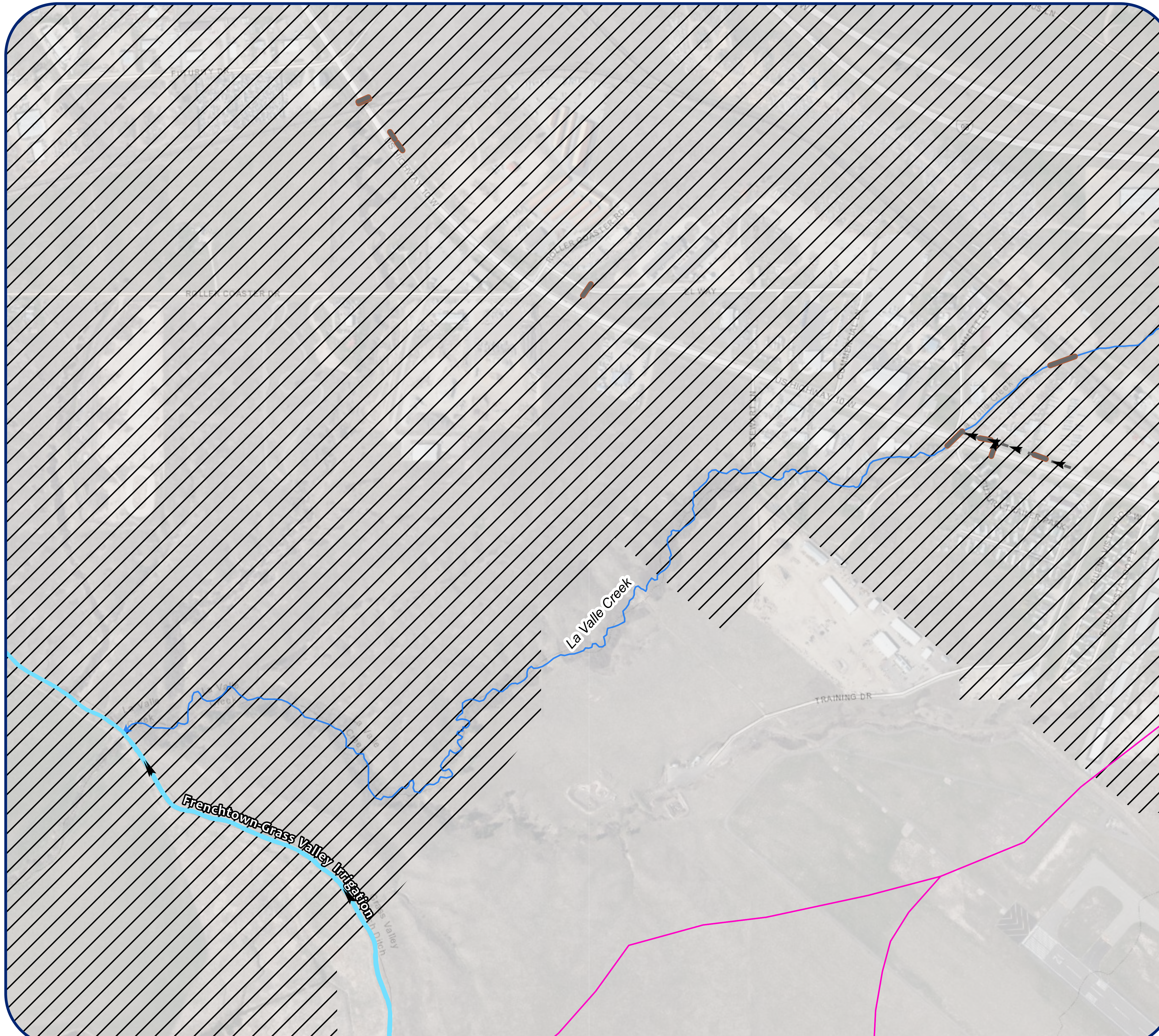

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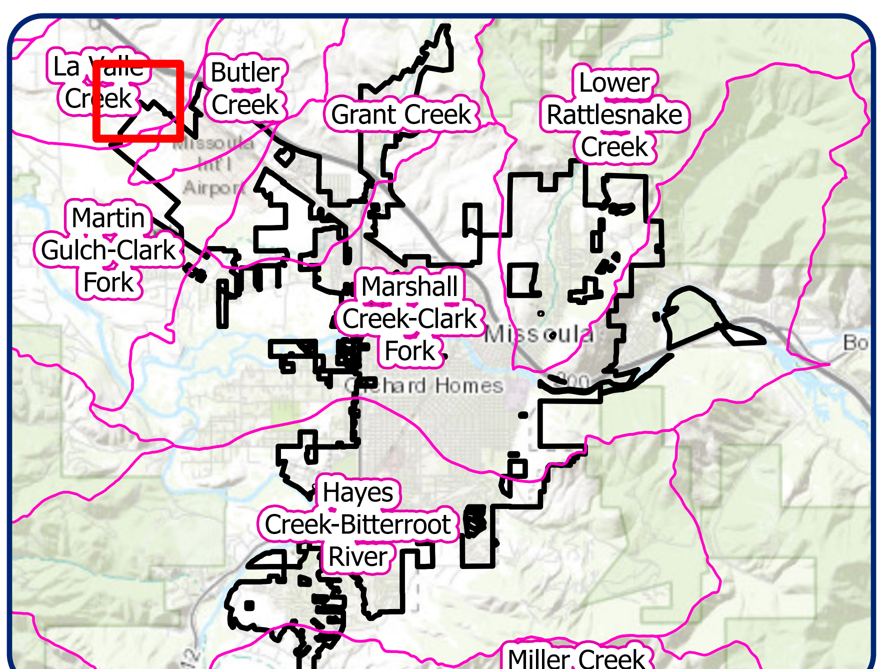

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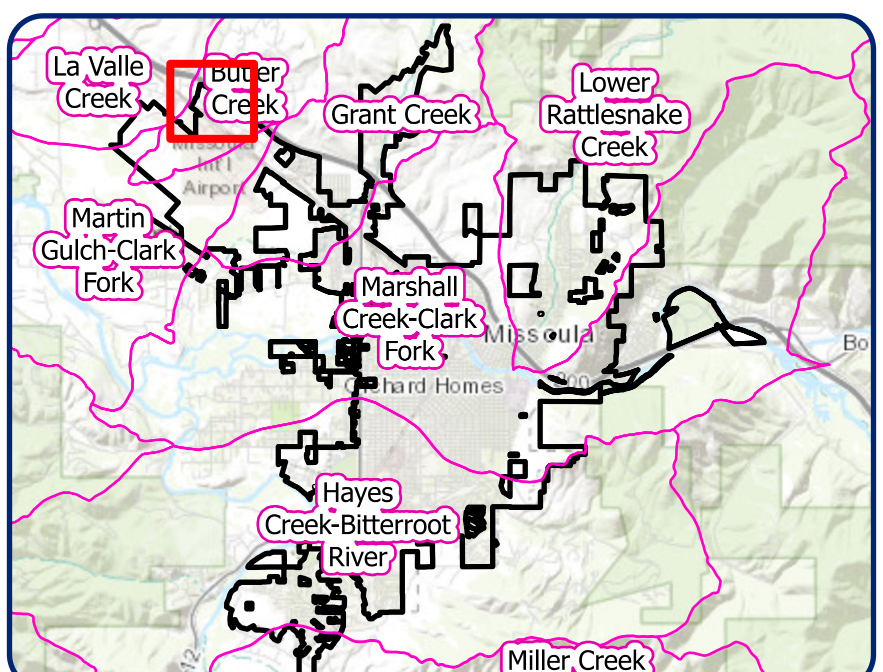

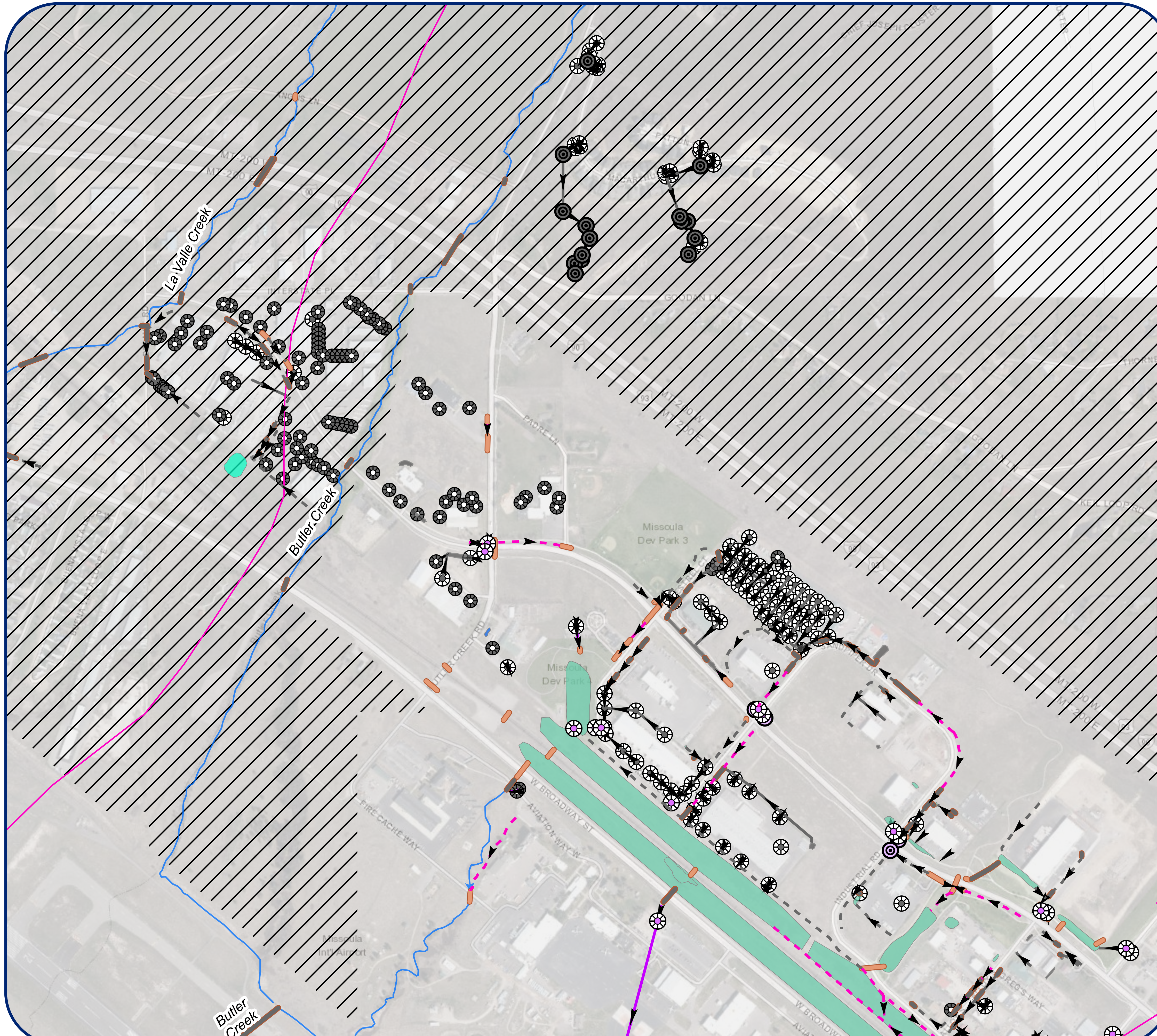

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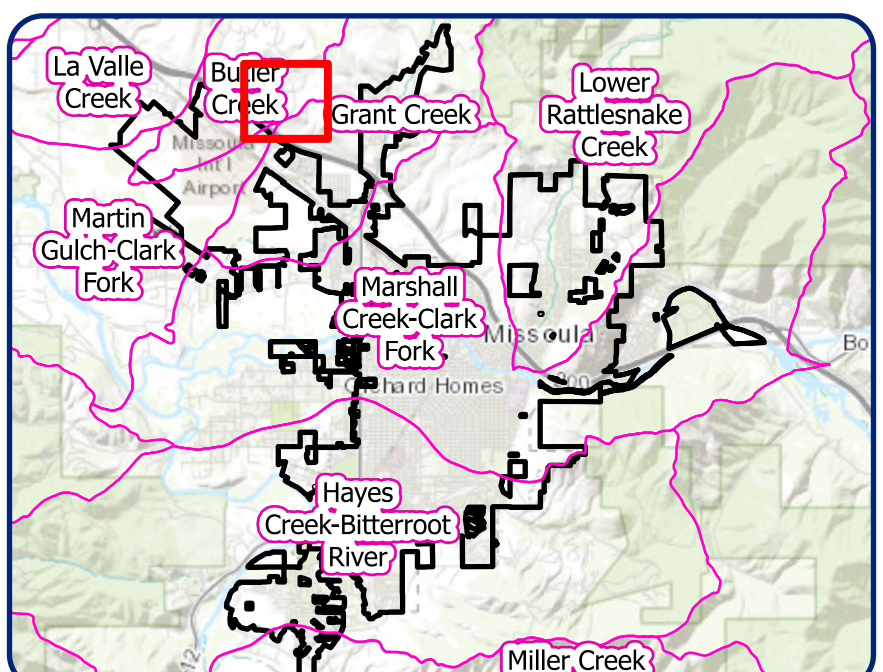

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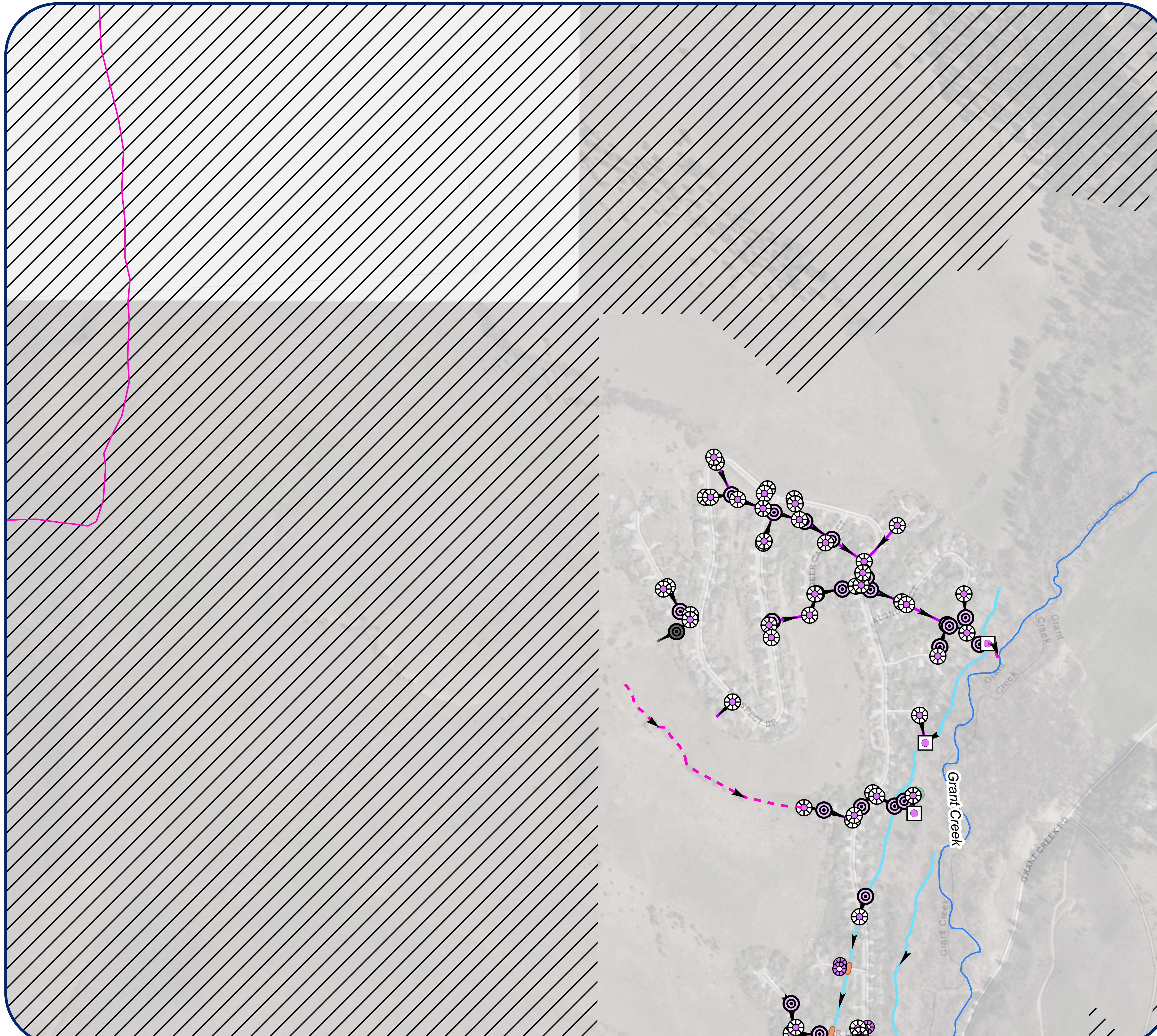

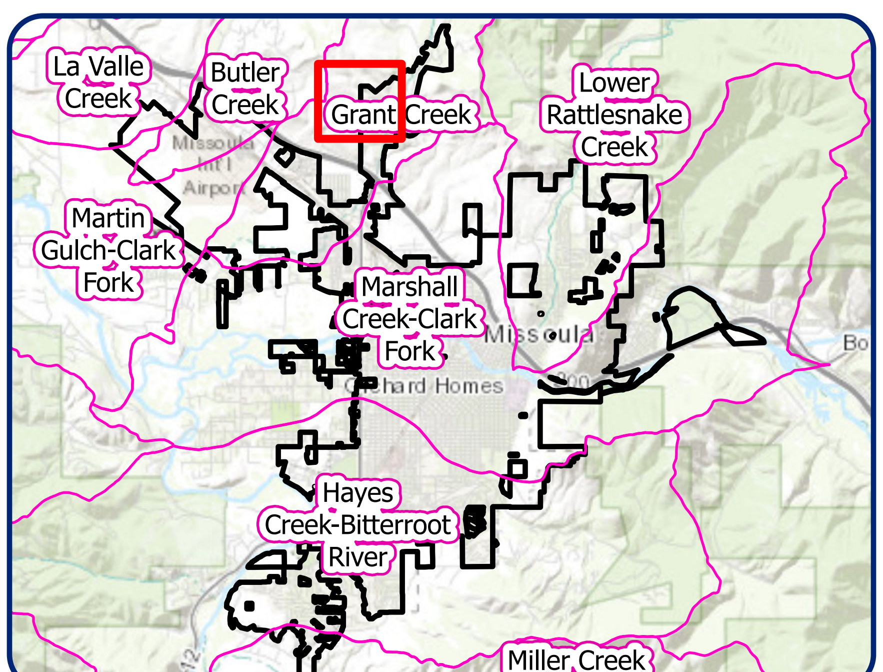

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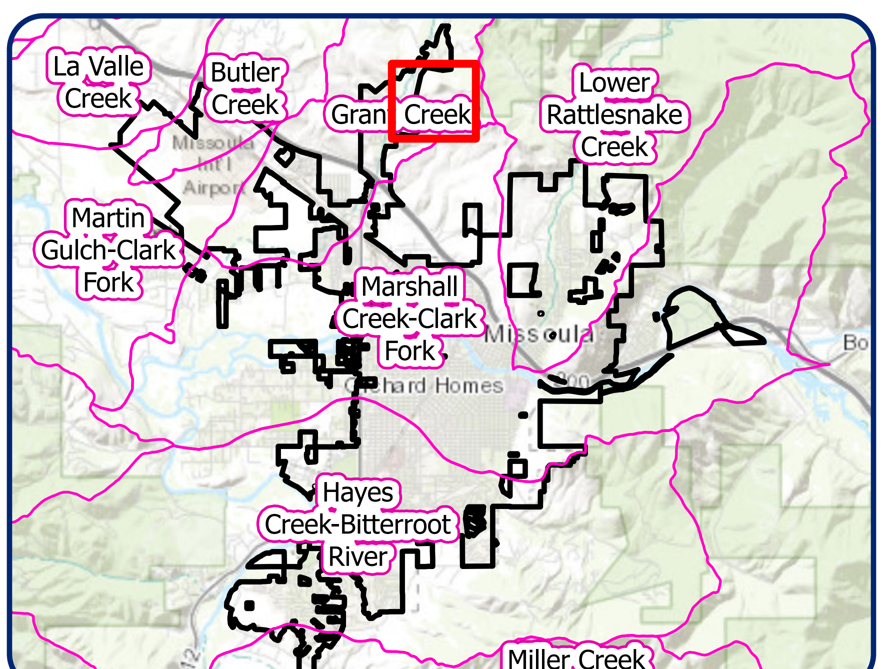

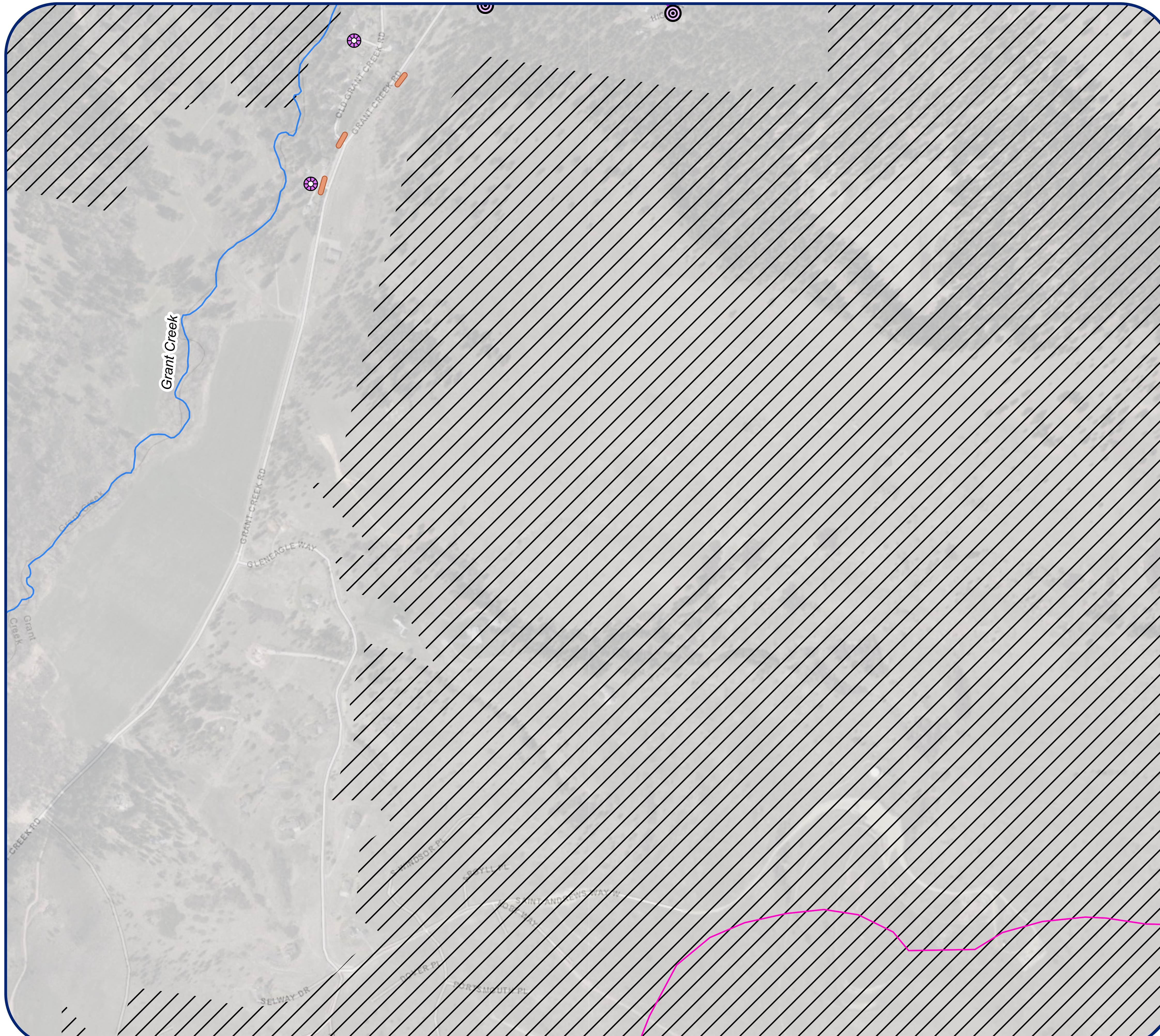

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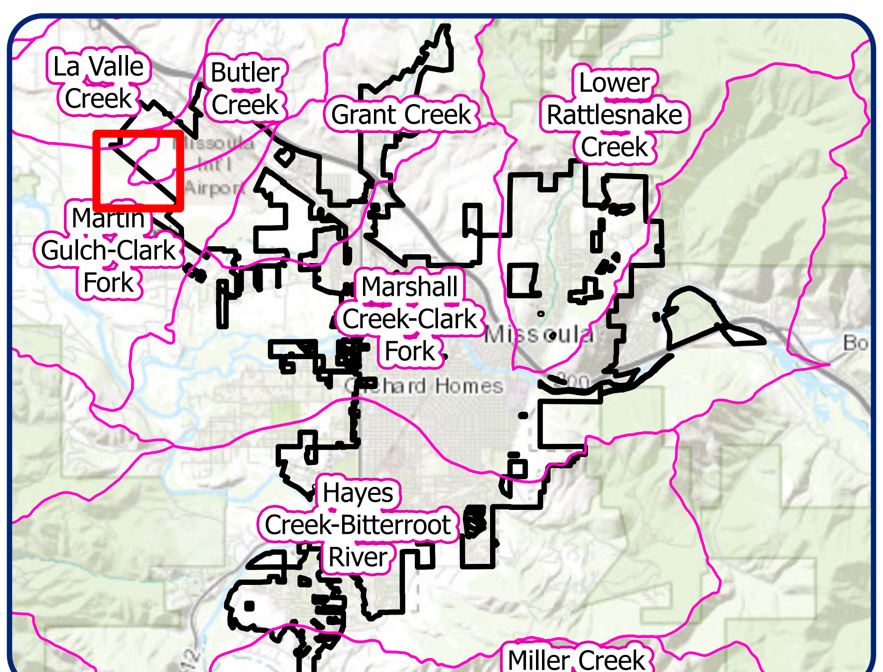

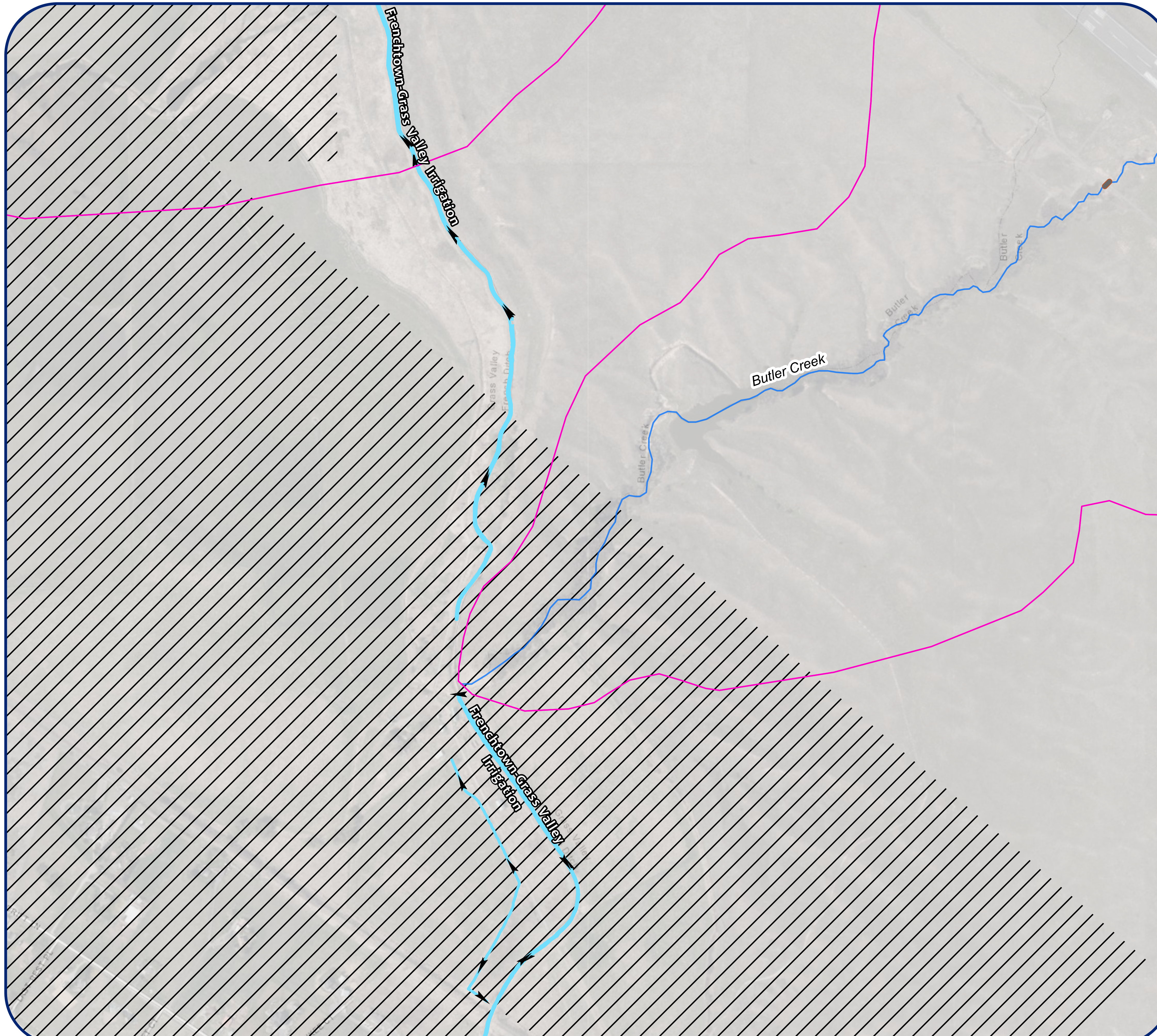

STORM WATER
City of Missoula

0 500 1,000 2,000 Feet

N

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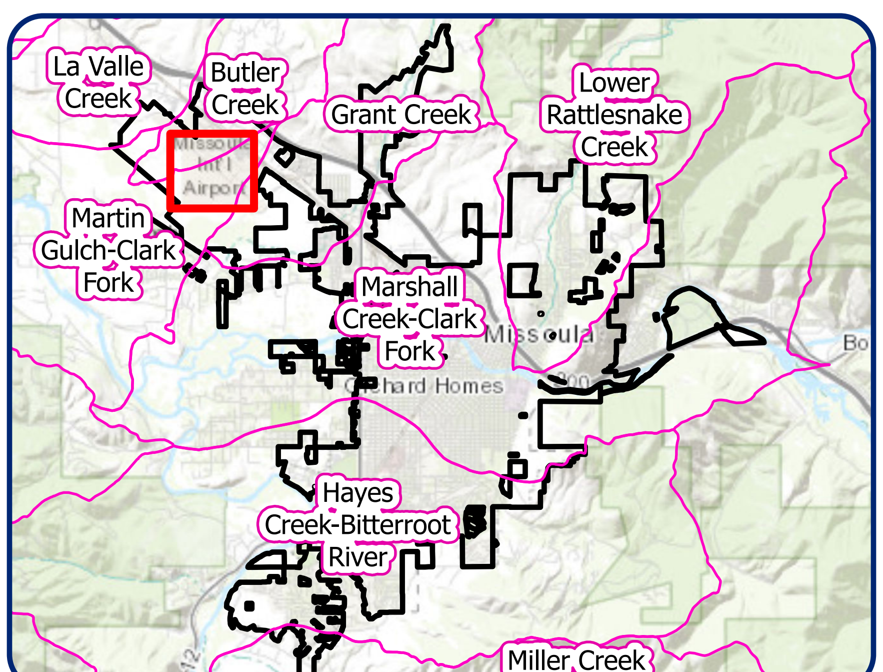

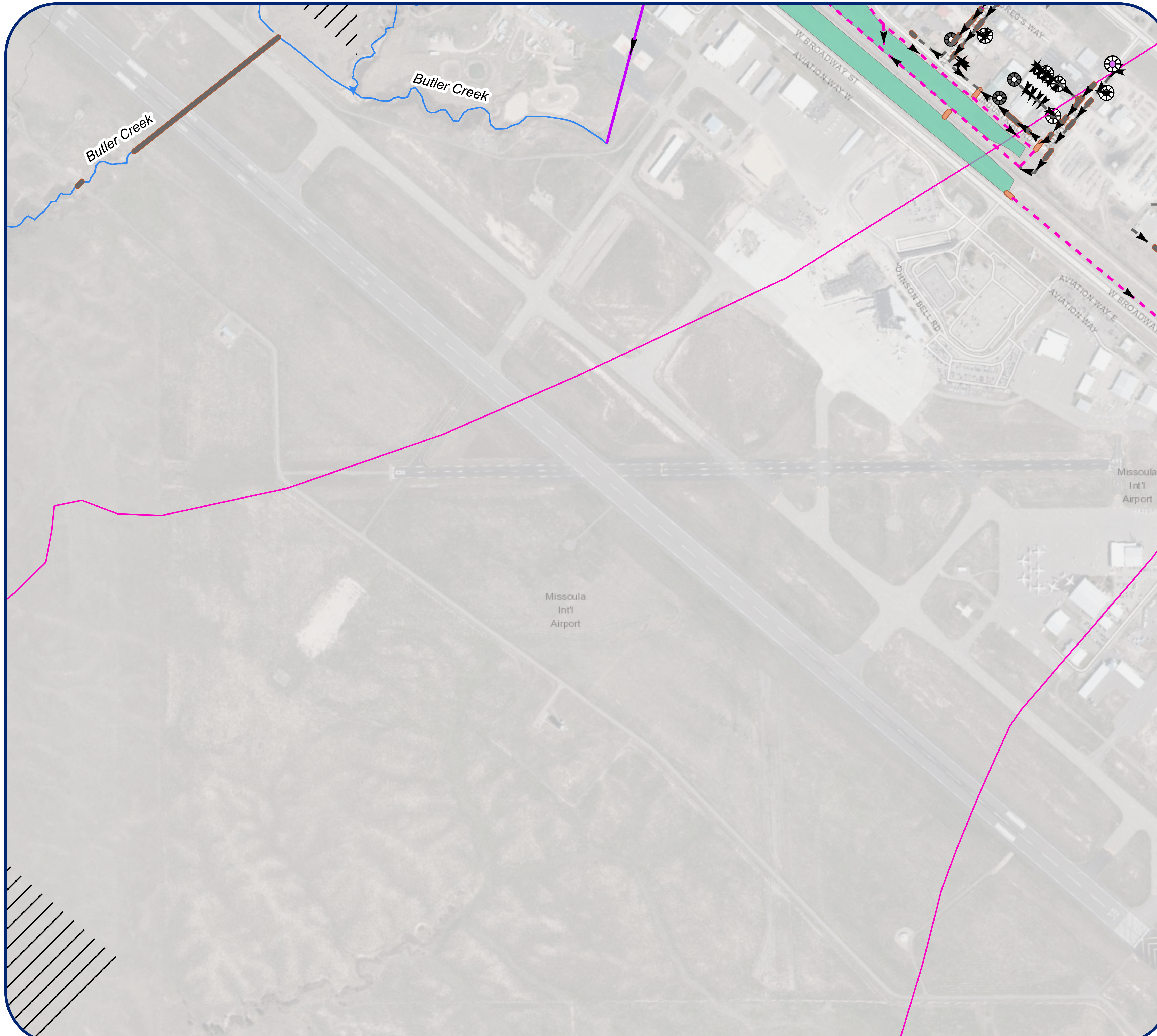

STORM WATER

City of Missoula

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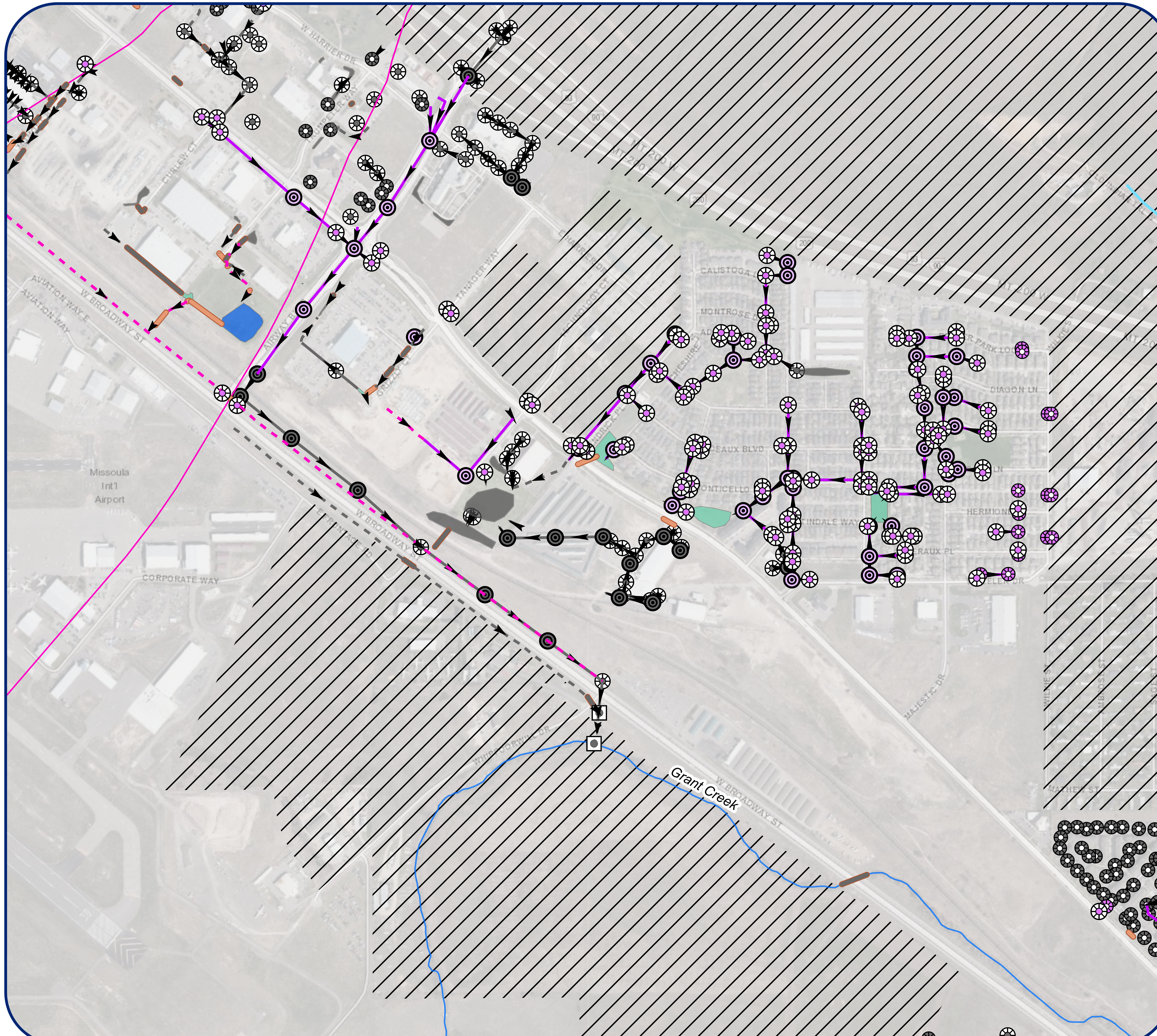

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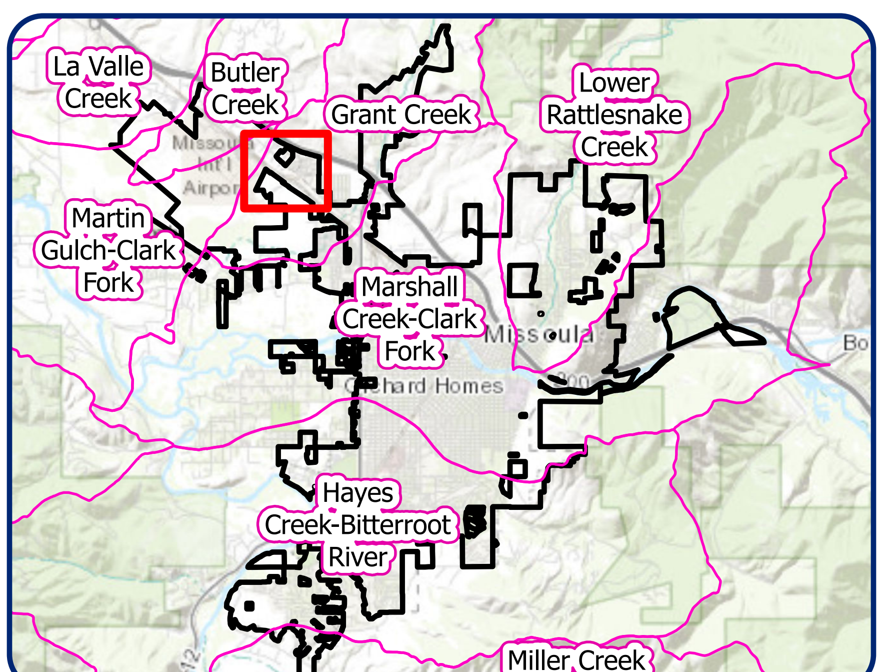

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City of Missoula

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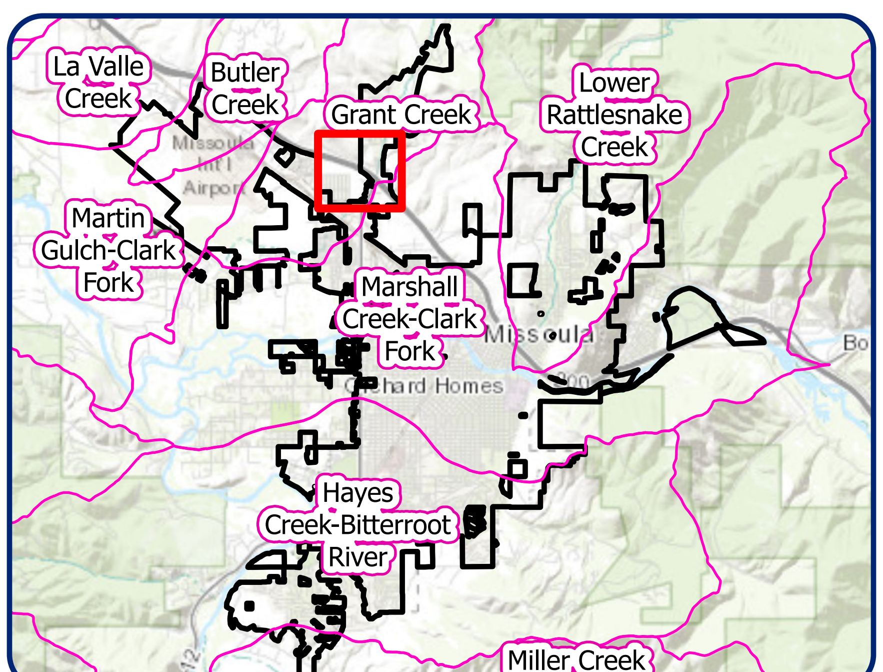

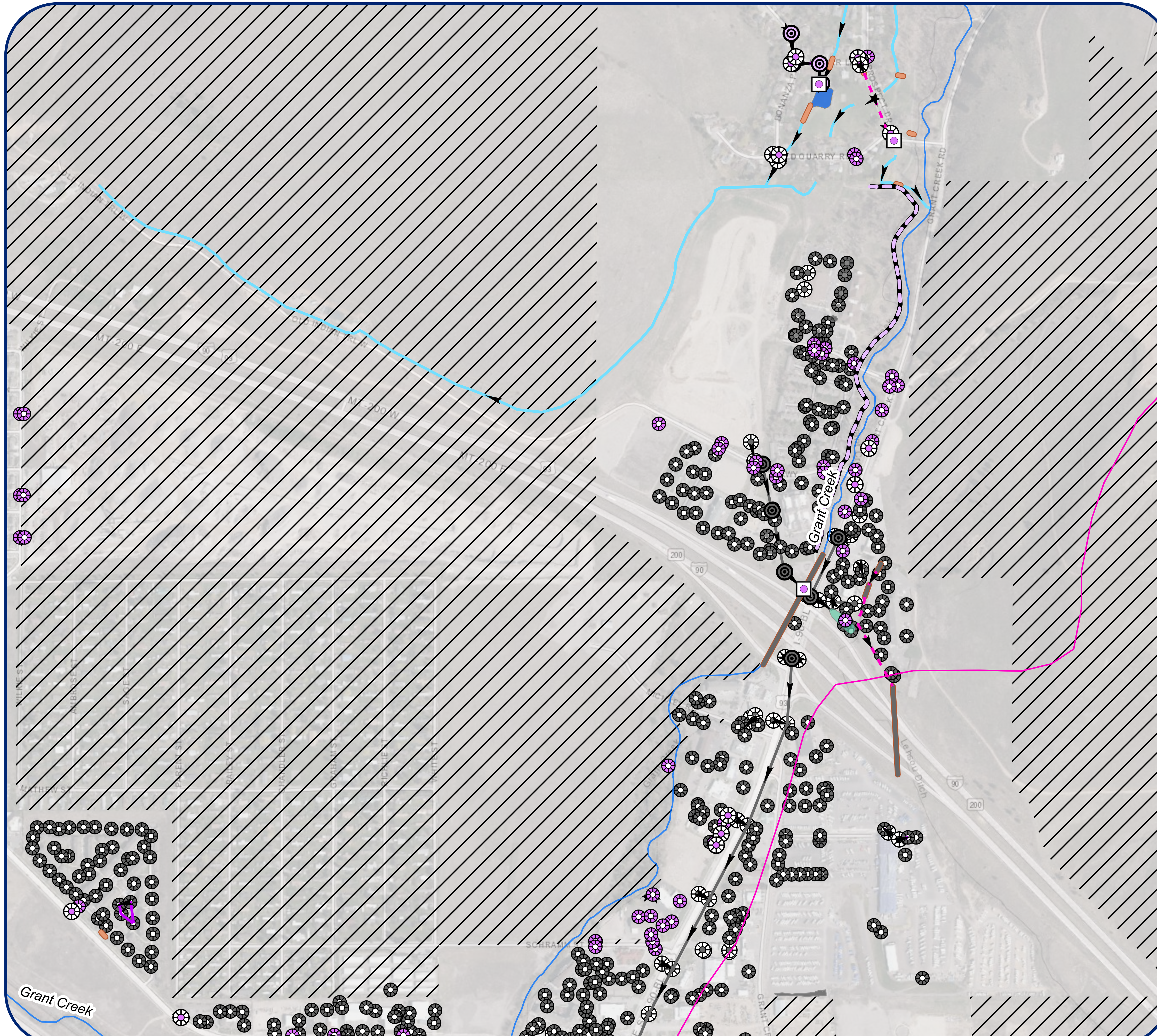

STORM WATER

City of Missoula

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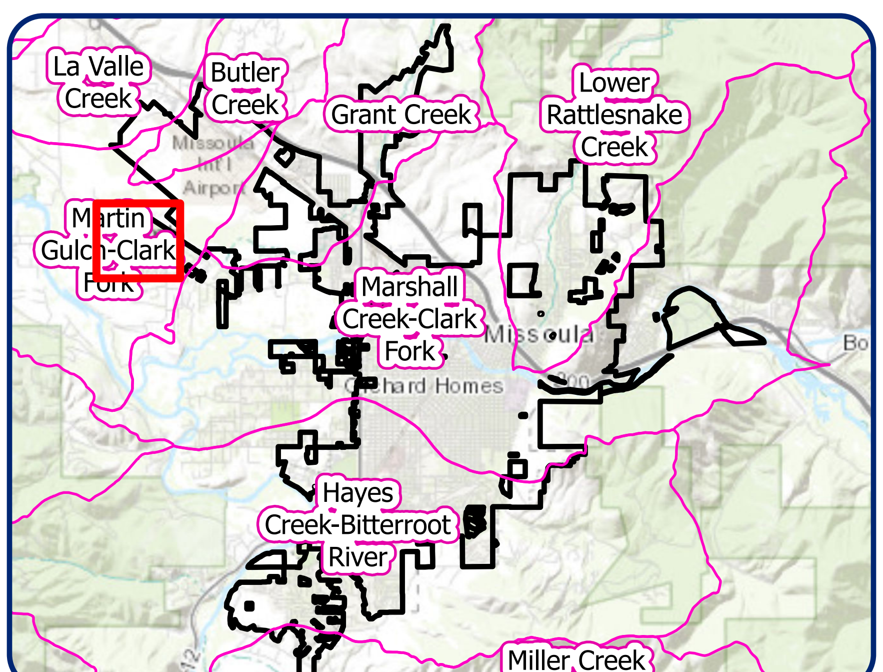

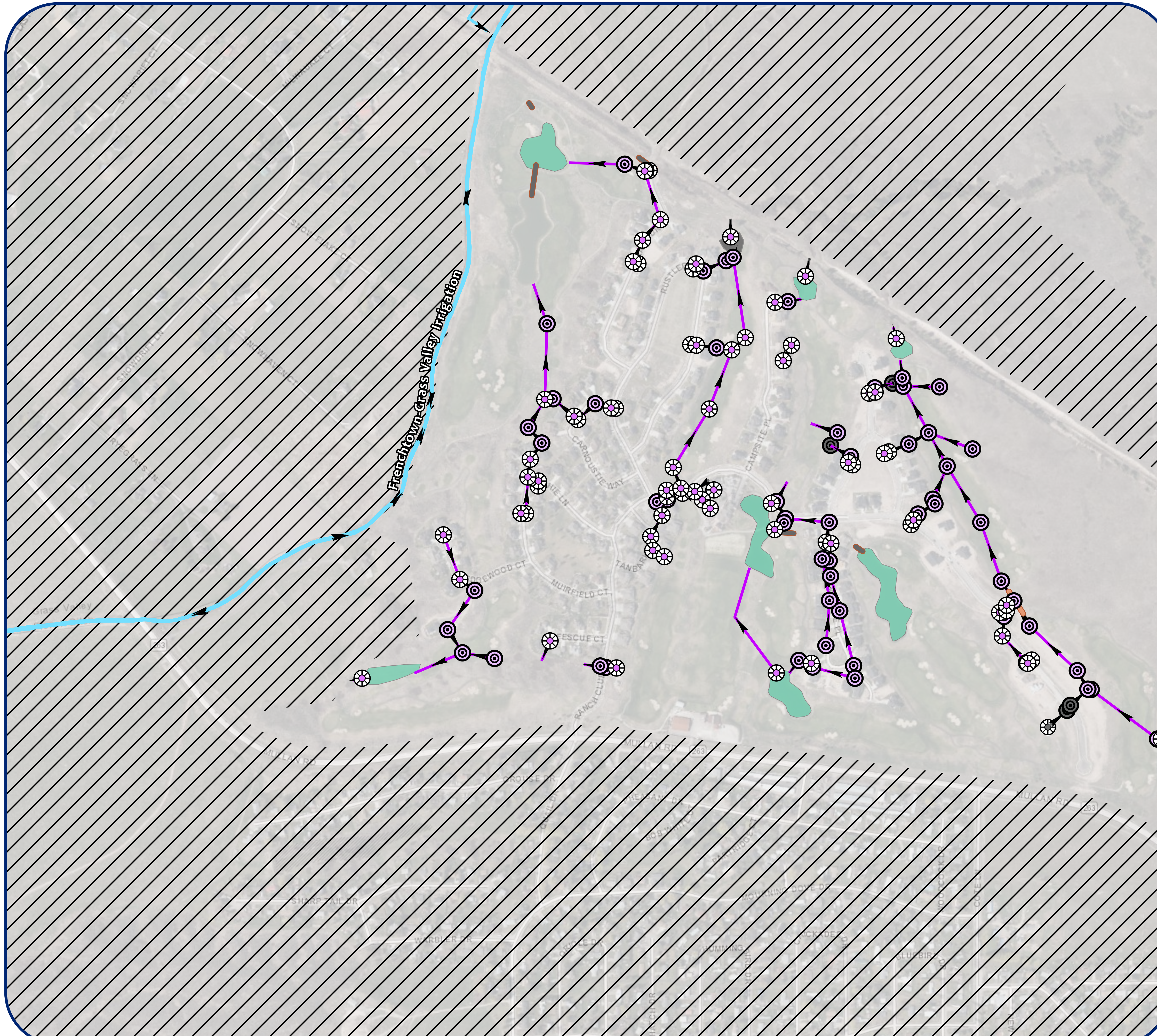

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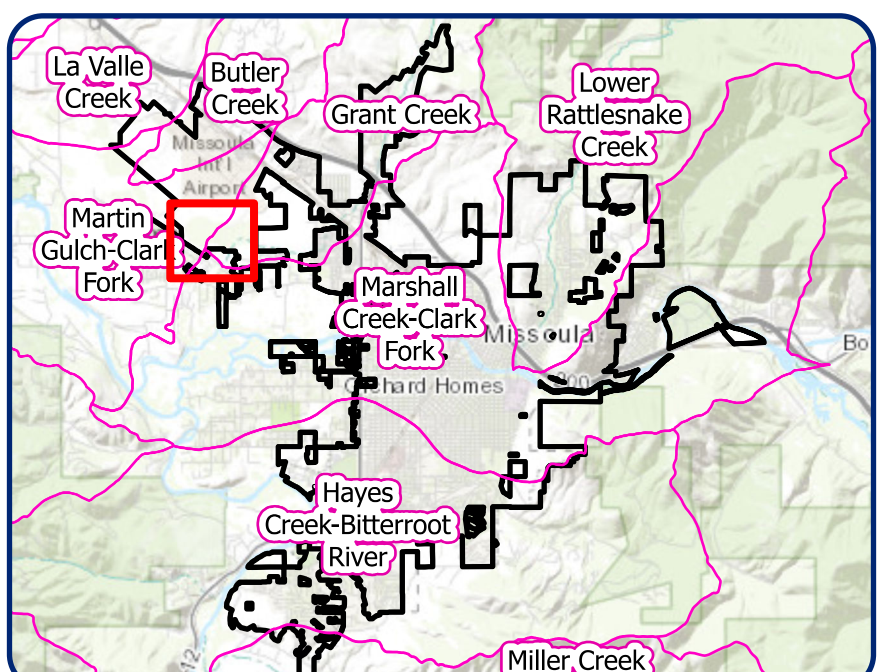

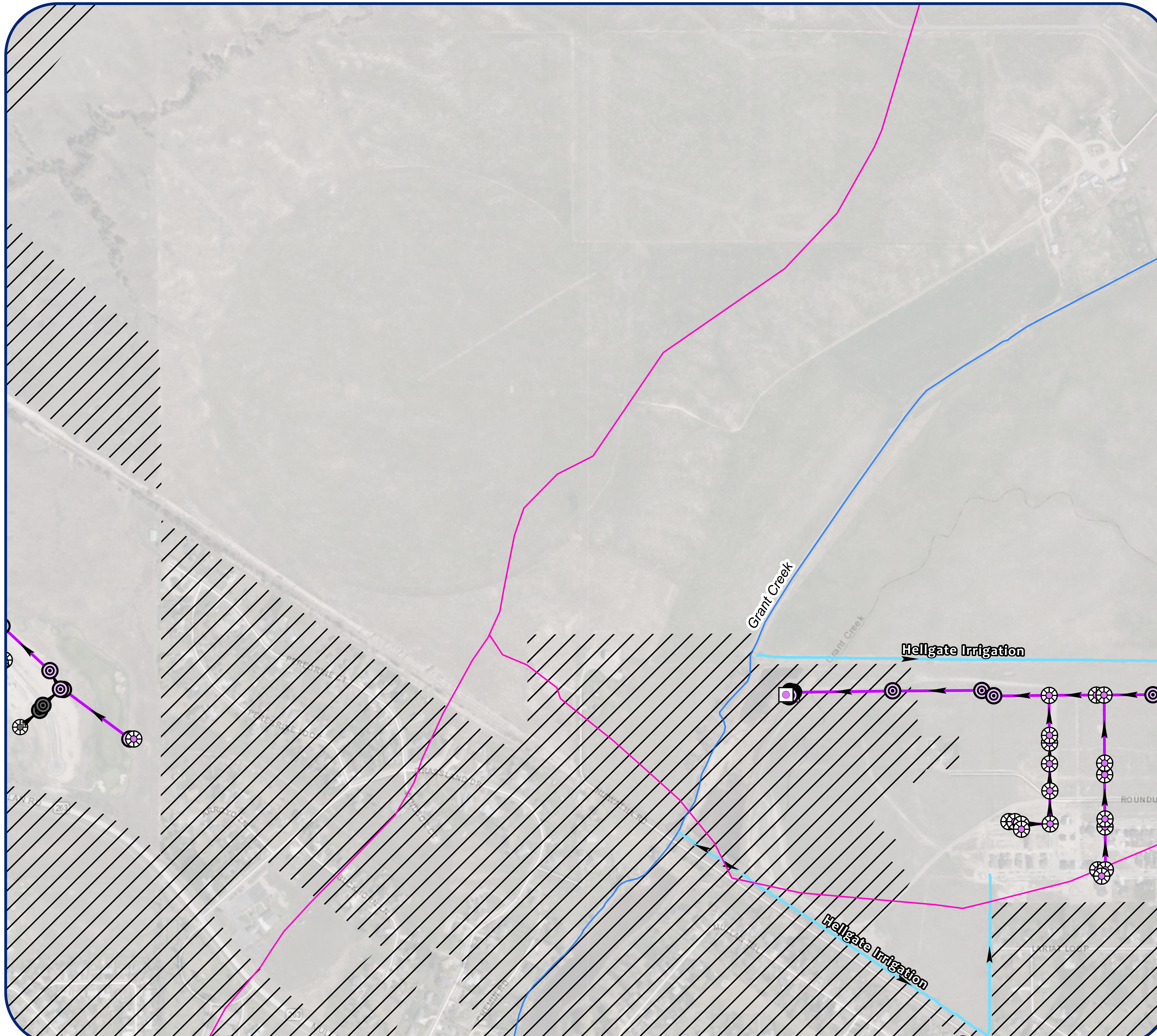

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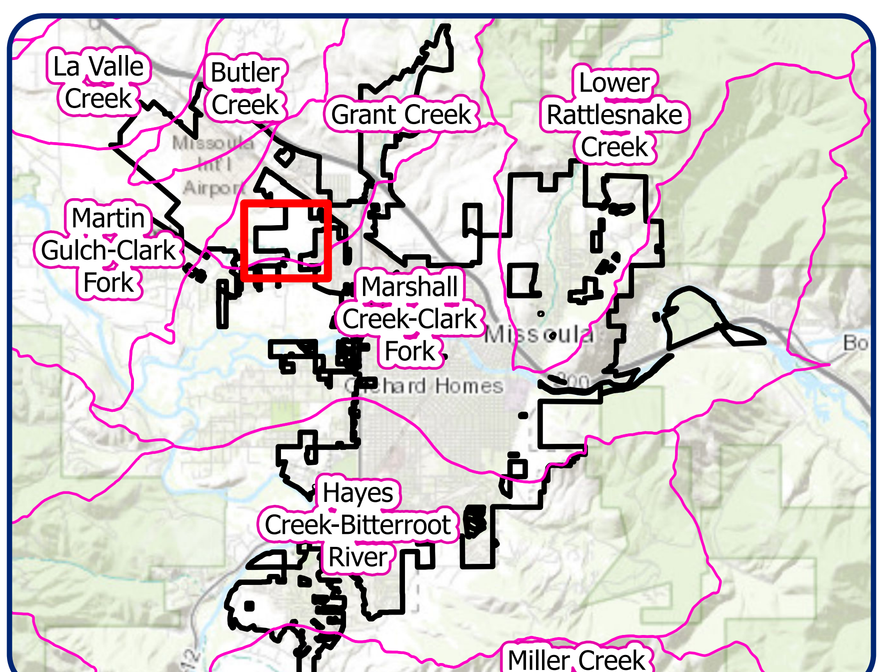

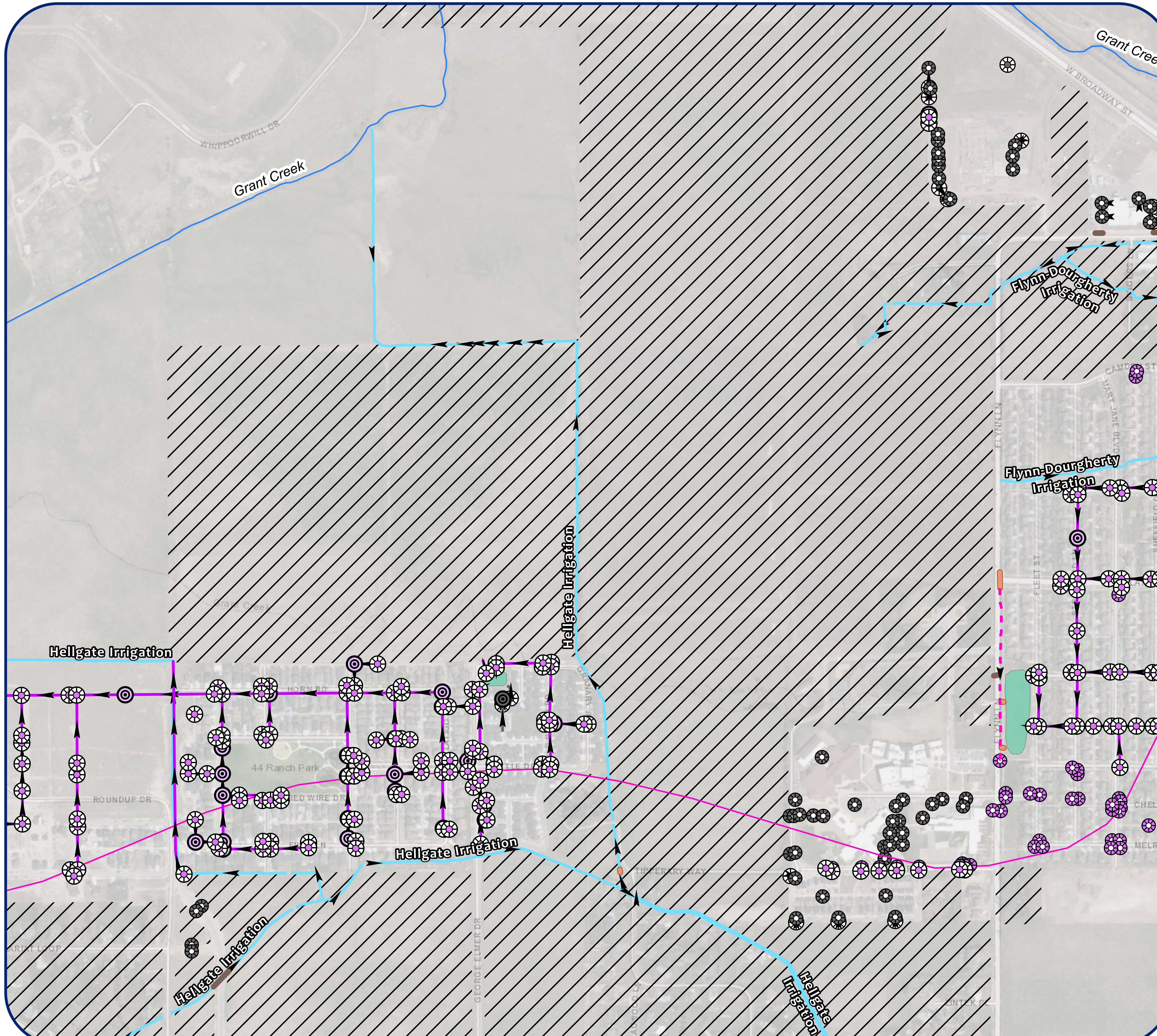

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City of Missoula

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Drywell	Drywell
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Infiltration Chamber	Infiltration Chamber
Culvert	Culvert
Storm Flood Control	Storm Flood Control
Treatment Structure	Irrigation Ditch
Detention Basin	Basin
Retention Basin	
Basin	

Reference Layers:

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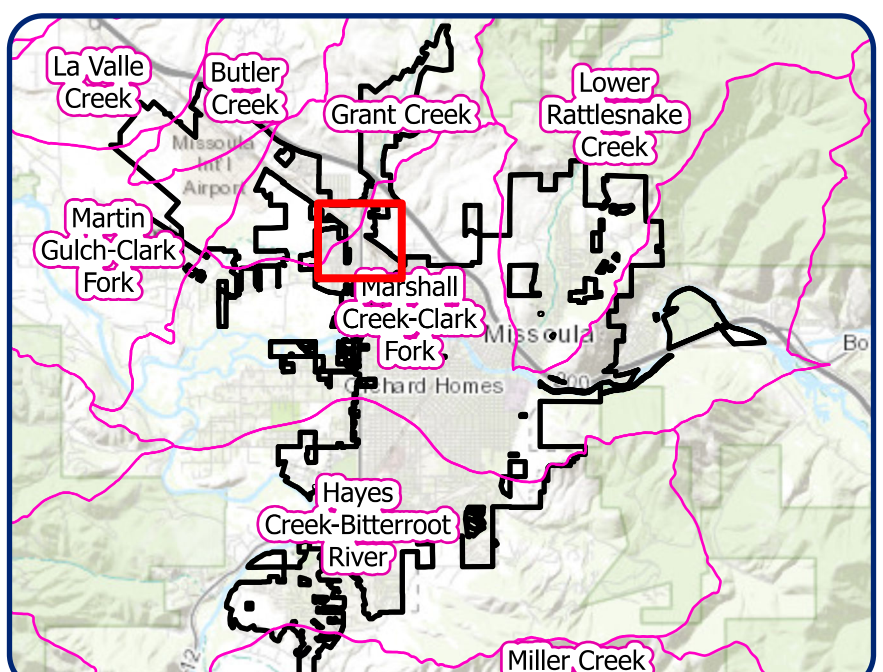

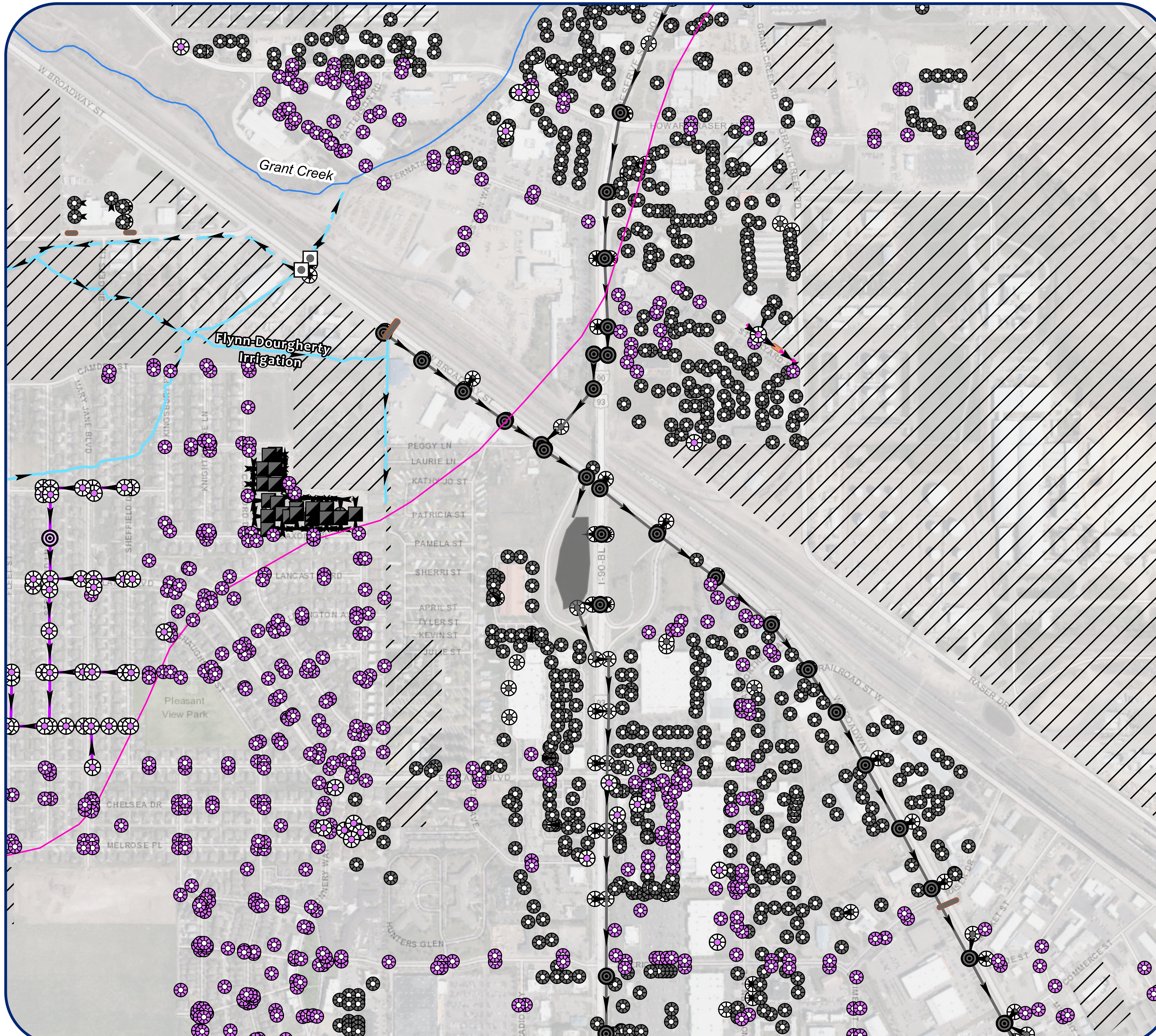

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City of Missoula

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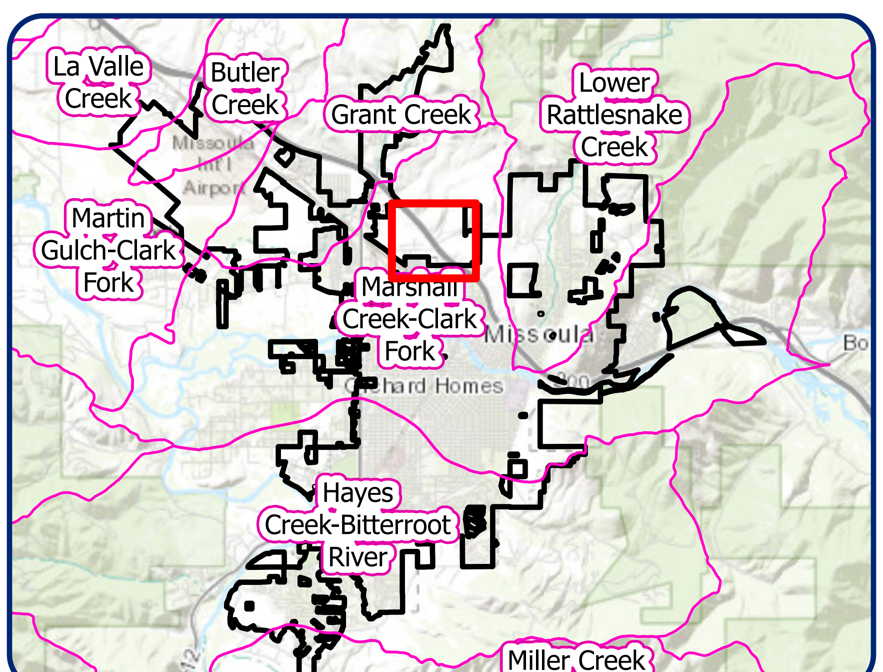

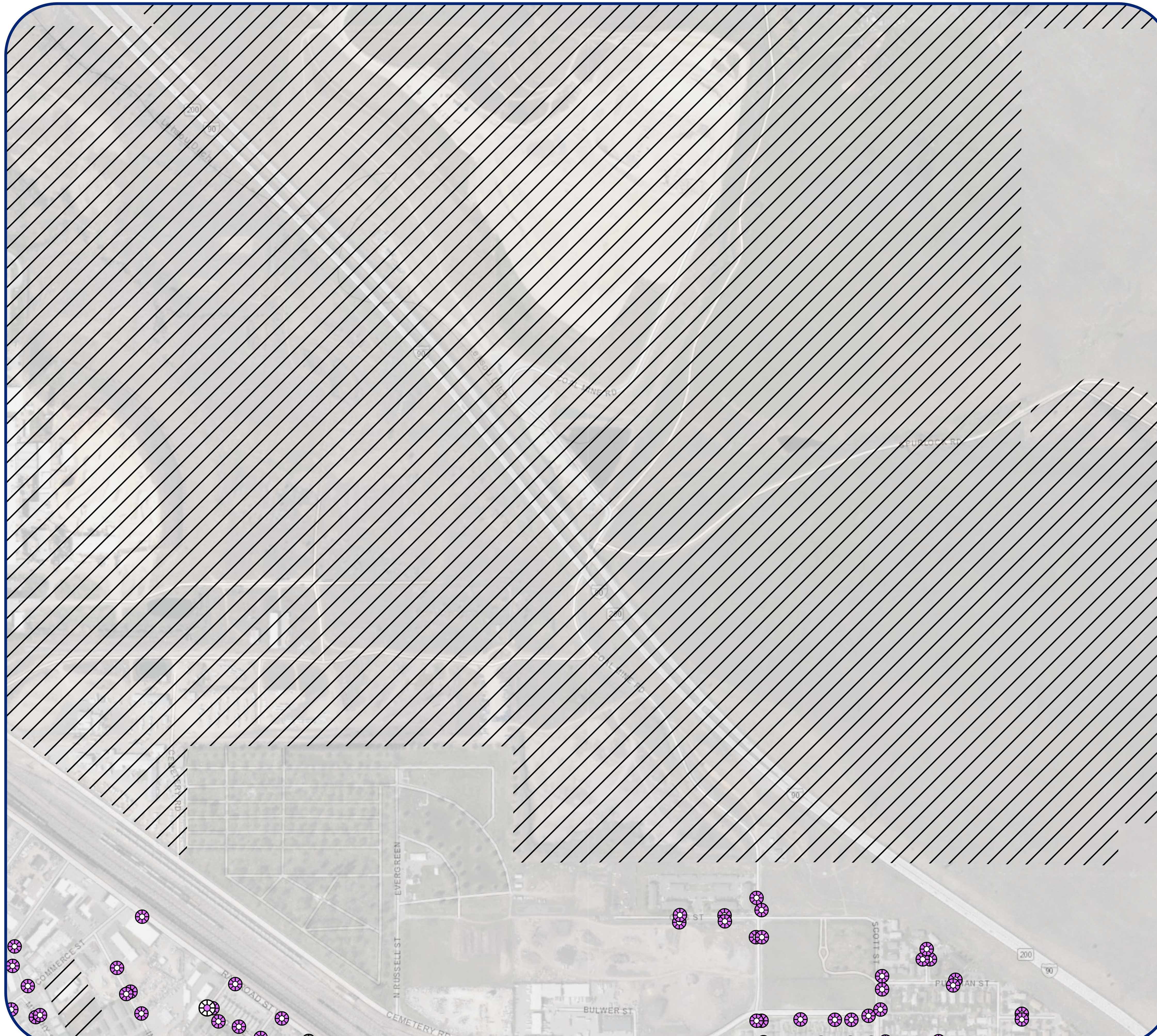

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City of Missoula

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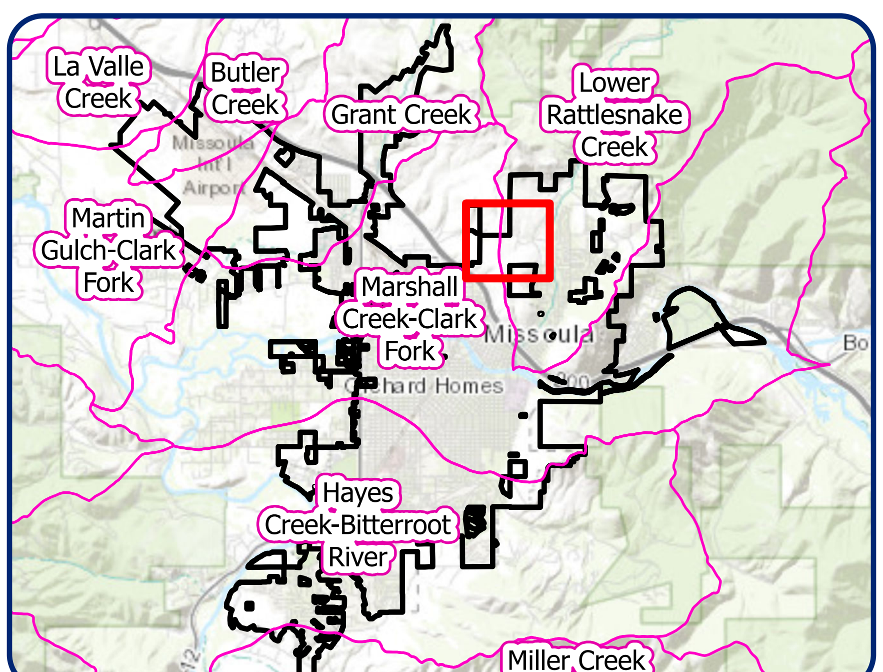

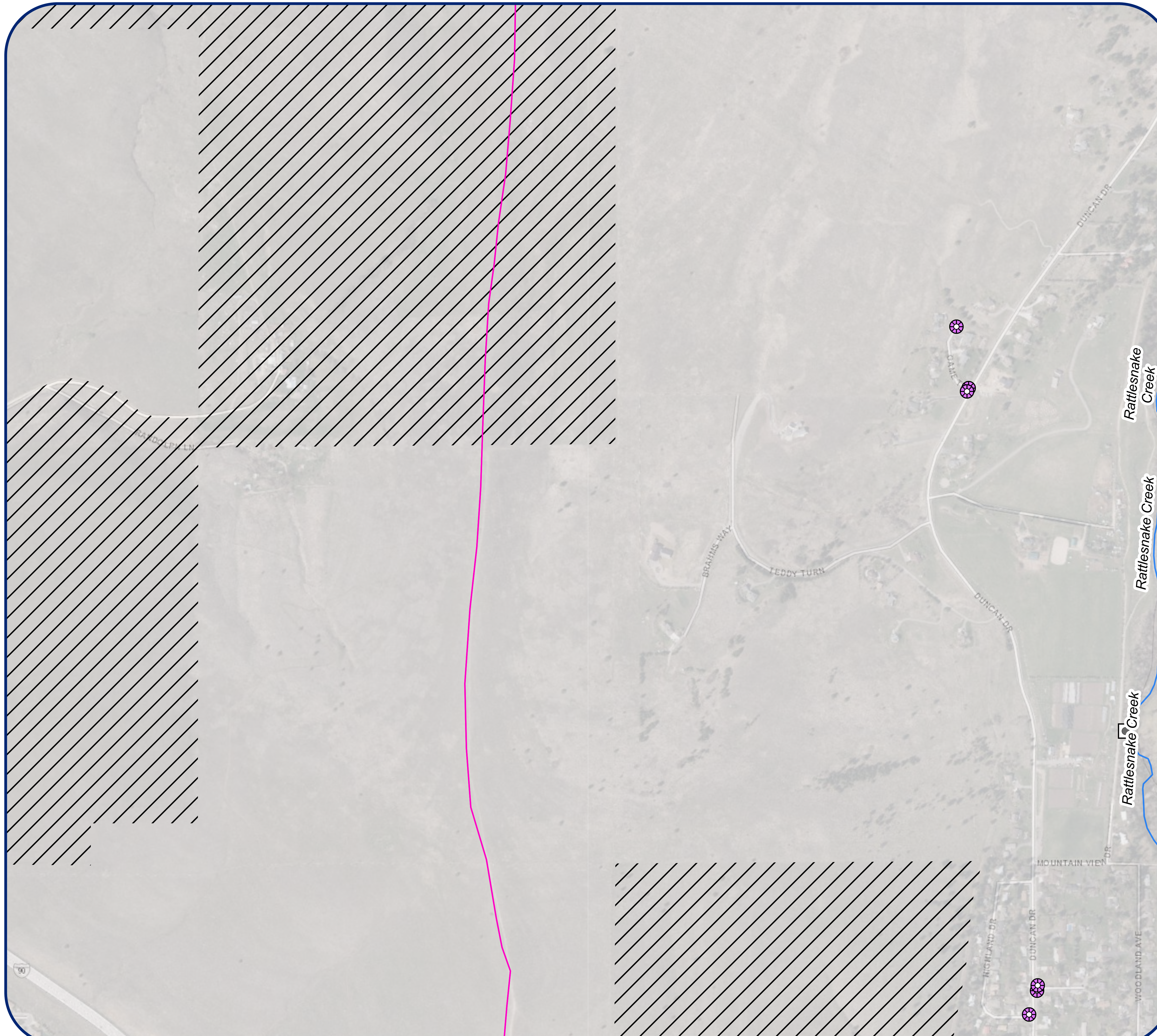

STORM WATER
City of Missoula

0 500 1,000 2,000
Feet

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City Infrastructure:	Other Infrastructure:
Drywell	Drywell
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Storm Flood Control	Storm Flood Control
Treatment Structure	Irrigation Ditch
Detention Basin	Basin
Retention Basin	
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Reference Layers:
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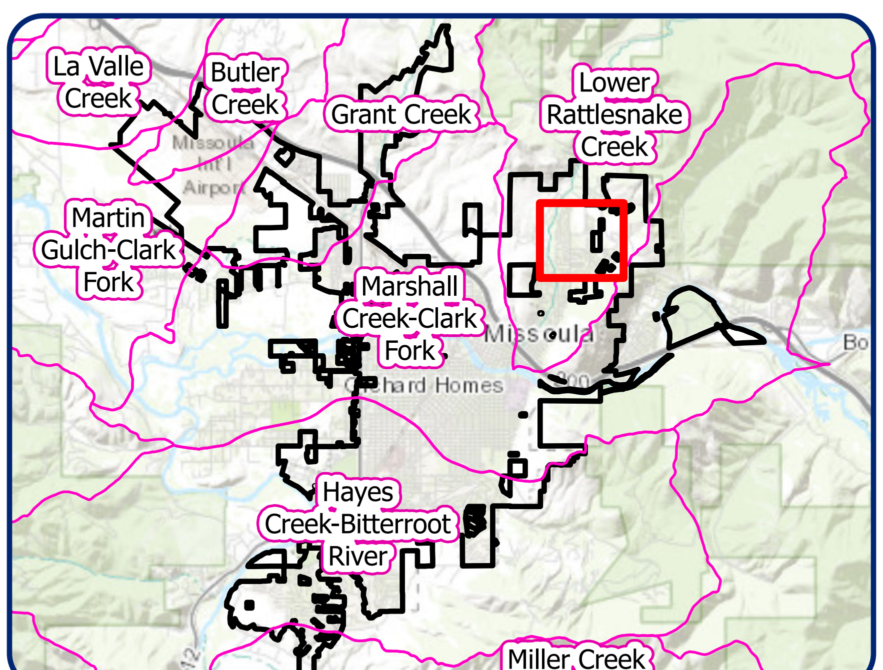

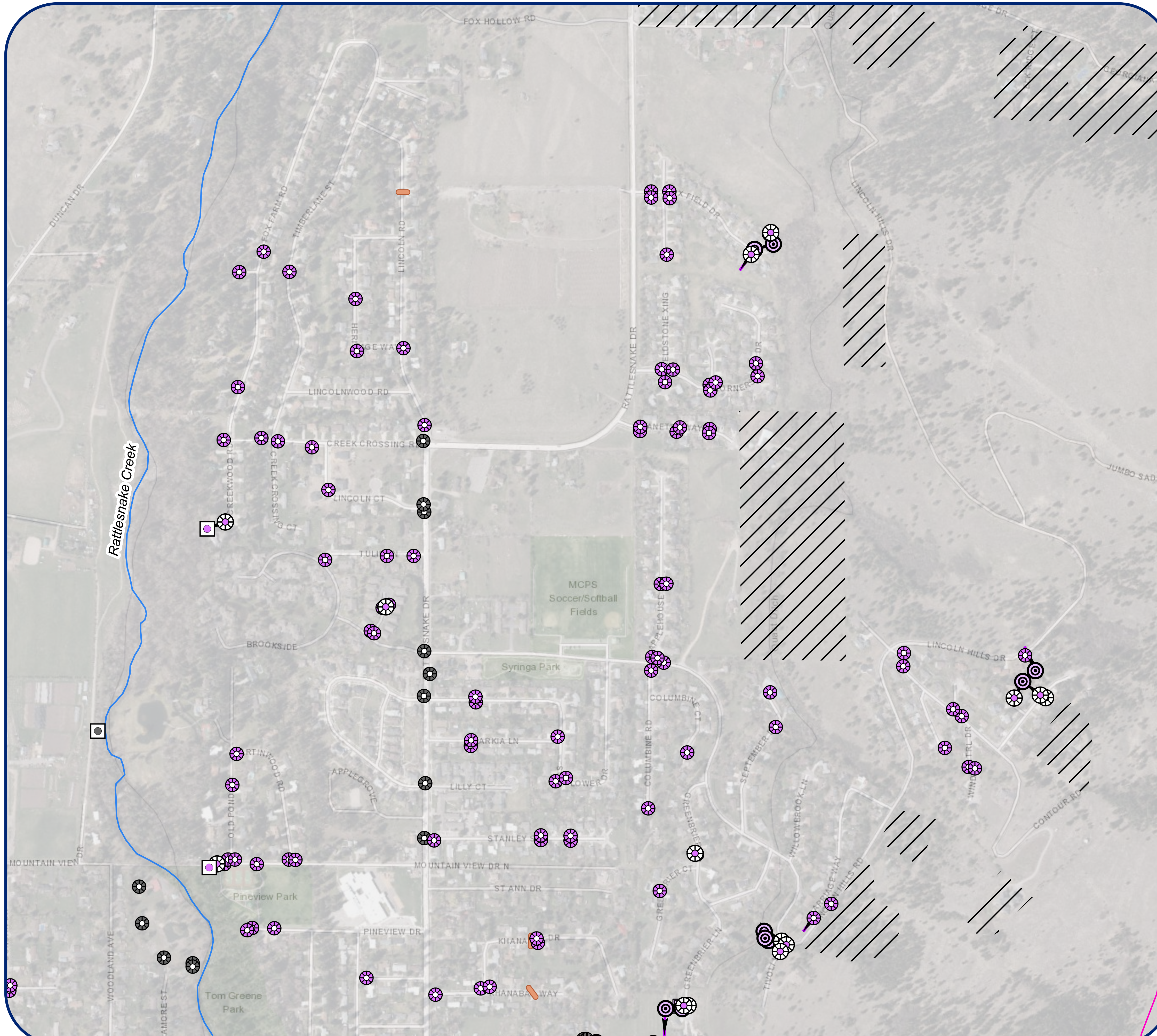

STORM WATER
City of Missoula

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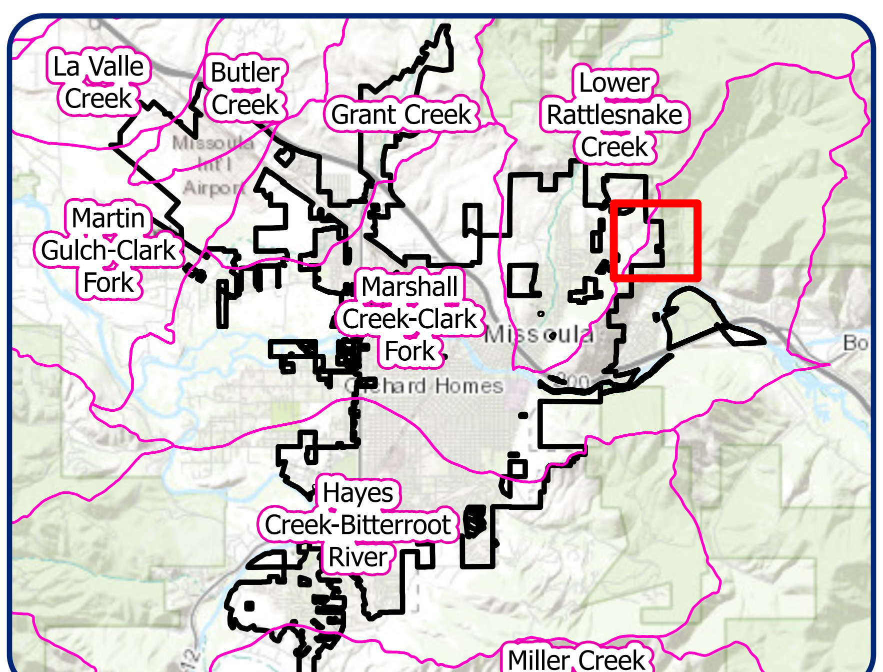

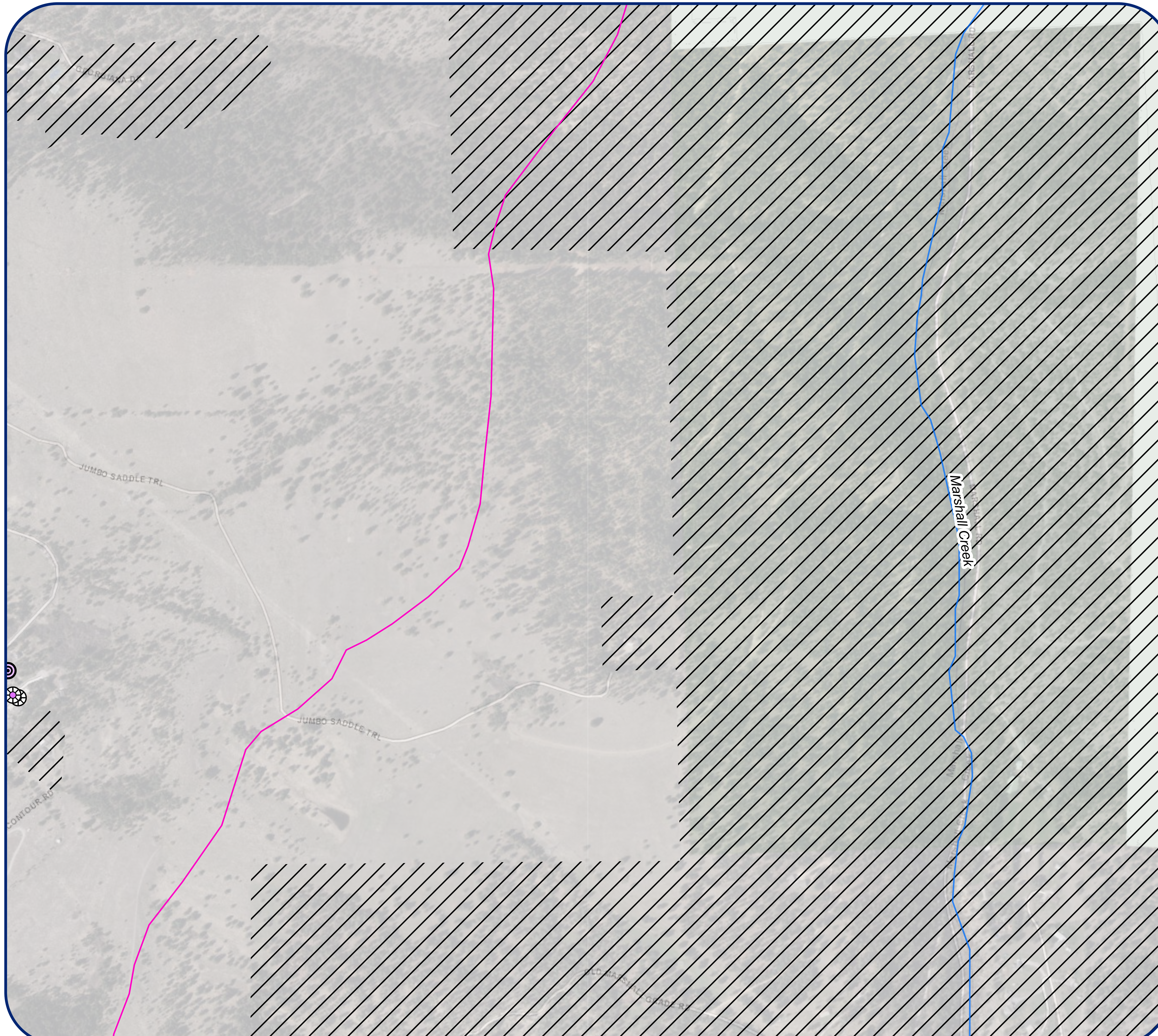

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City of Missoula

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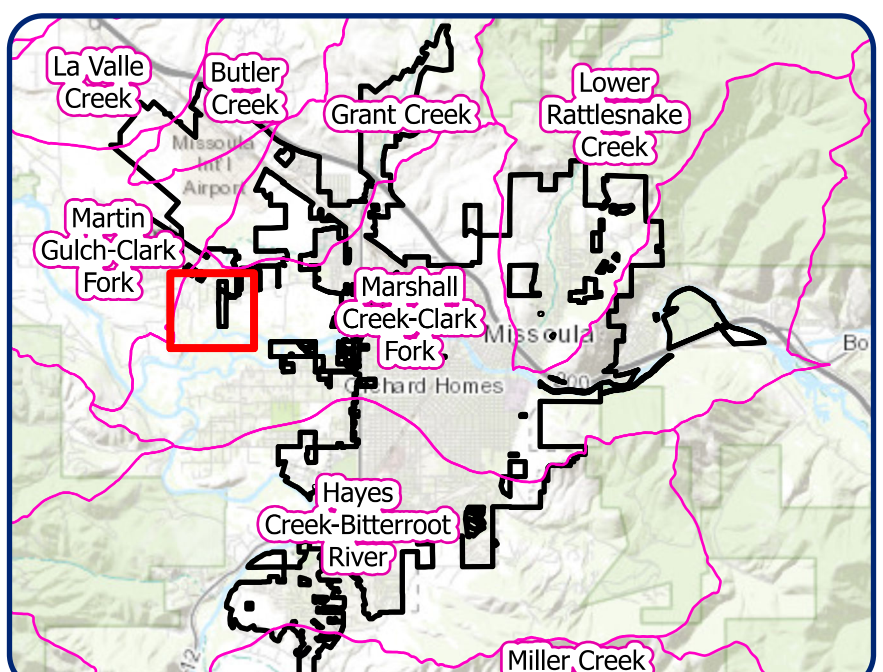

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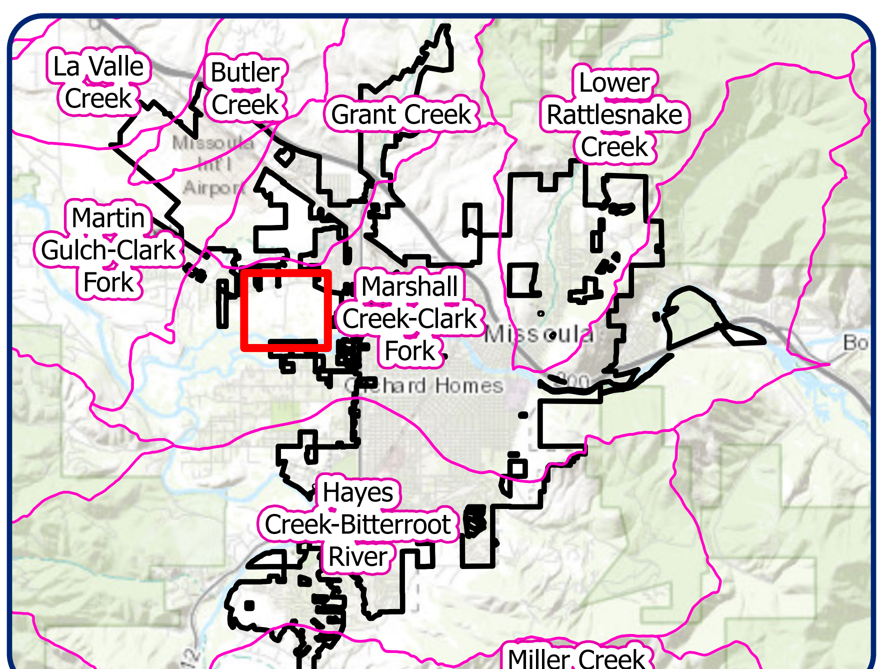

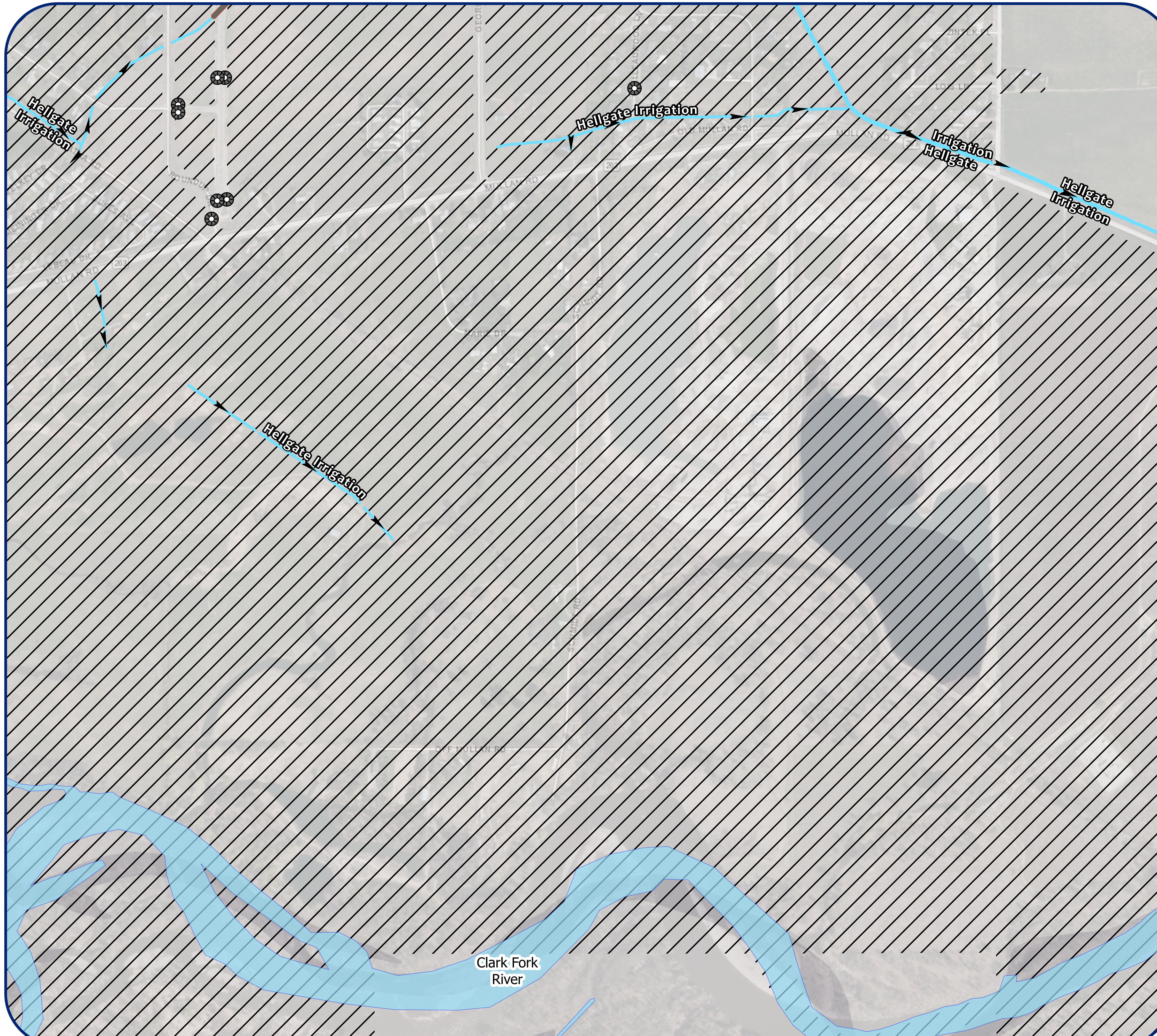

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City of Missoula

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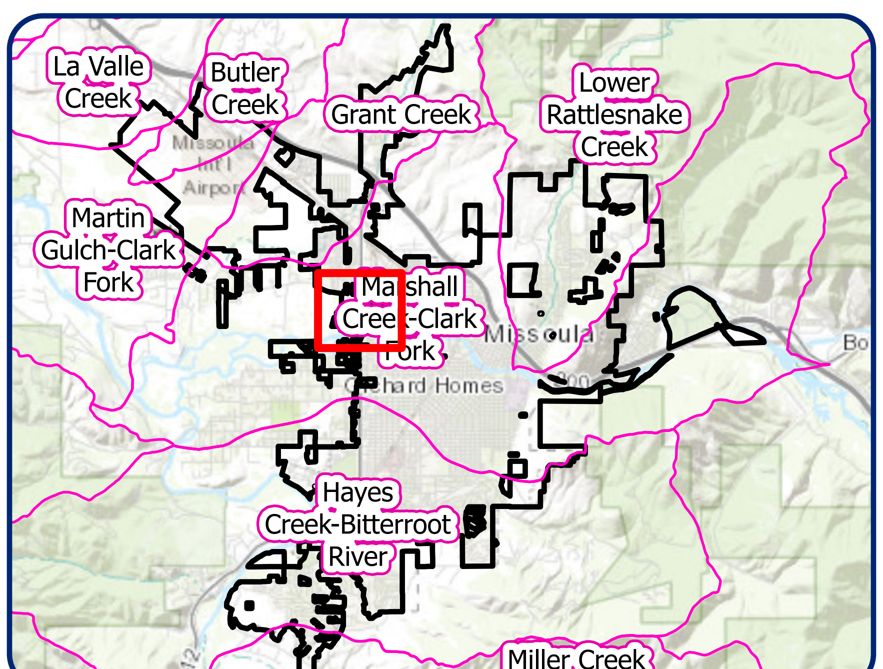

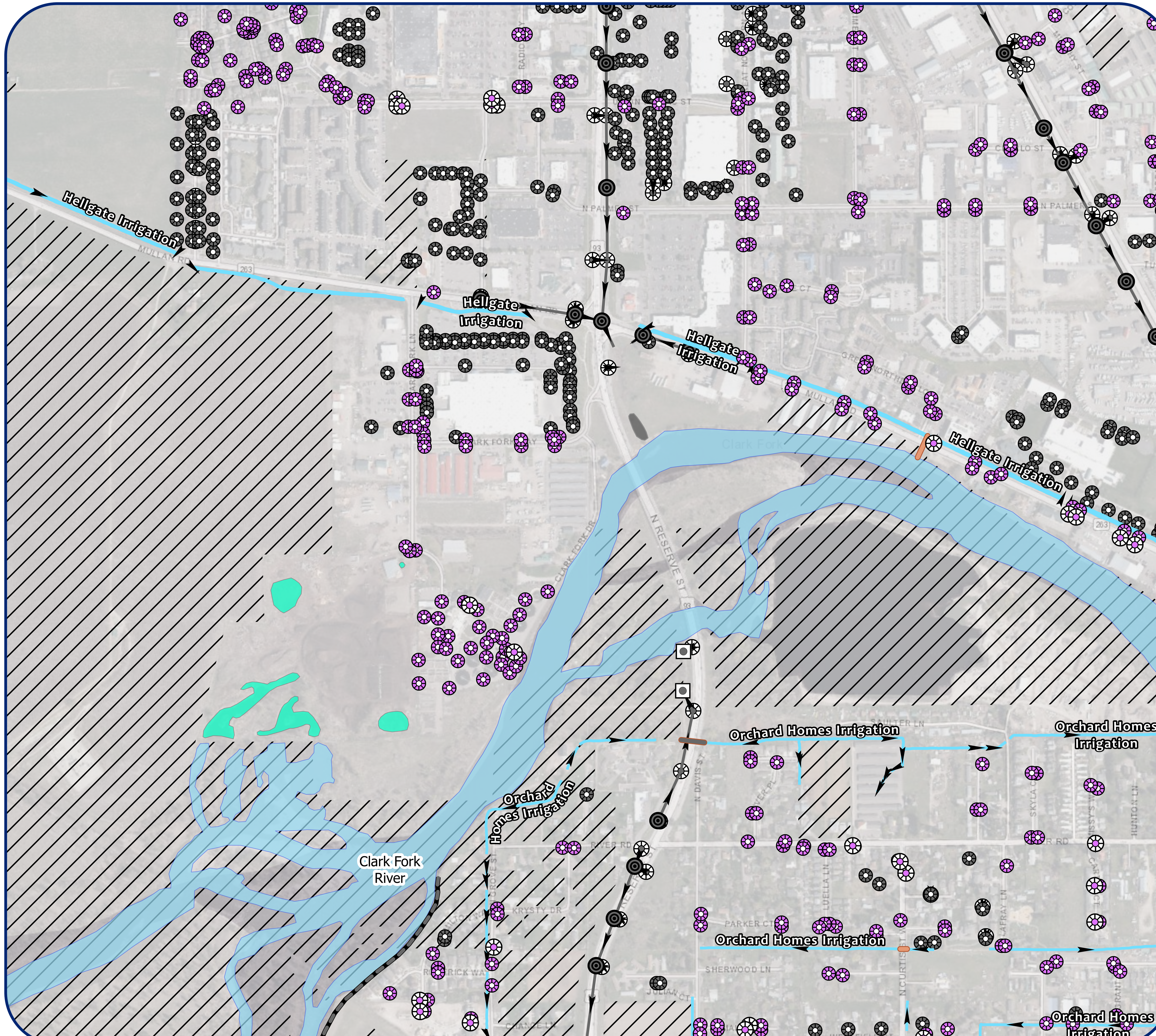

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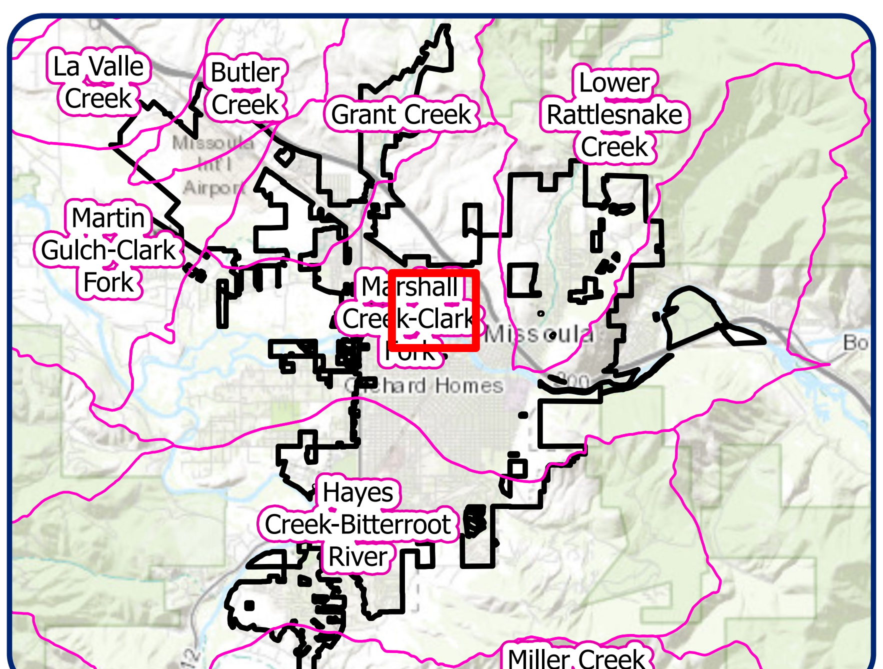

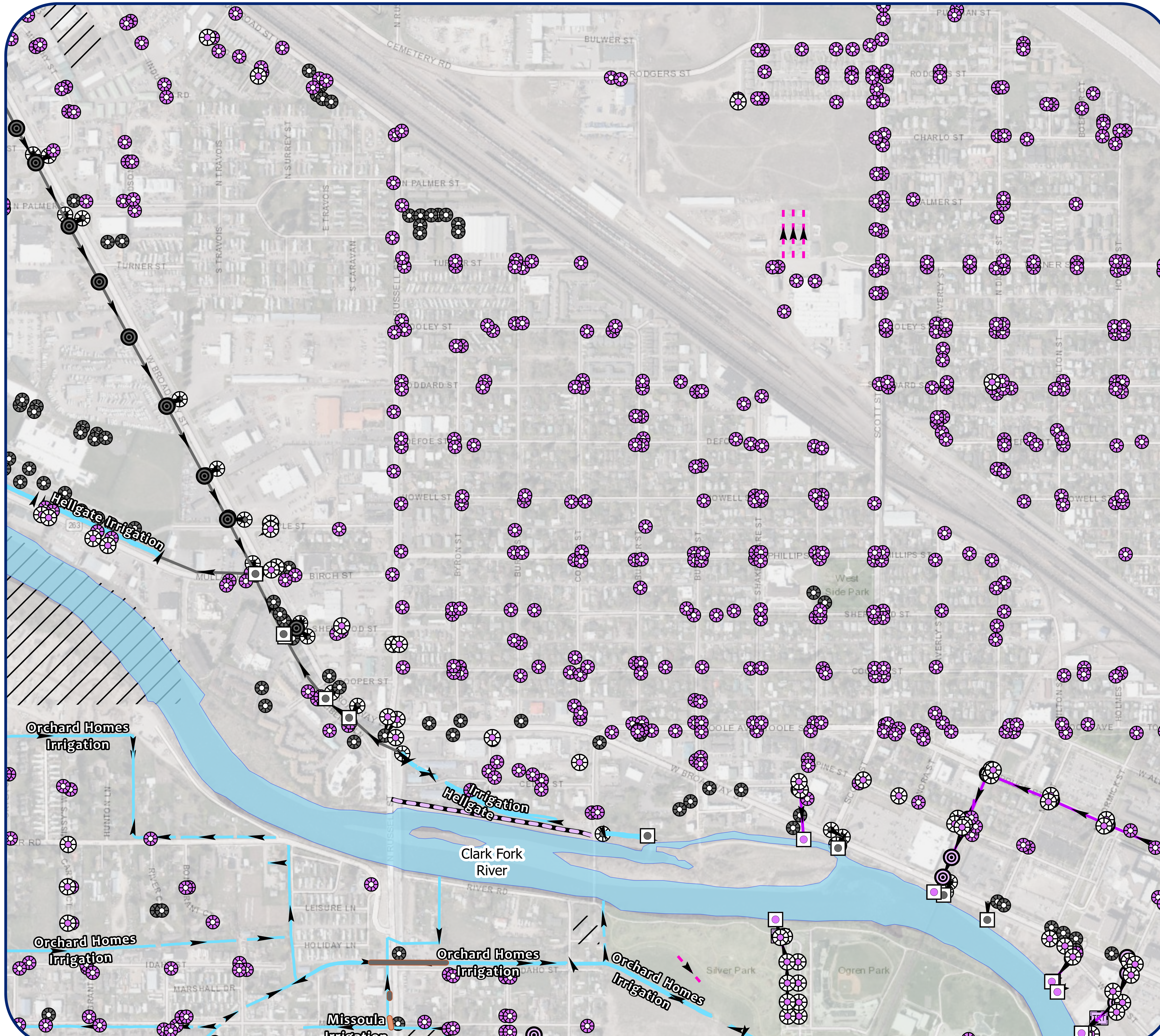

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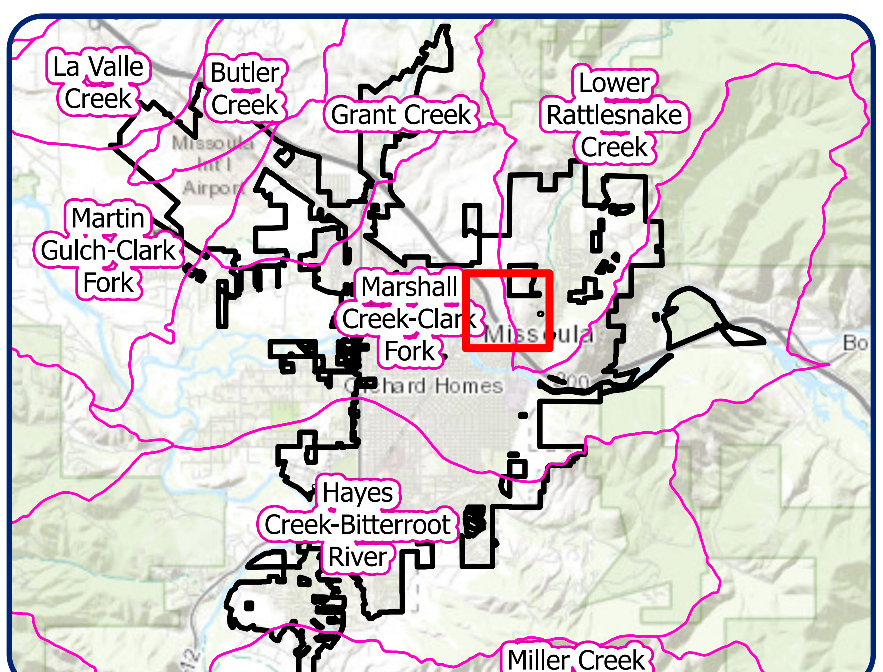

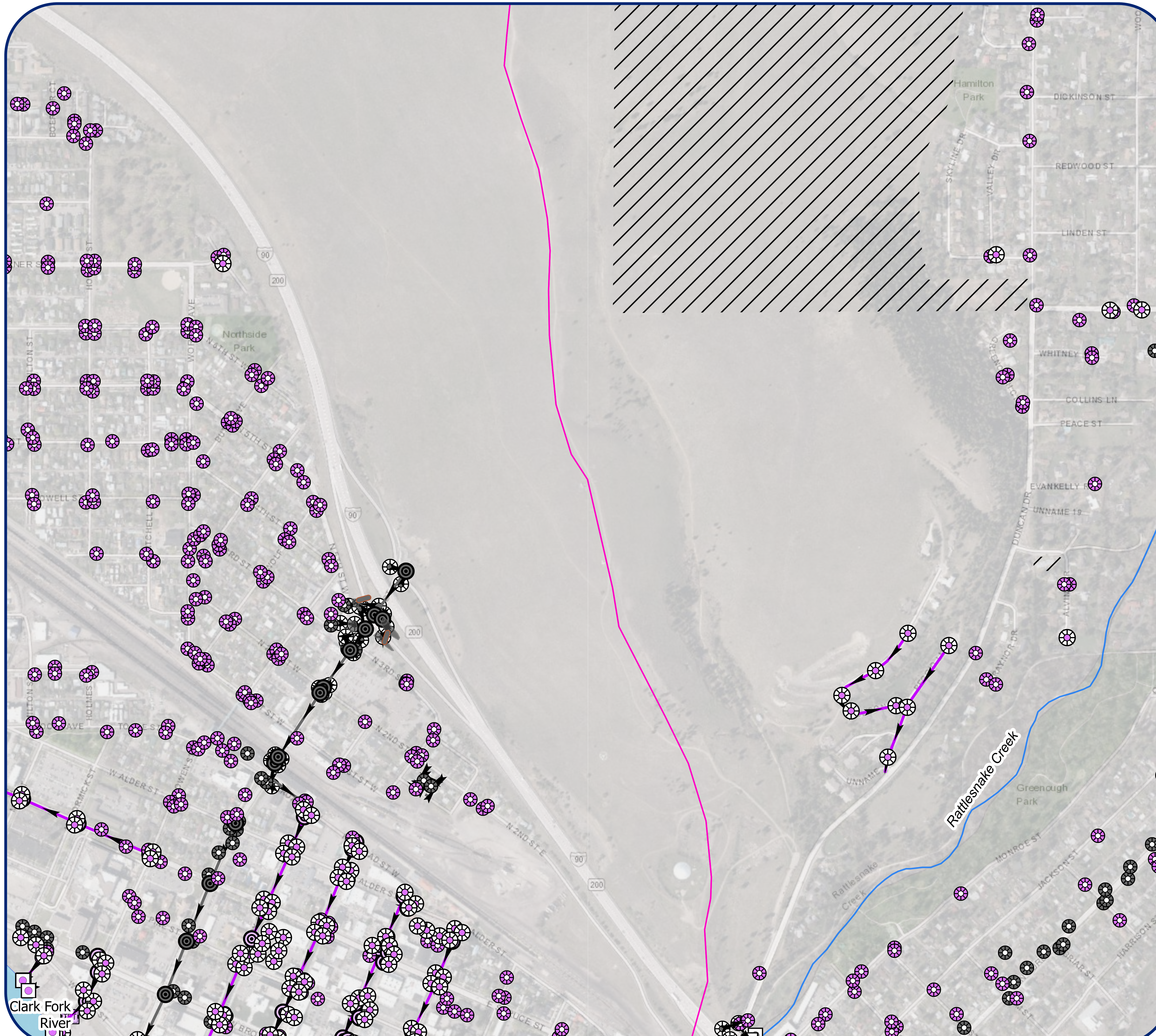

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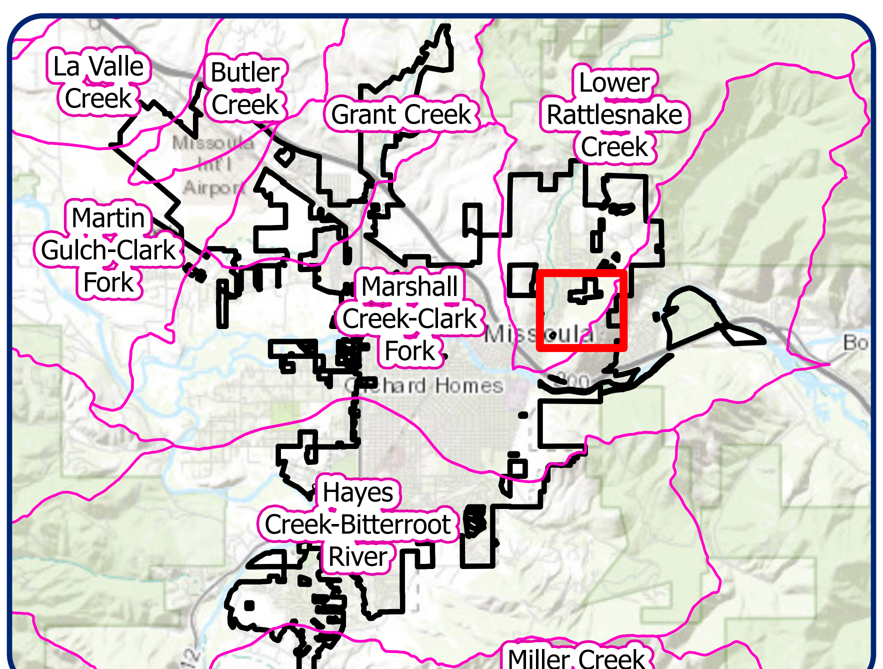

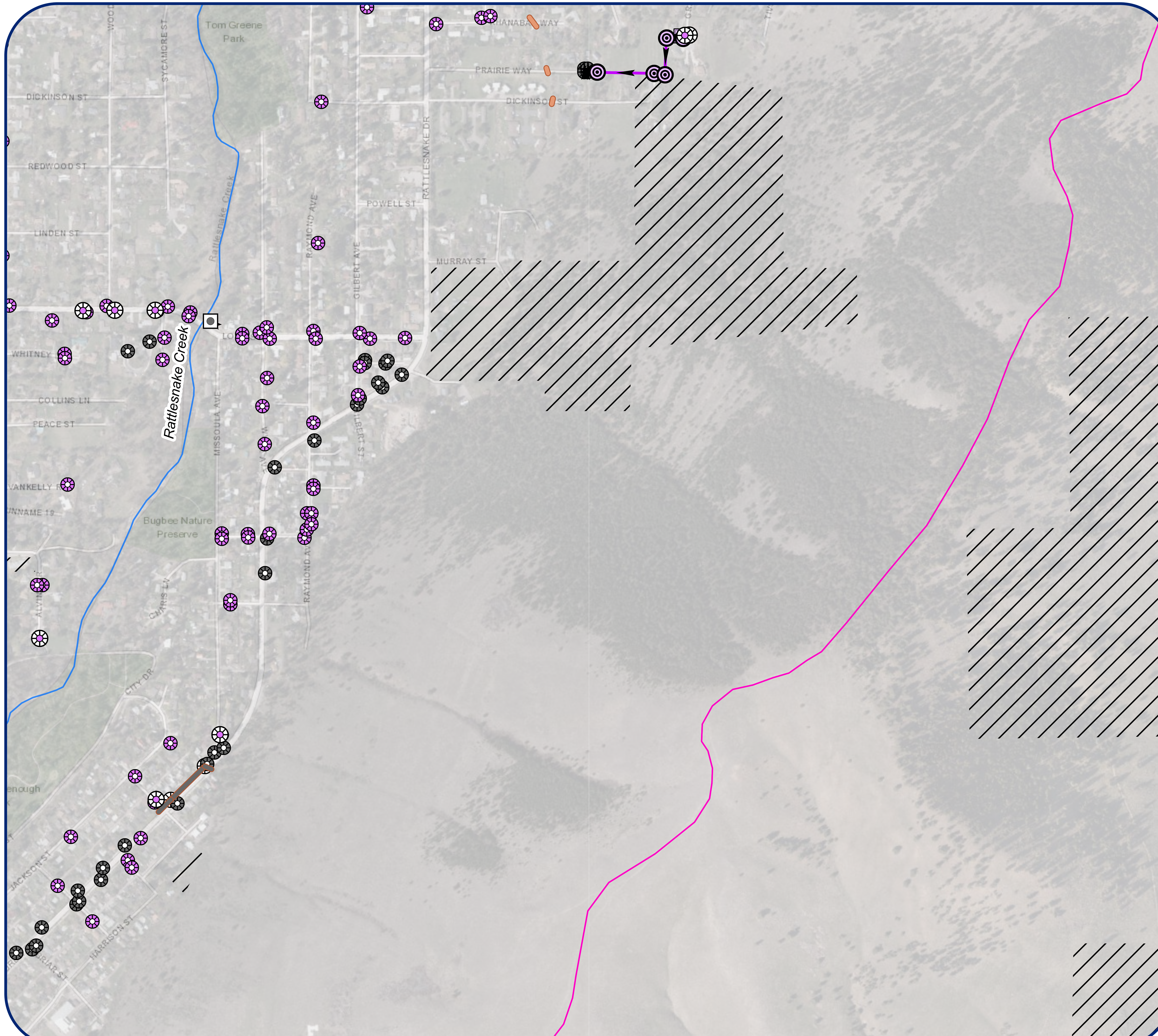

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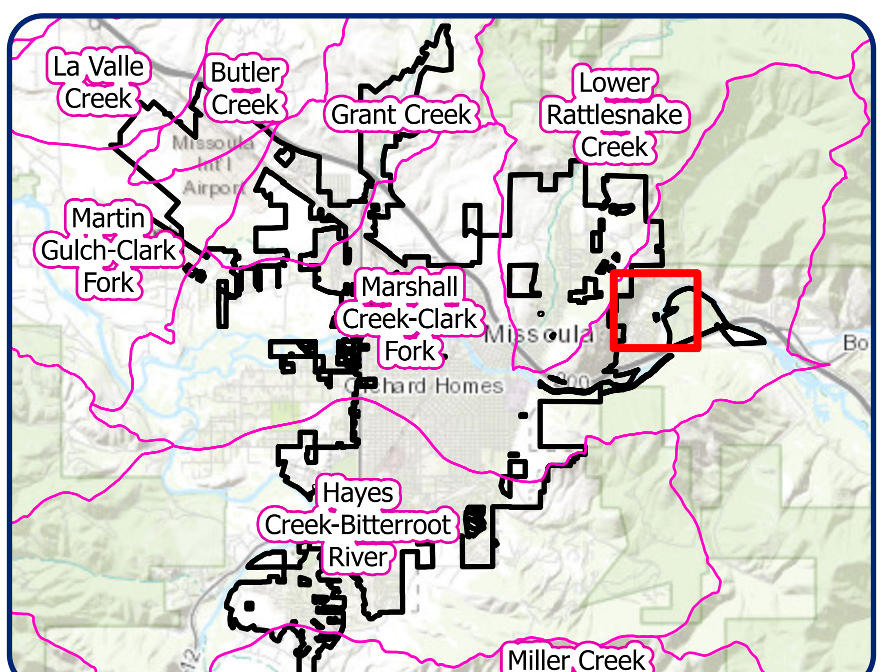

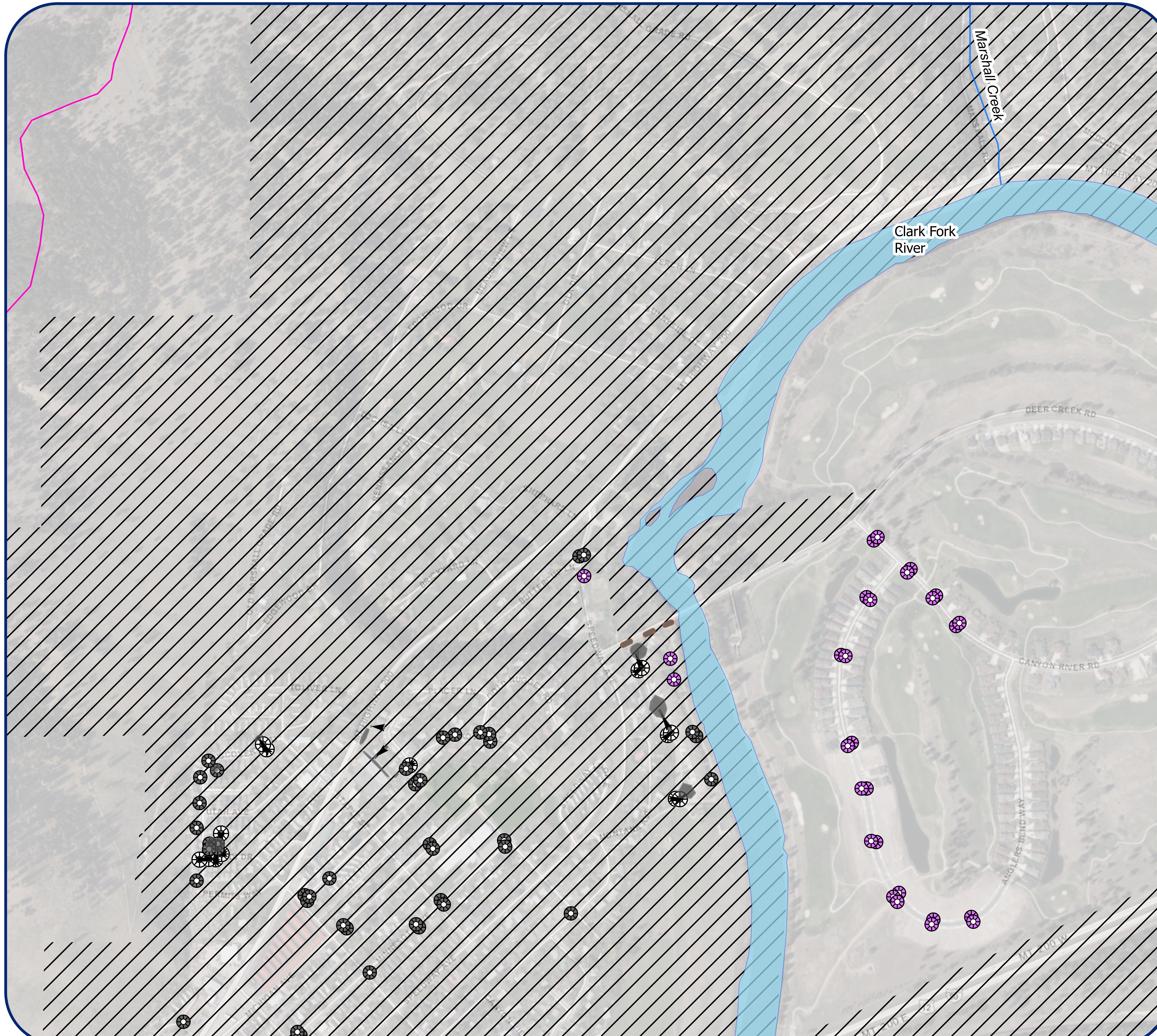

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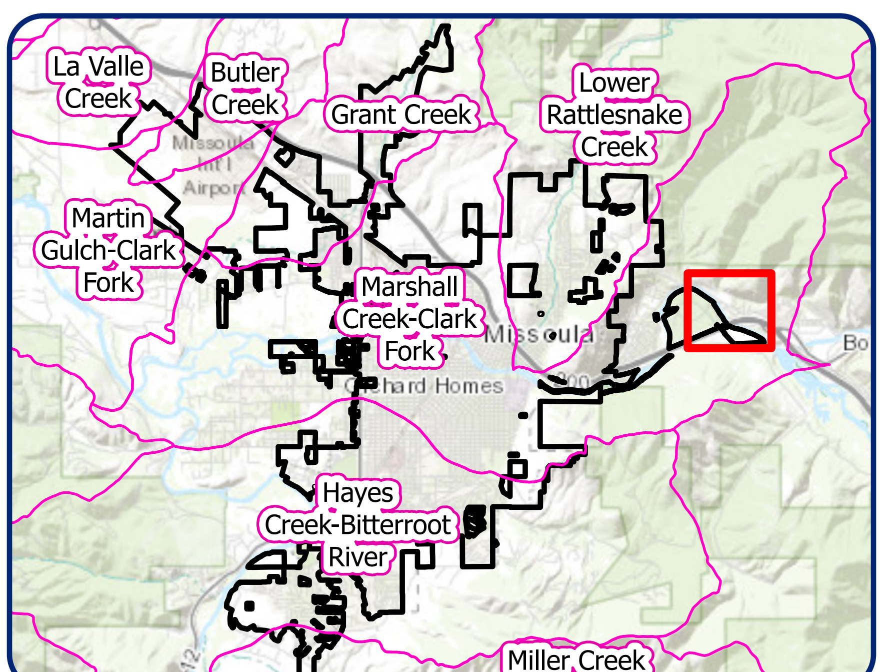

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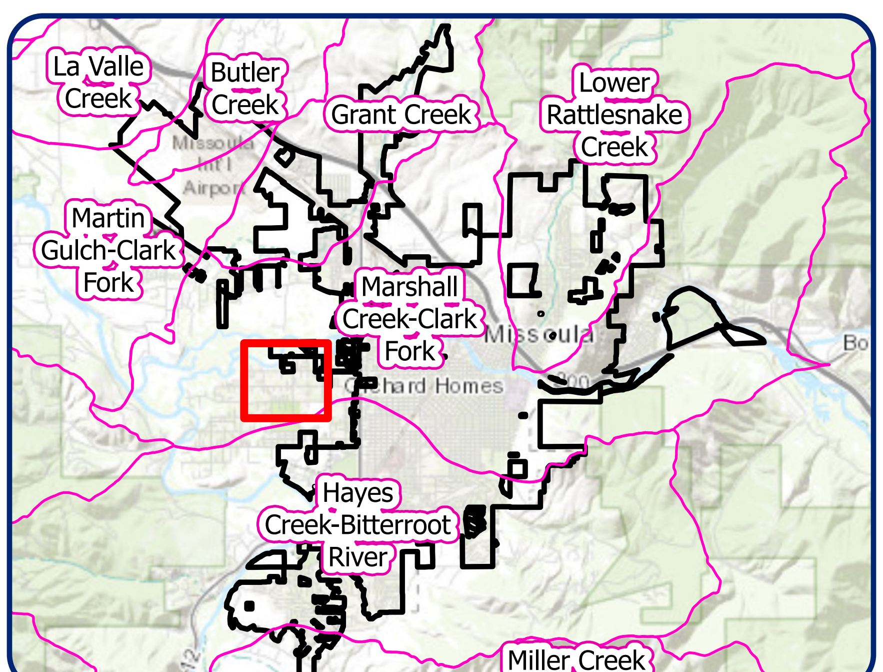

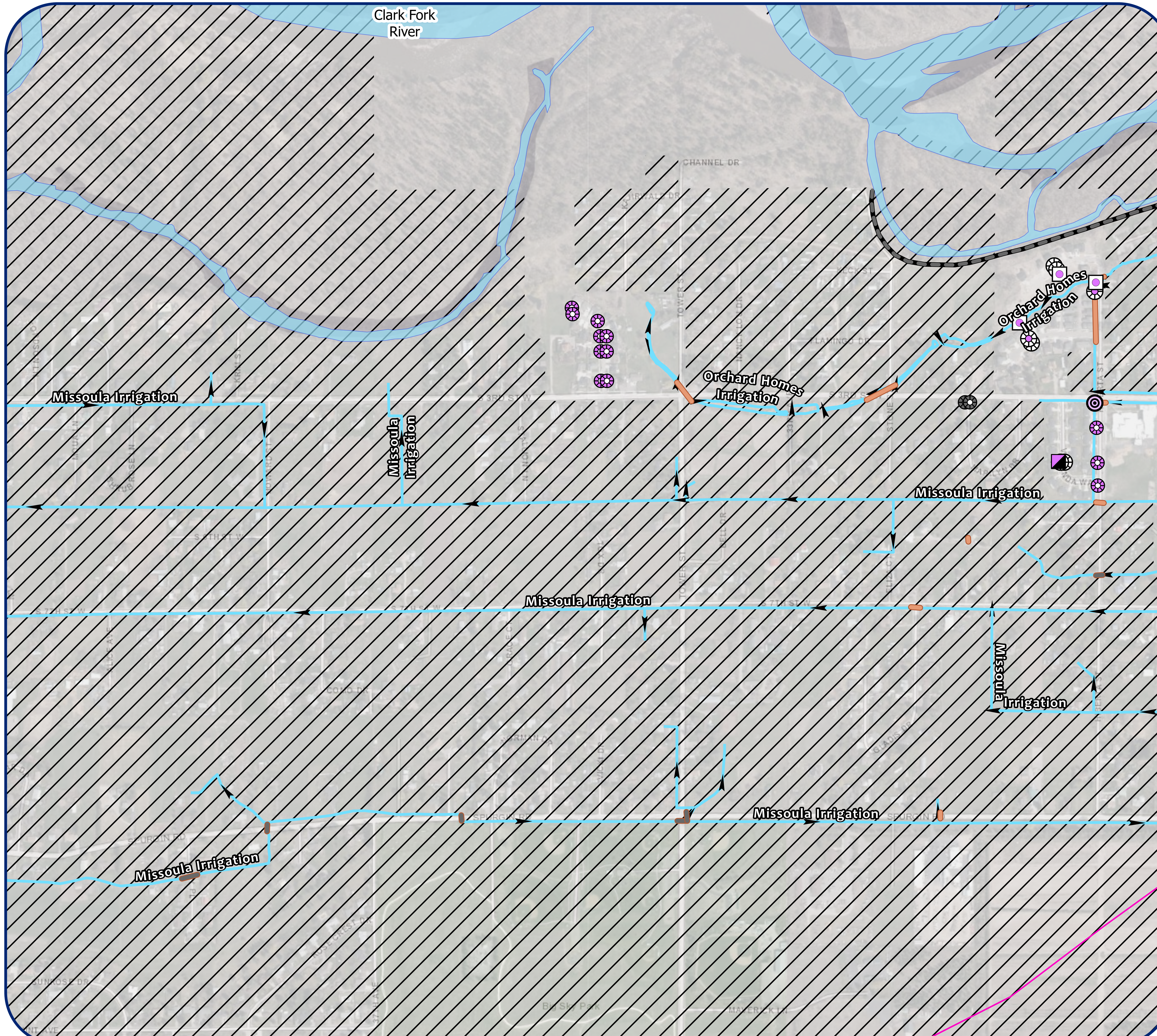

STORM WATER

City of Missoula

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N

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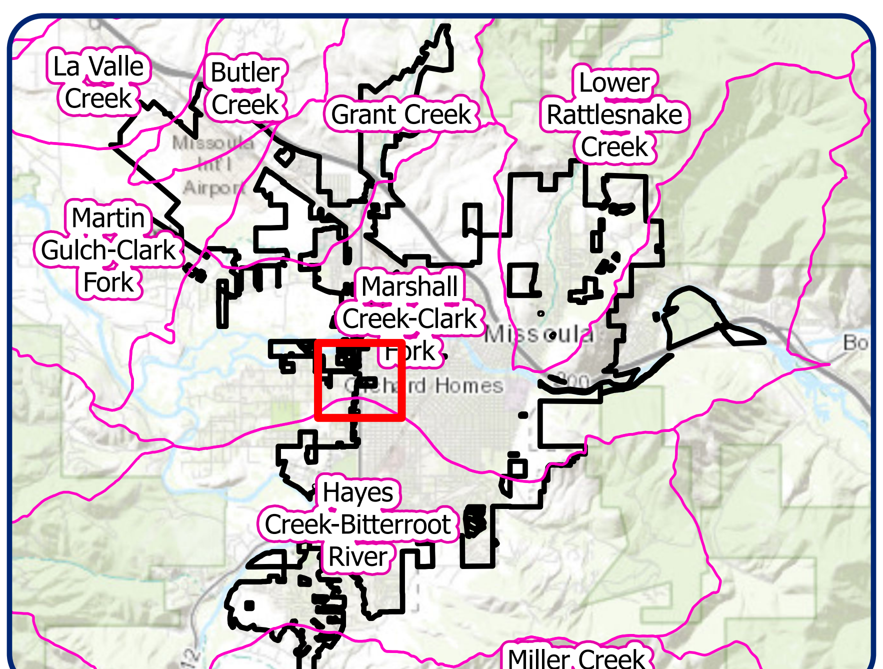
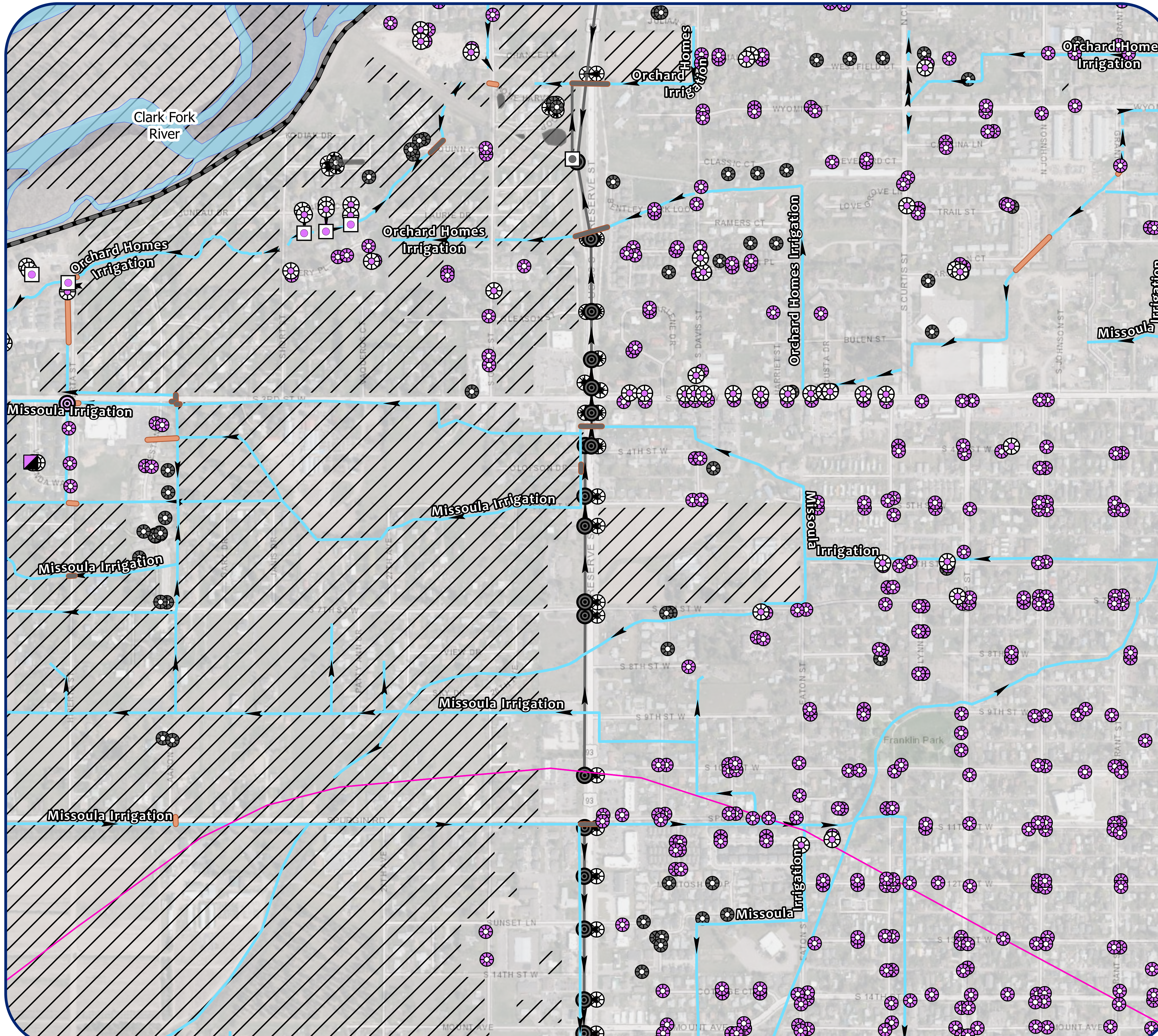
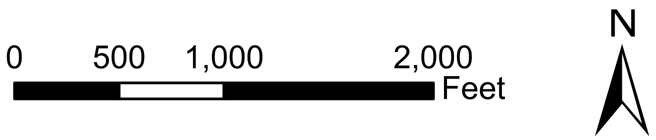




STORM WATER
City of Missoula



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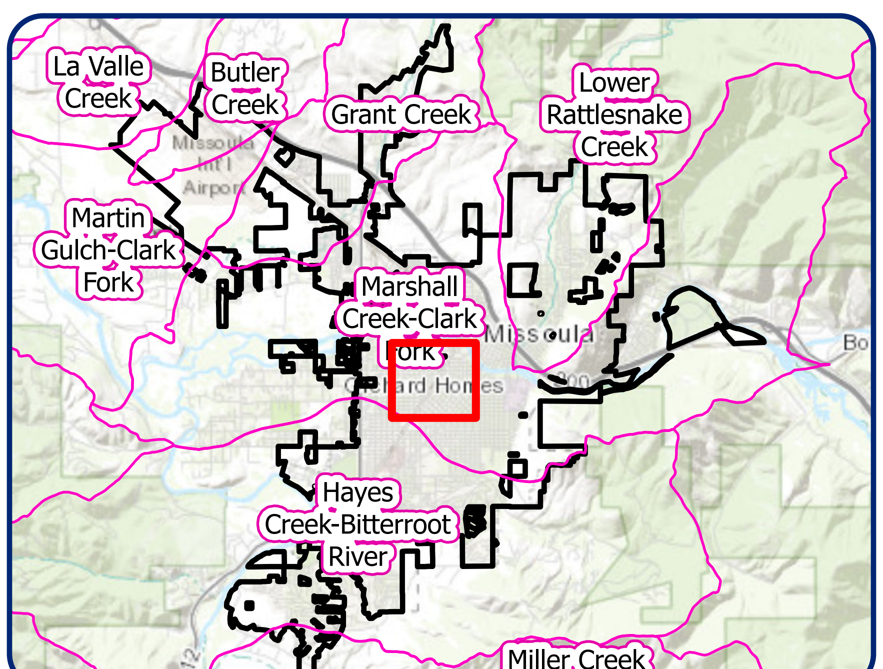

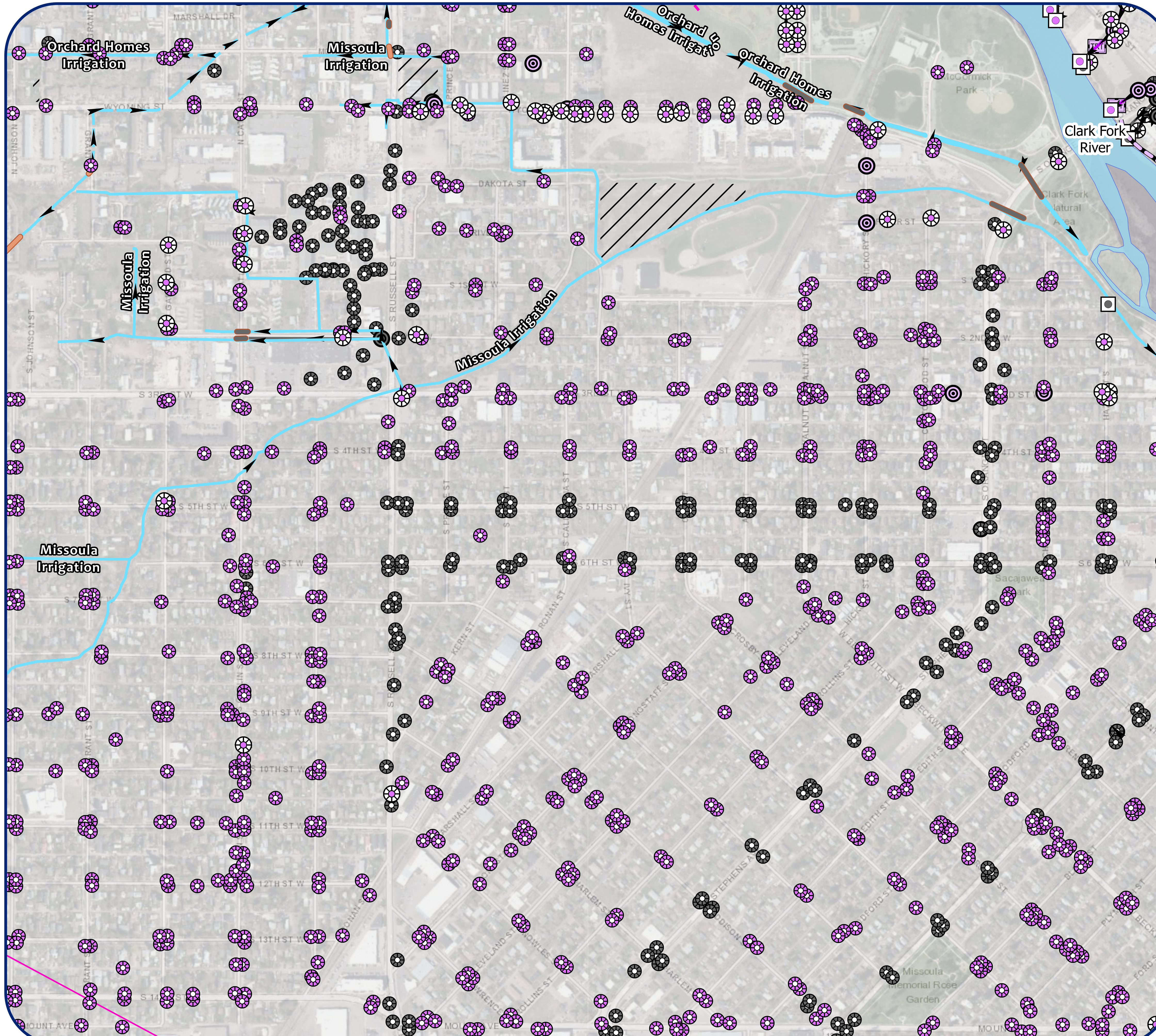

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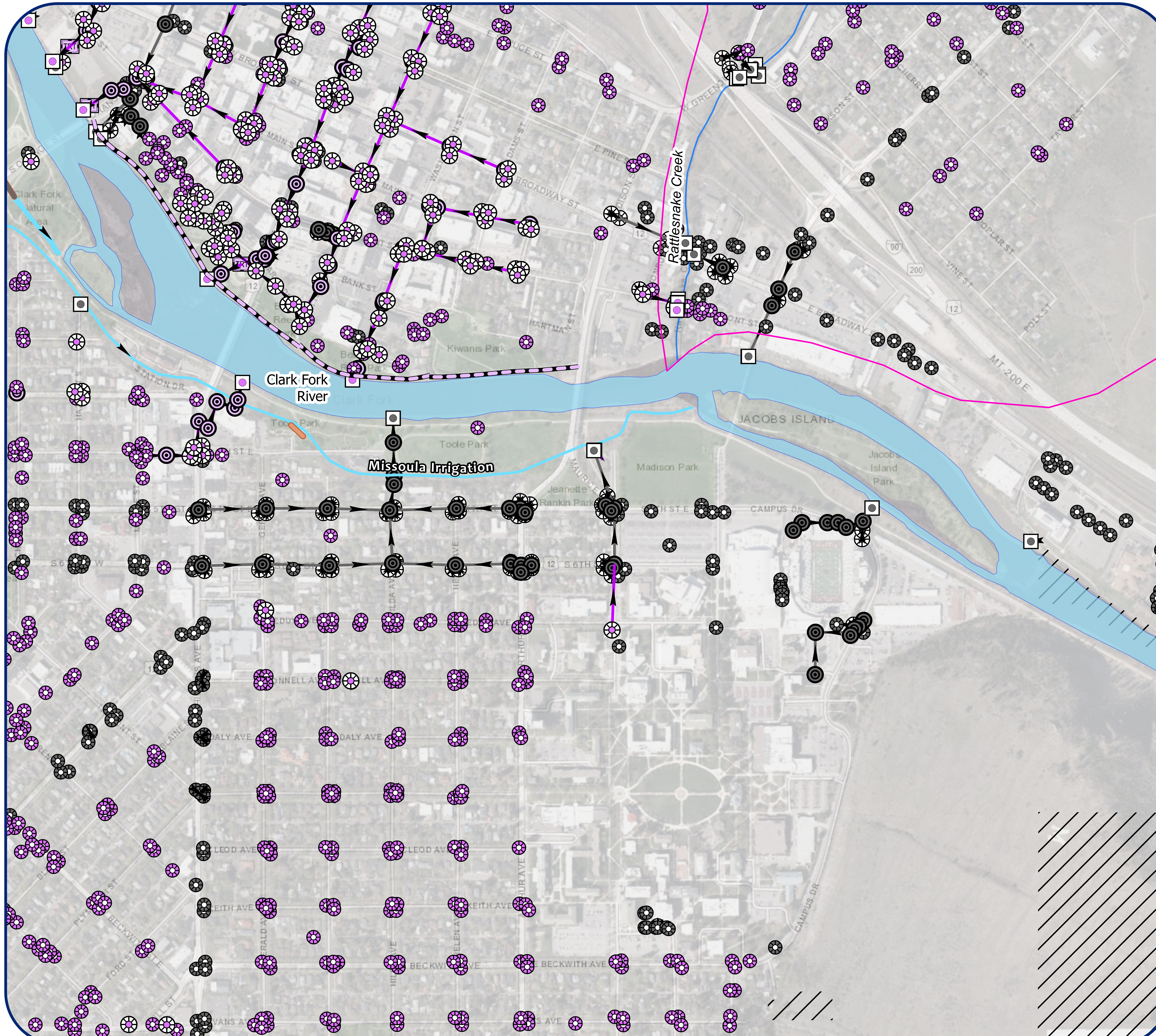

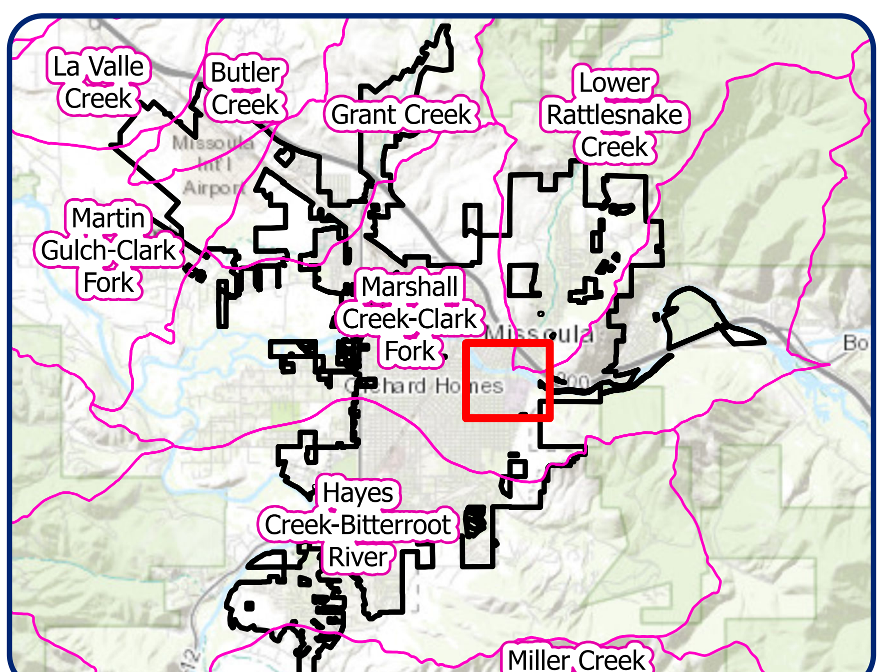

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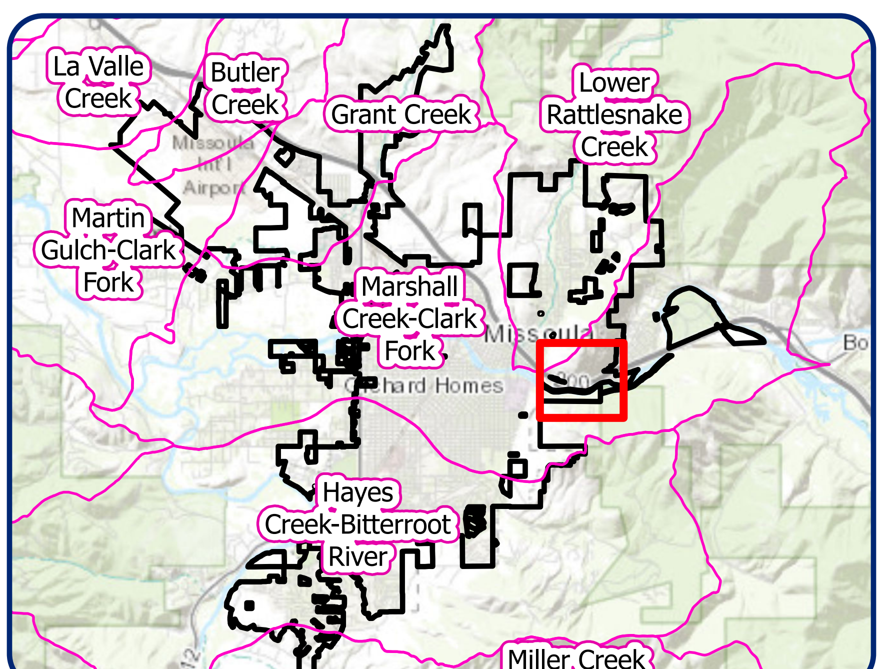

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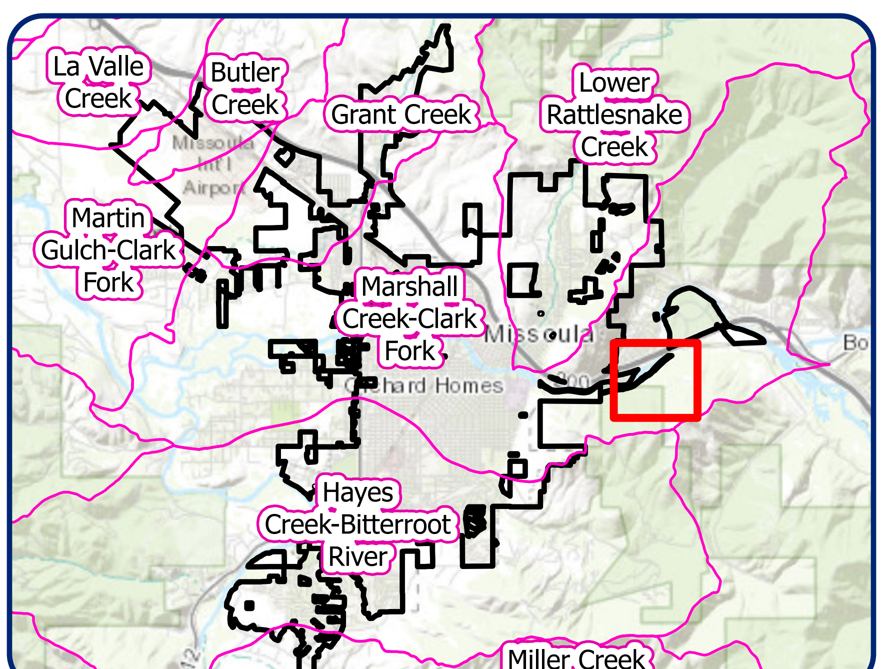

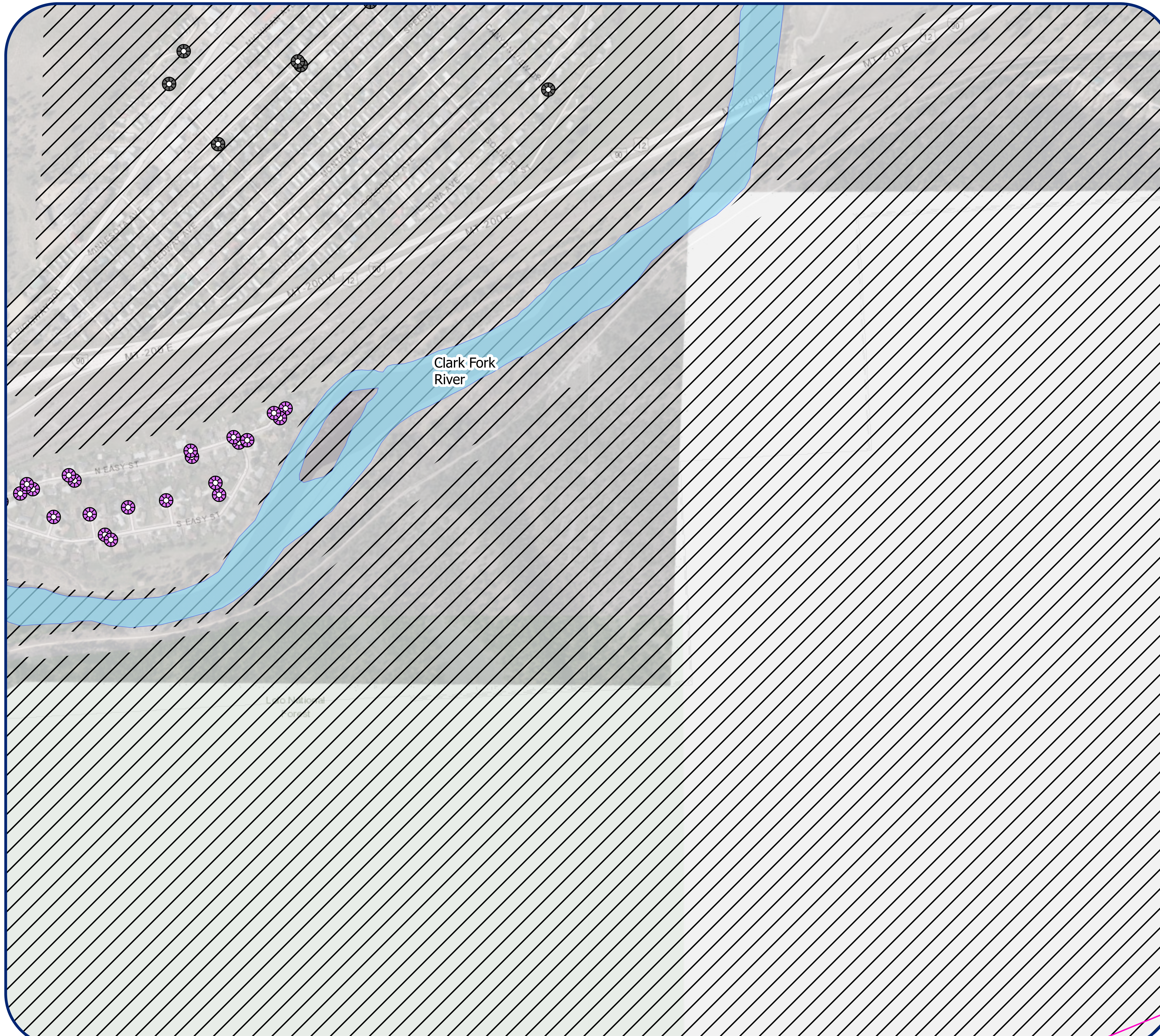

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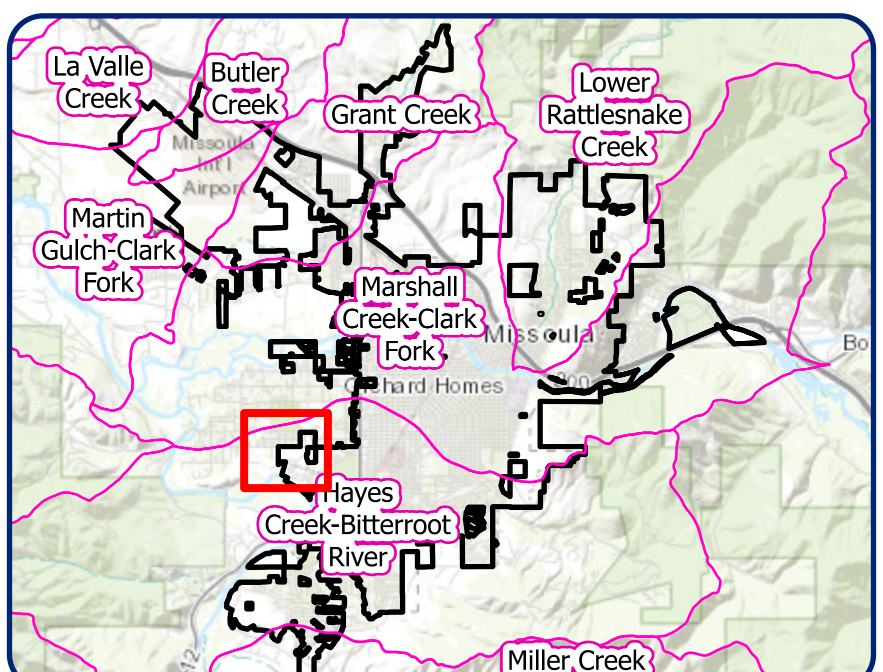

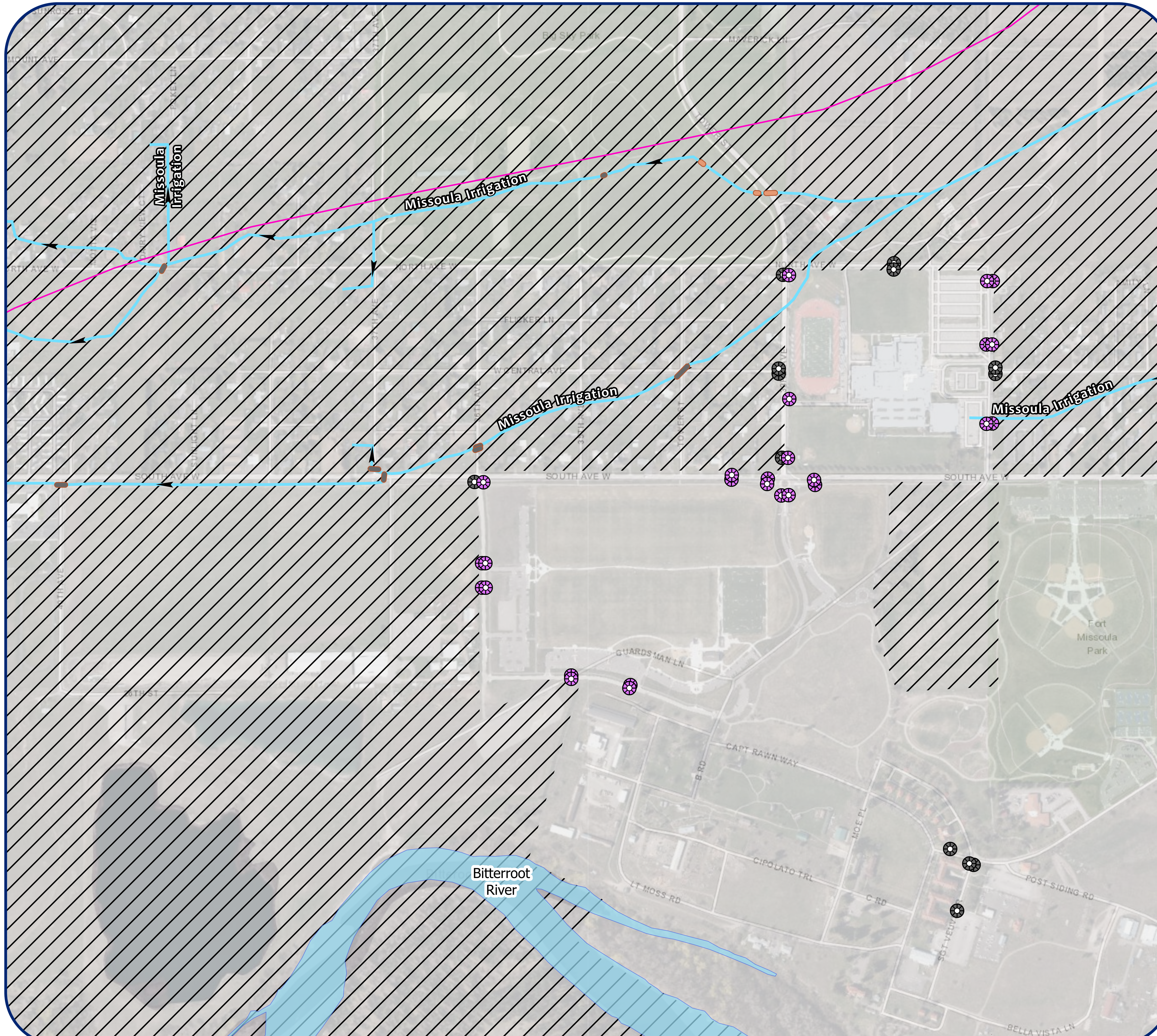

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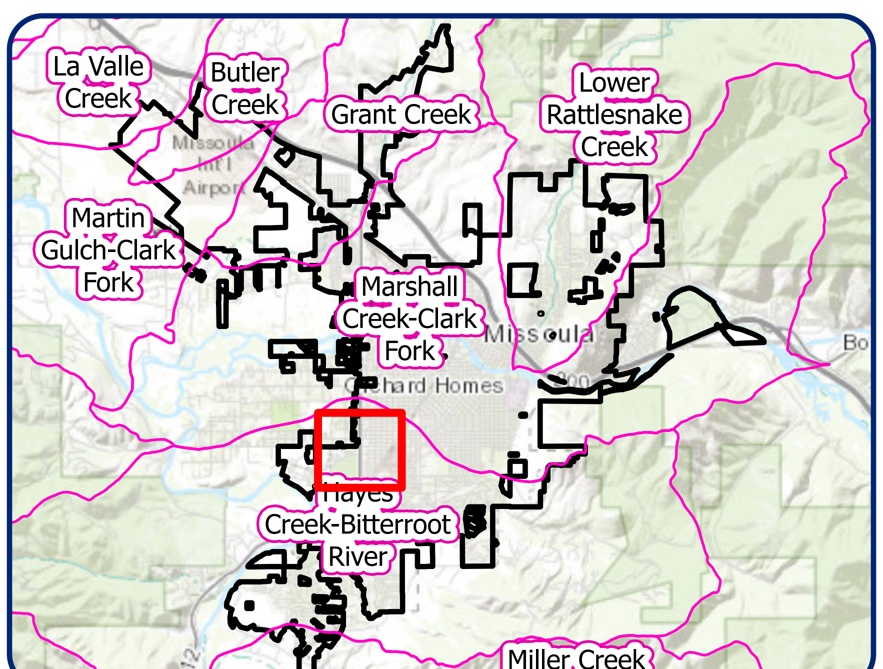

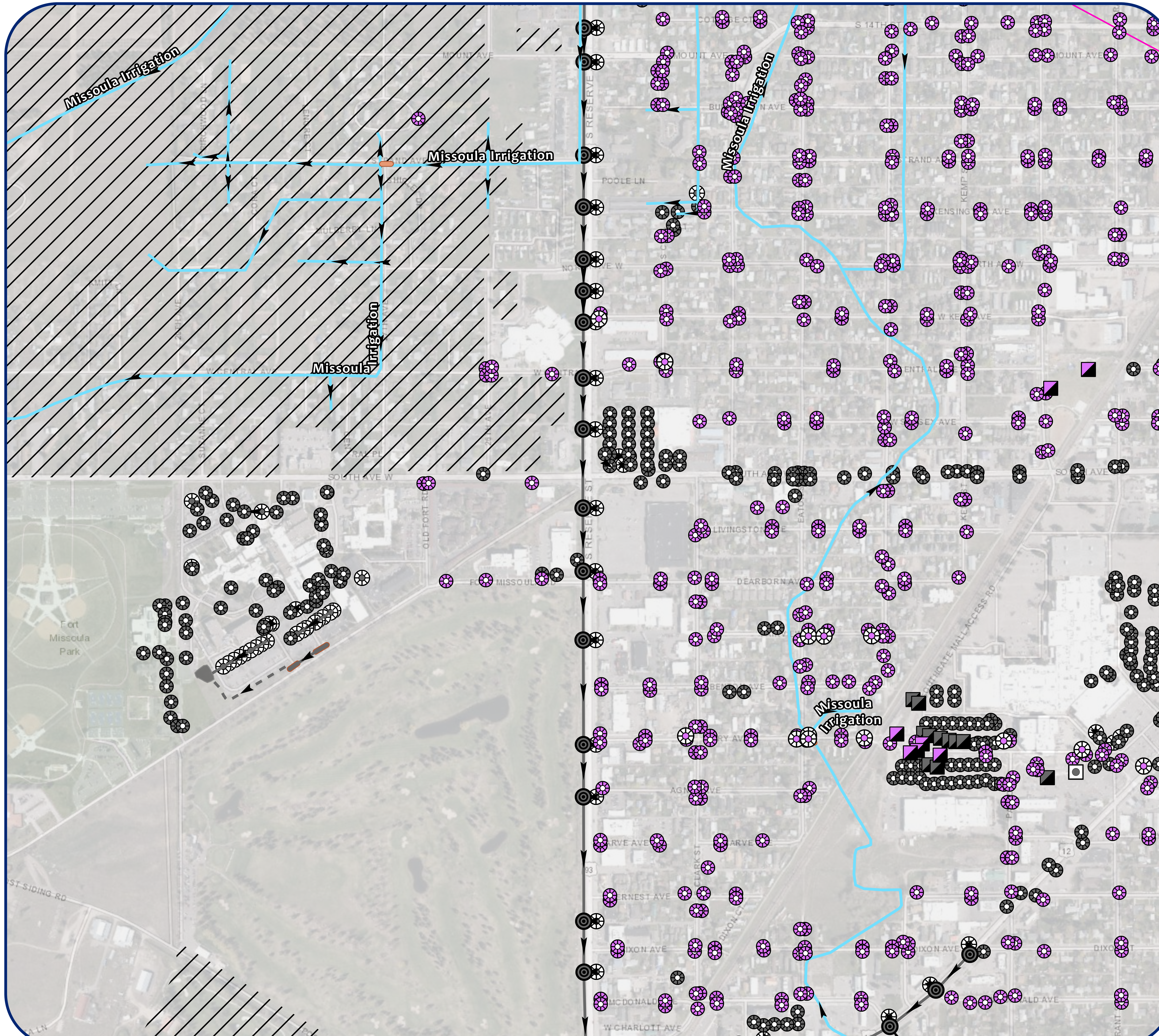

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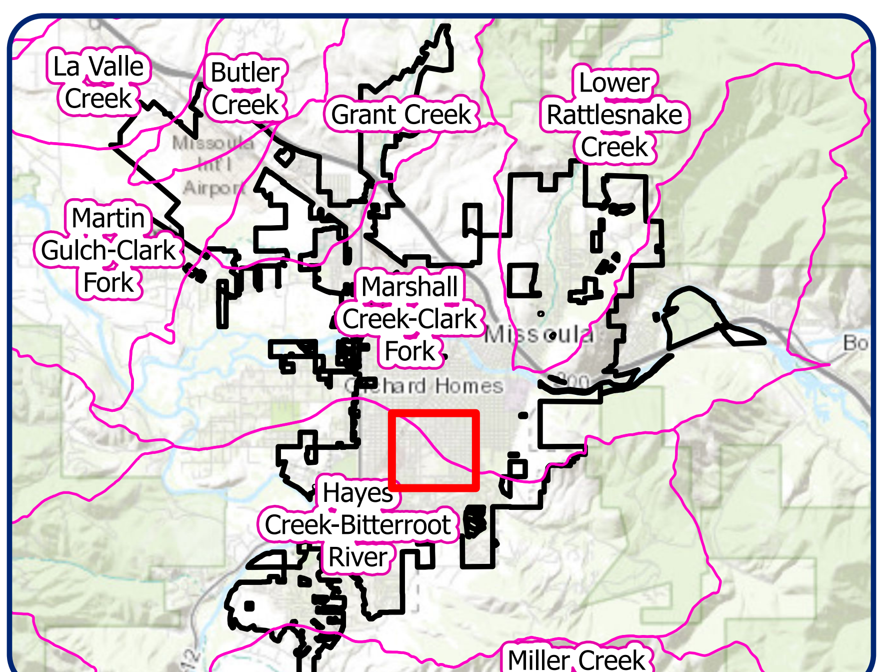

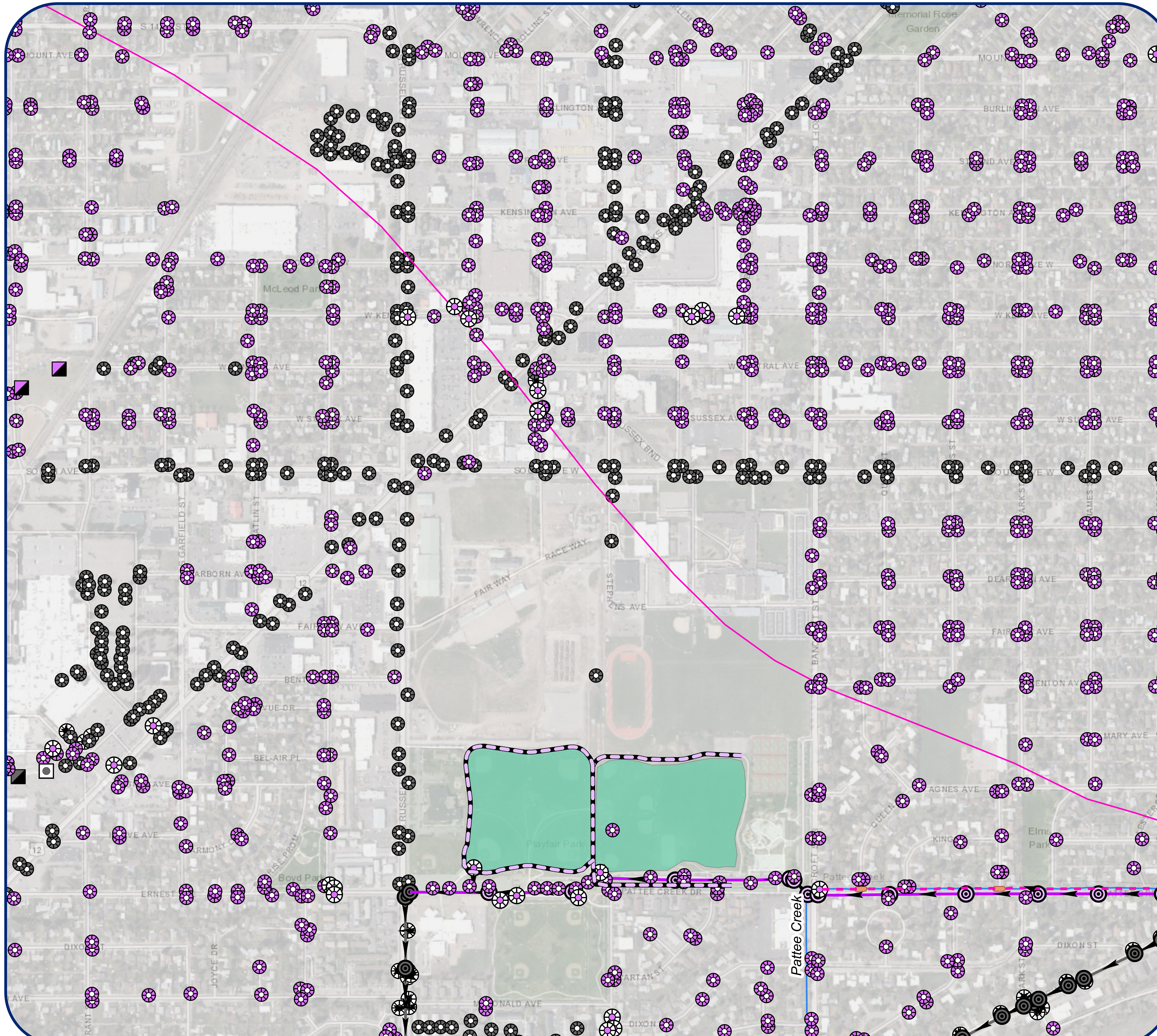

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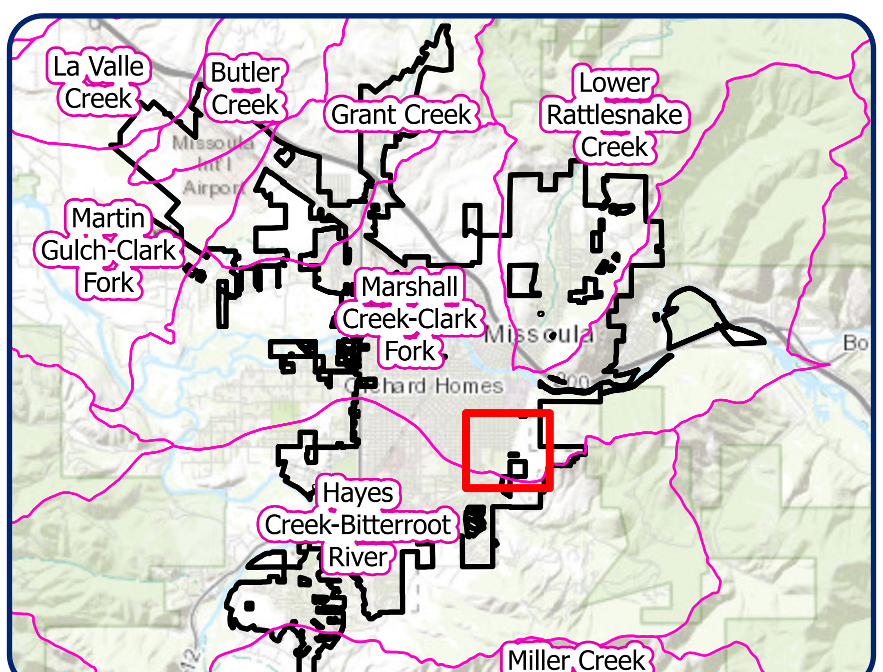

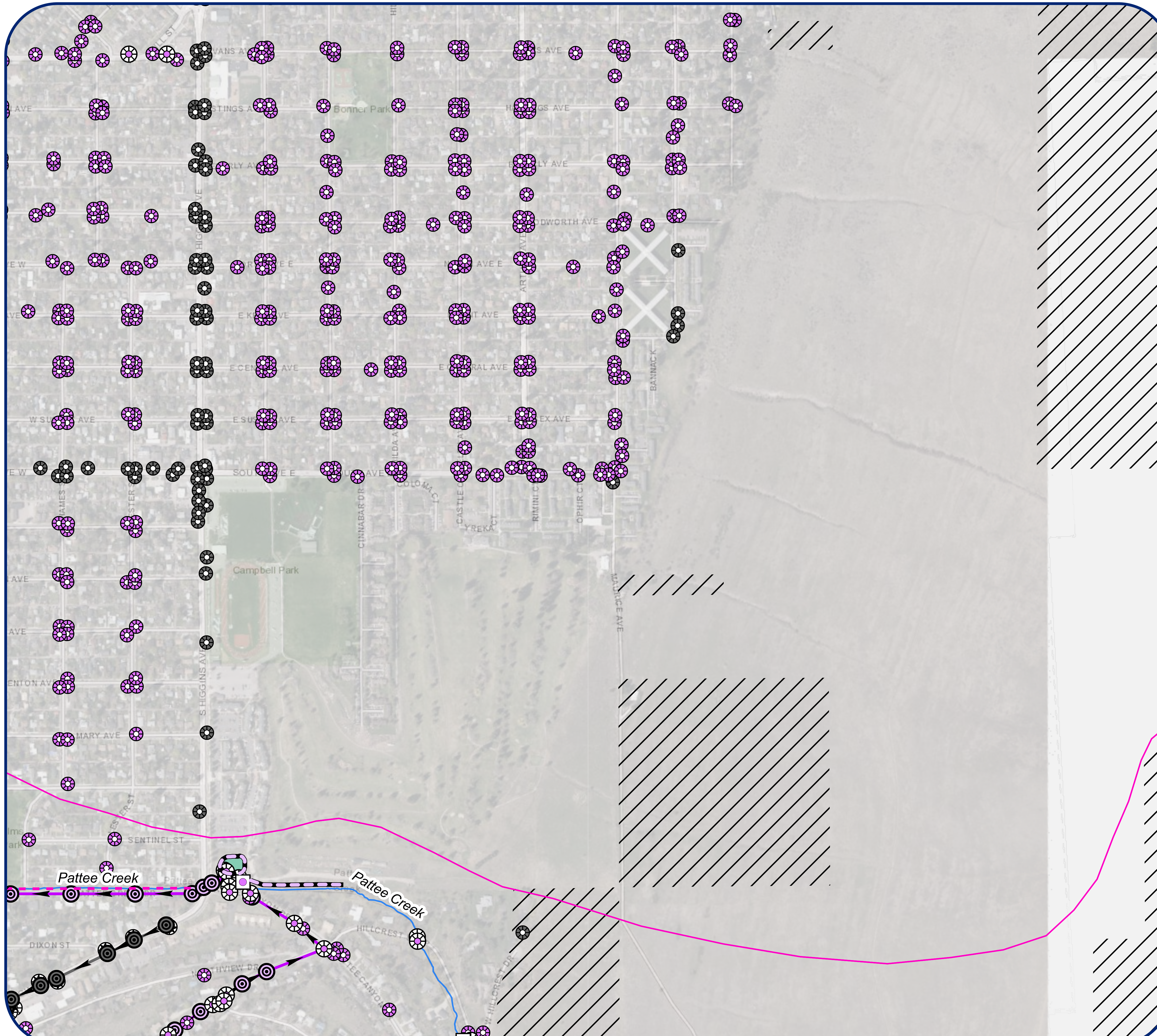

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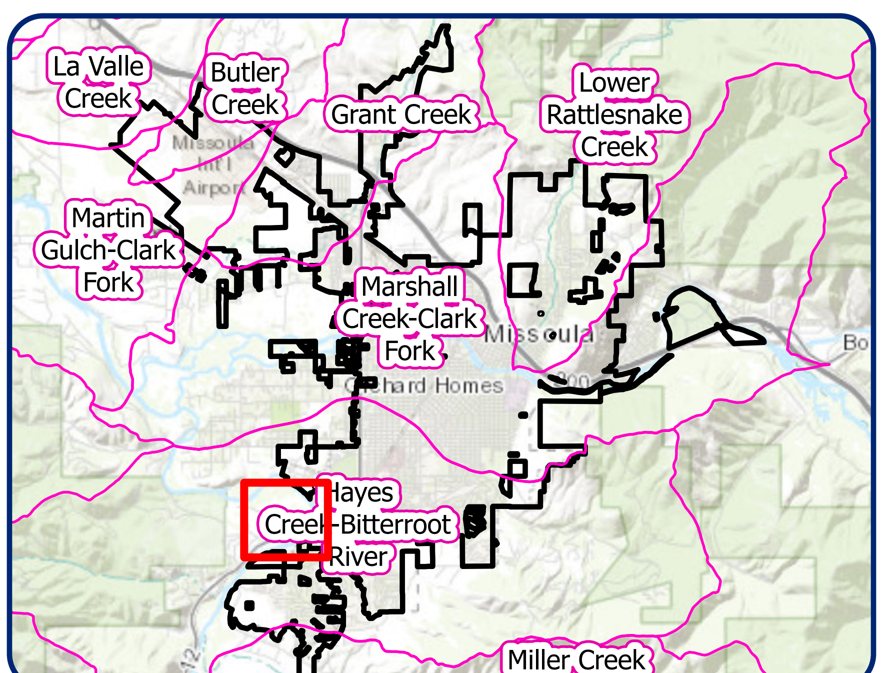

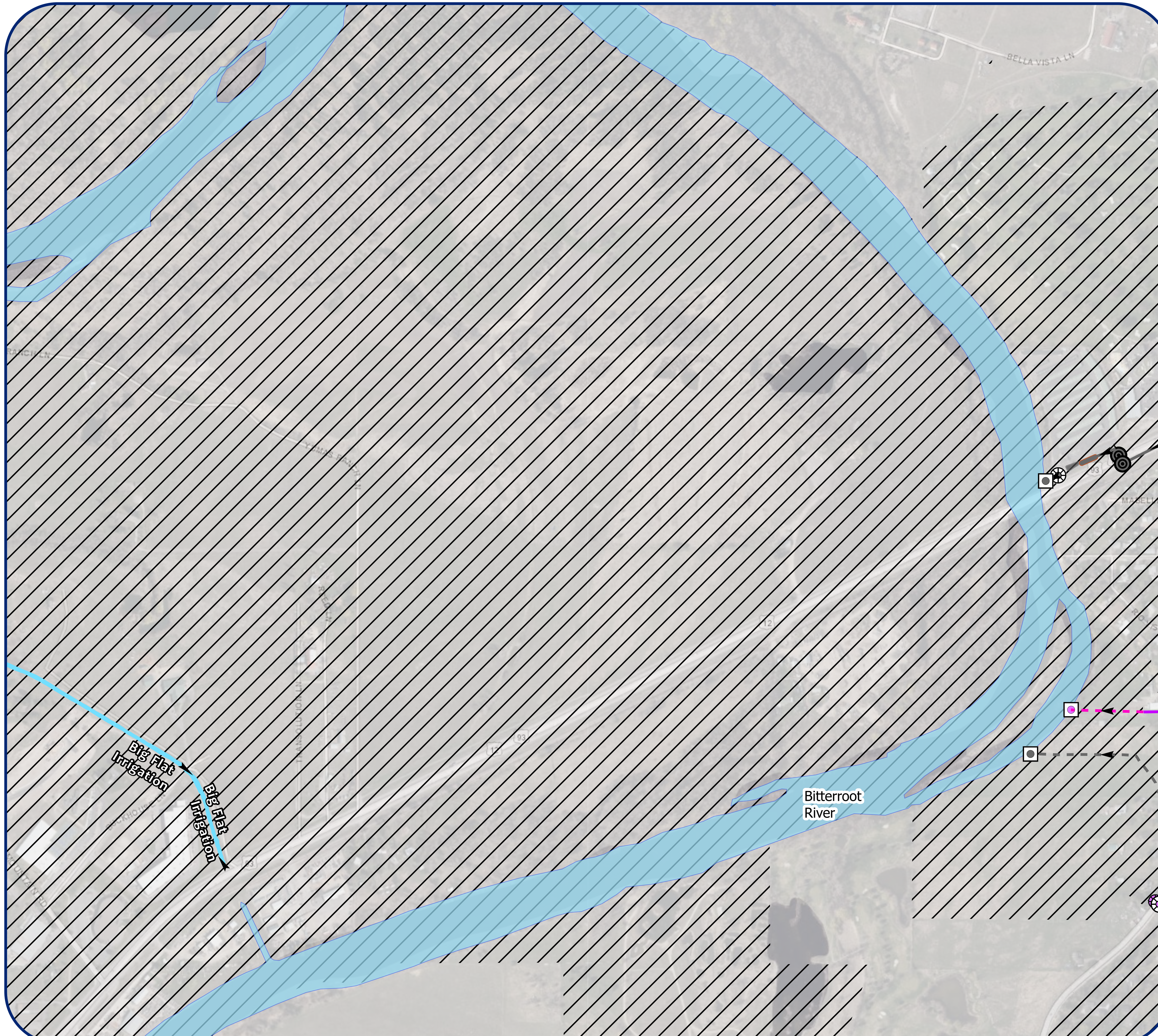

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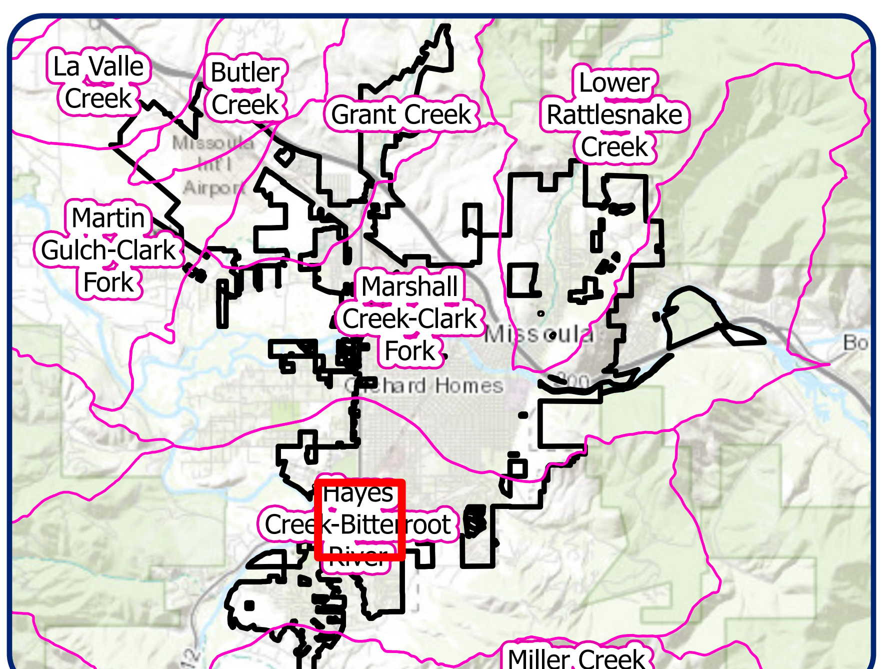

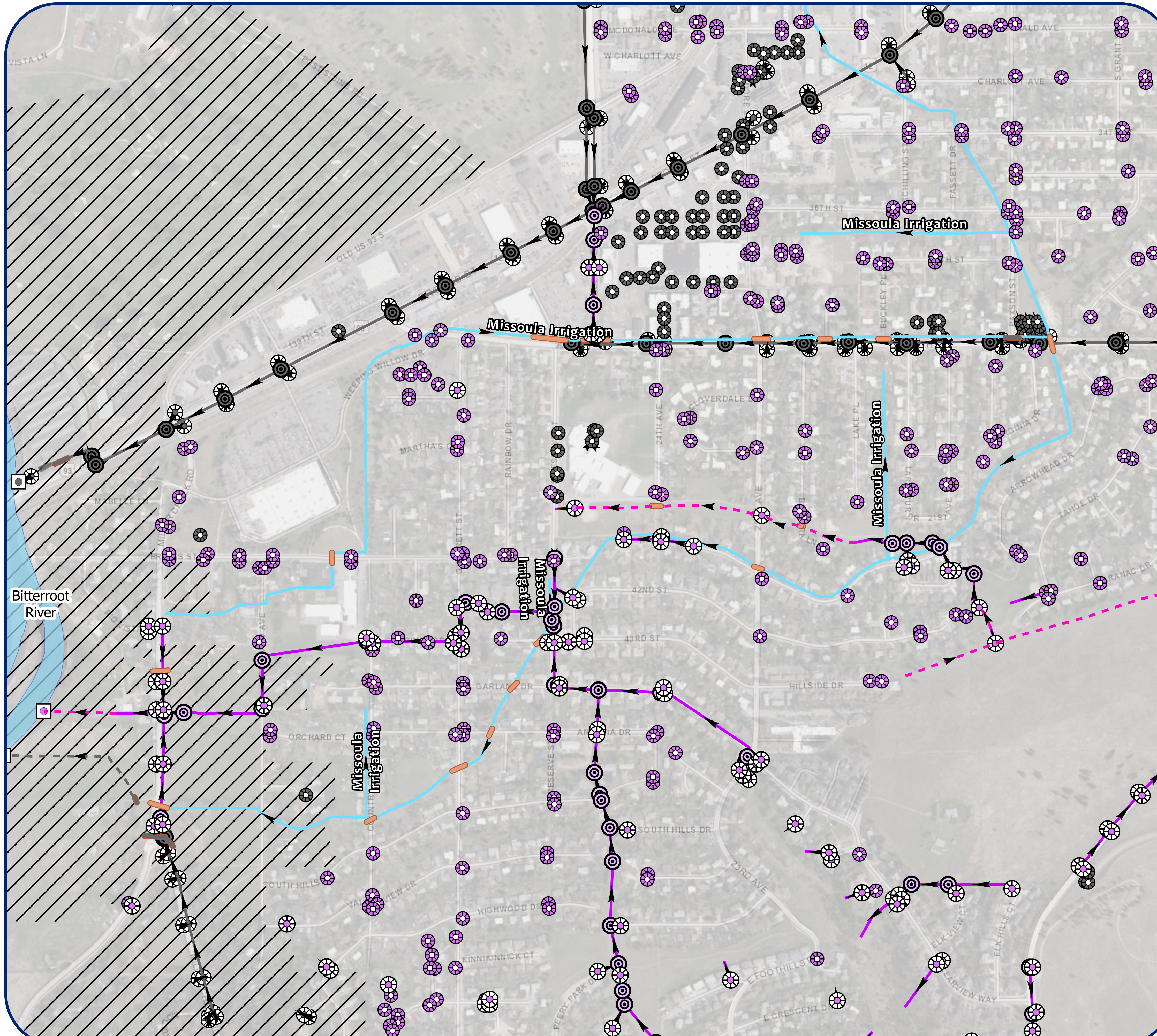

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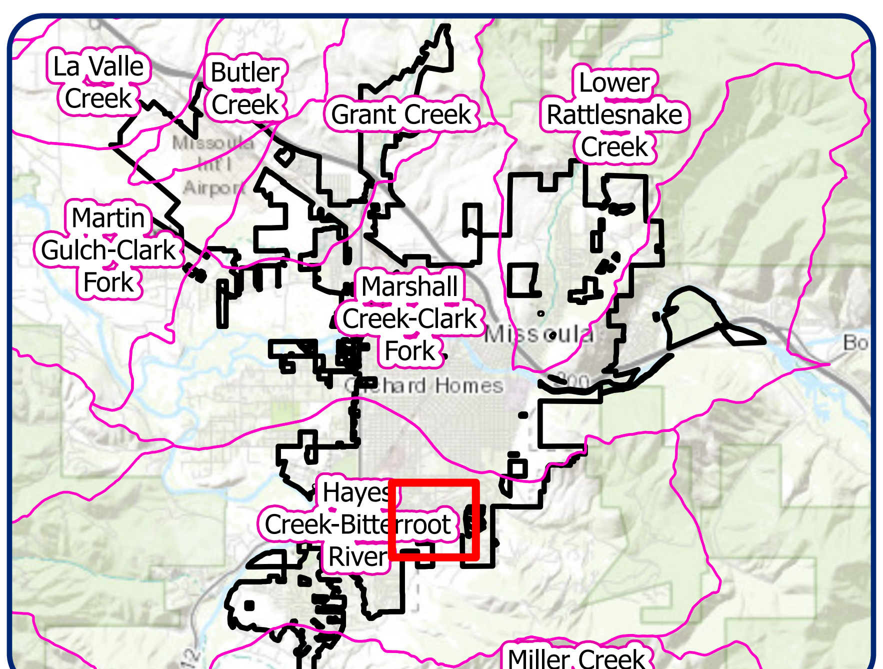

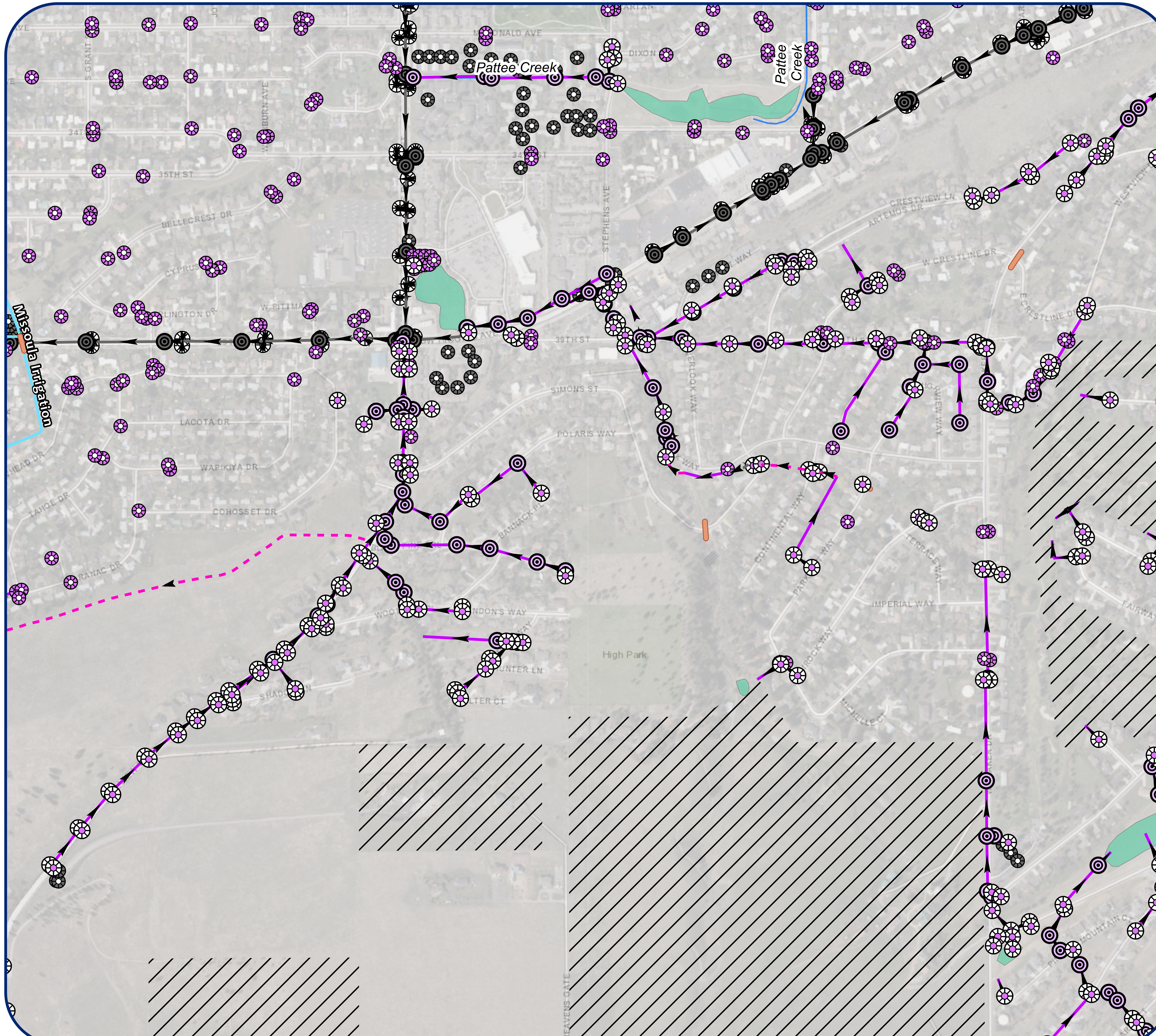

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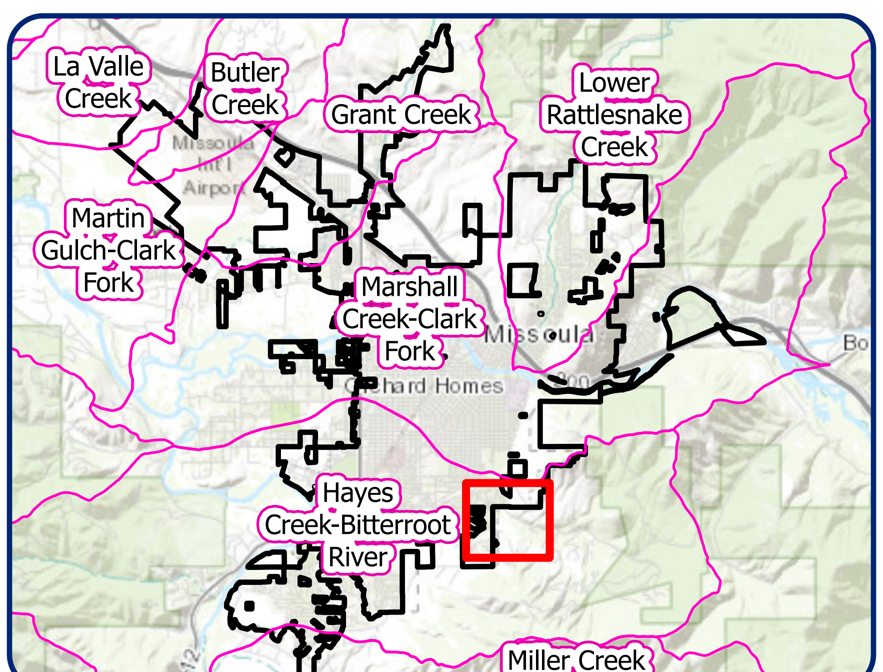

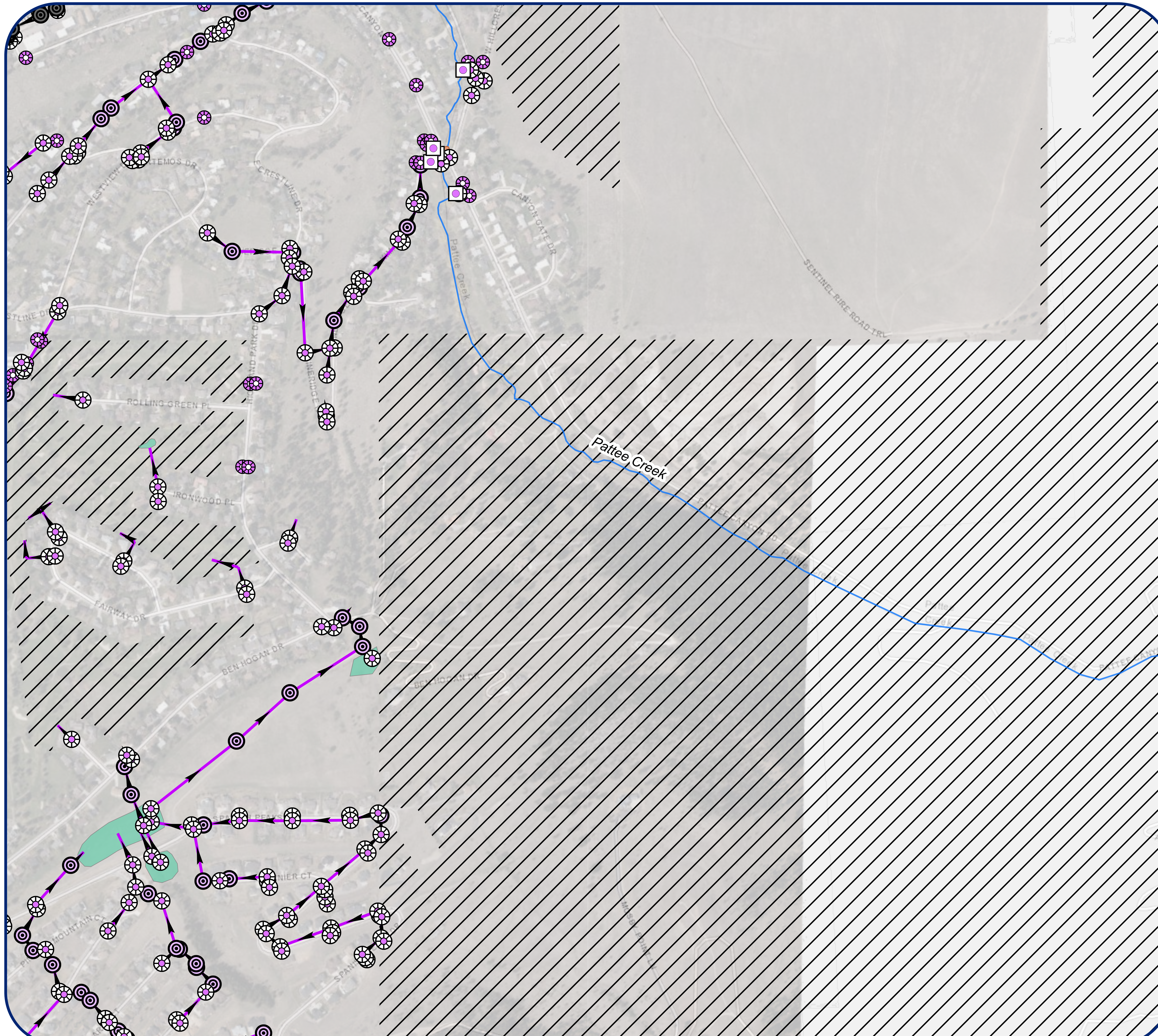

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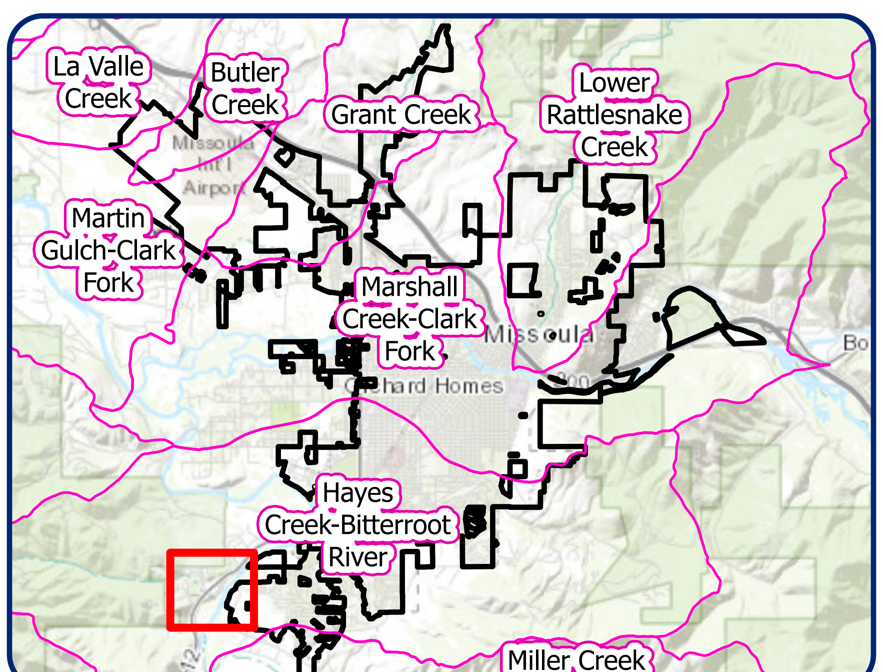

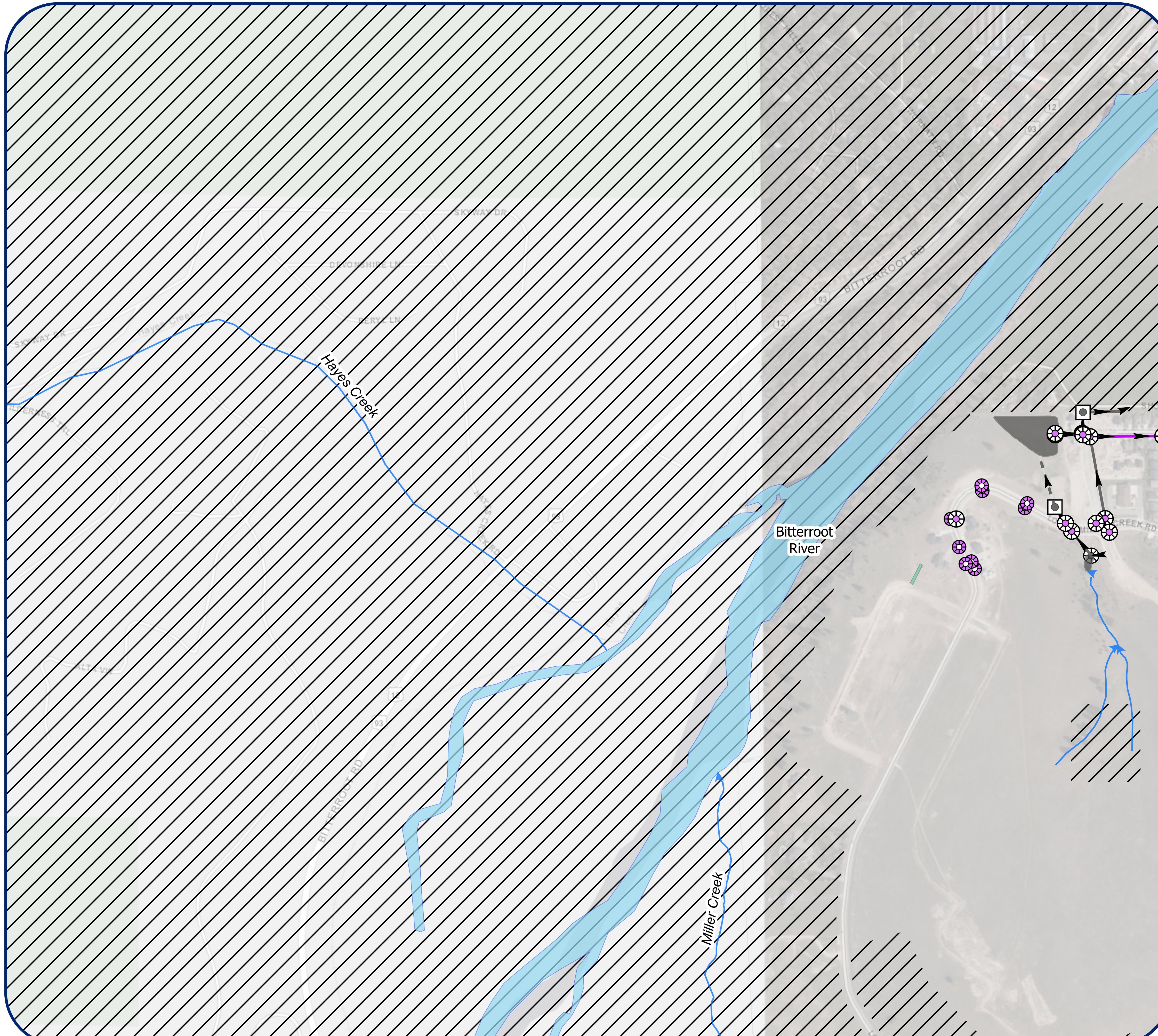

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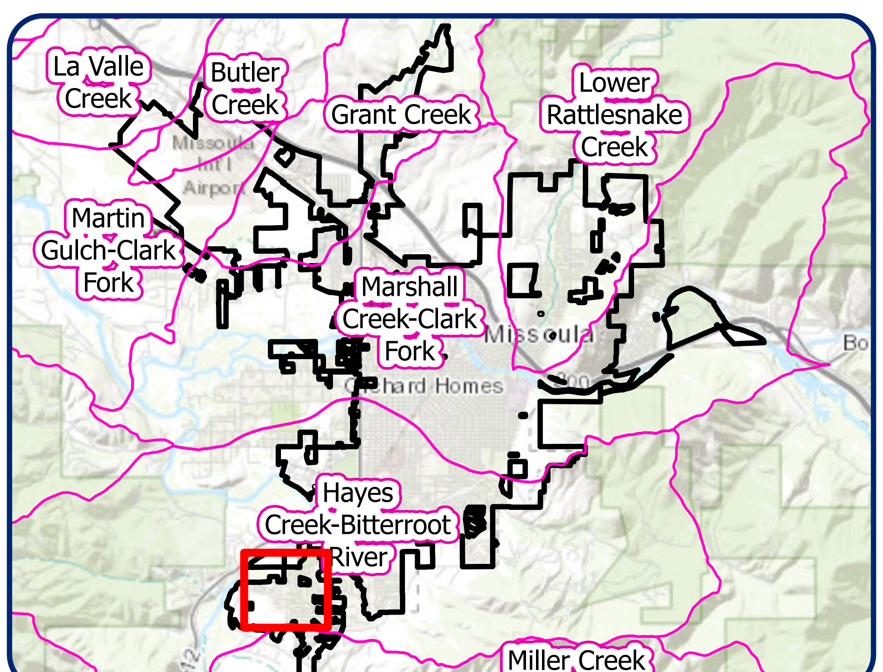

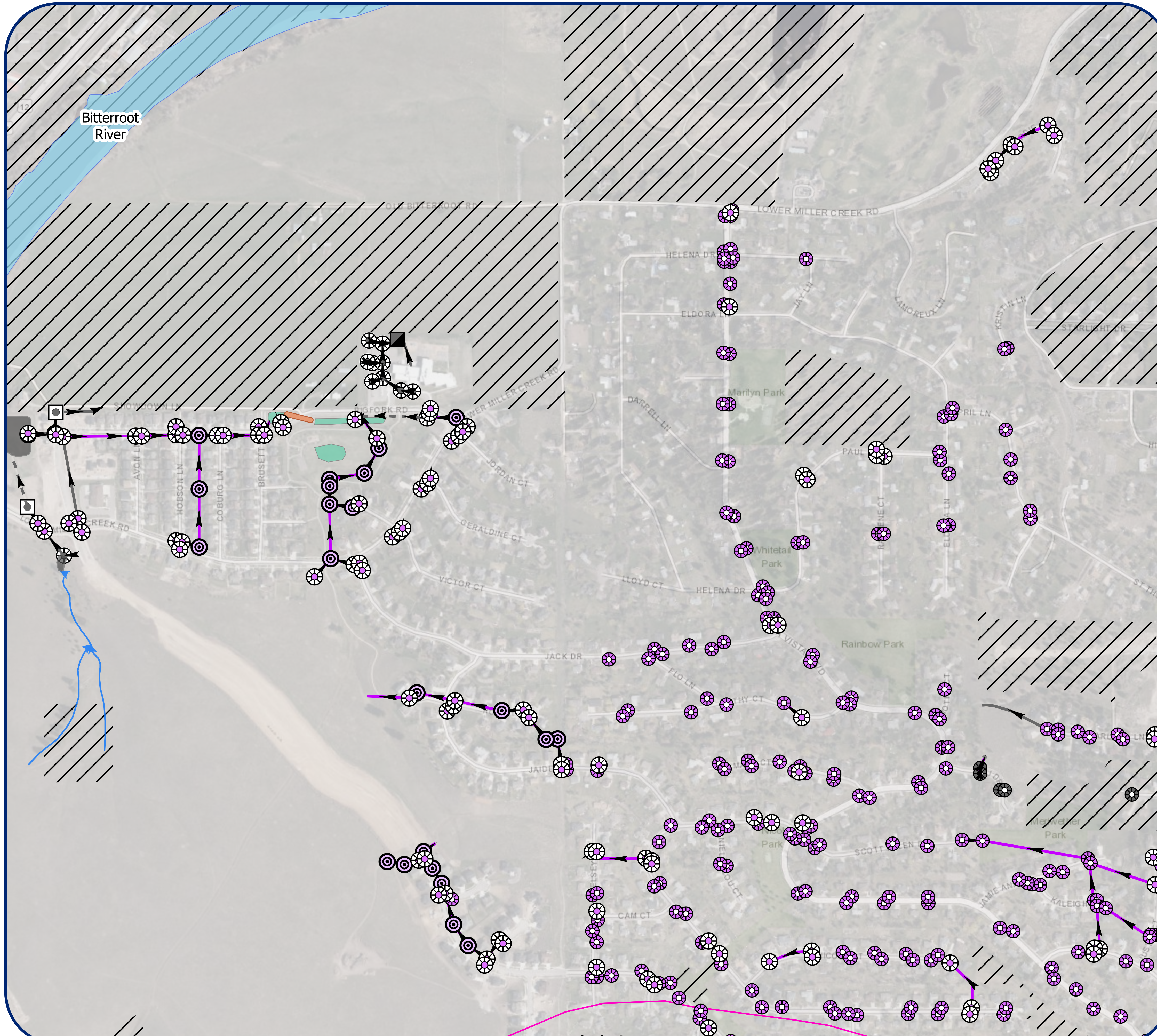

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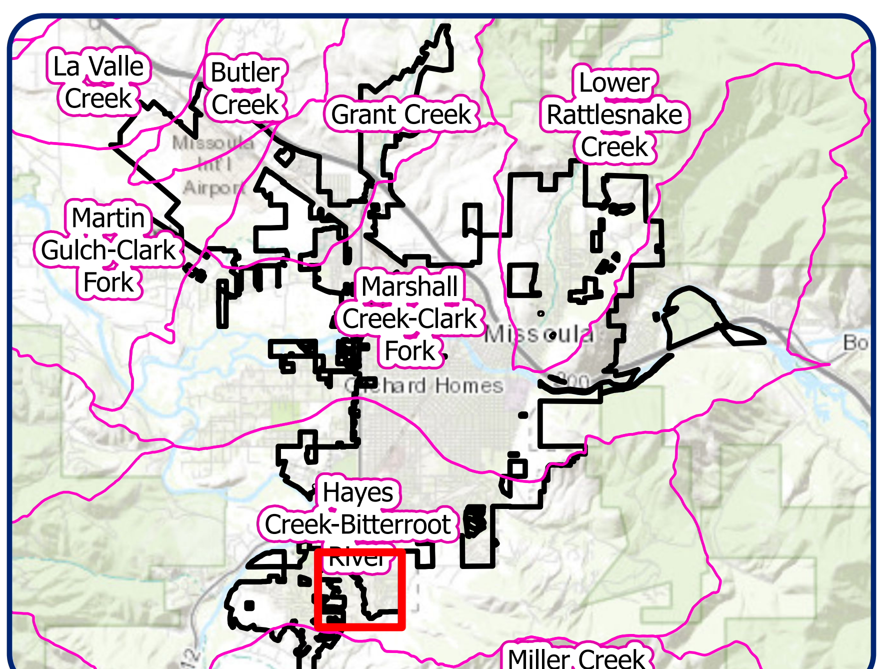

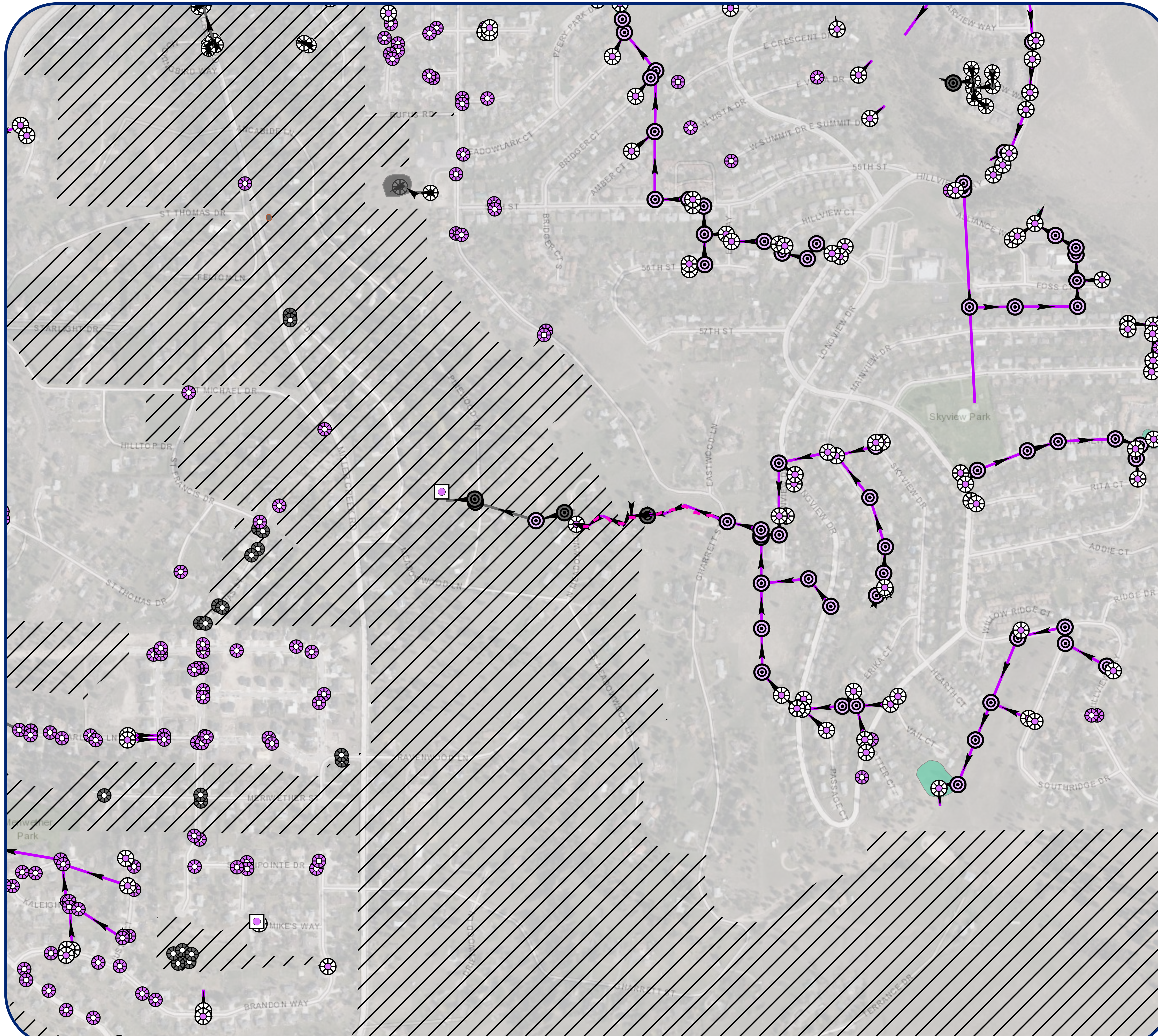

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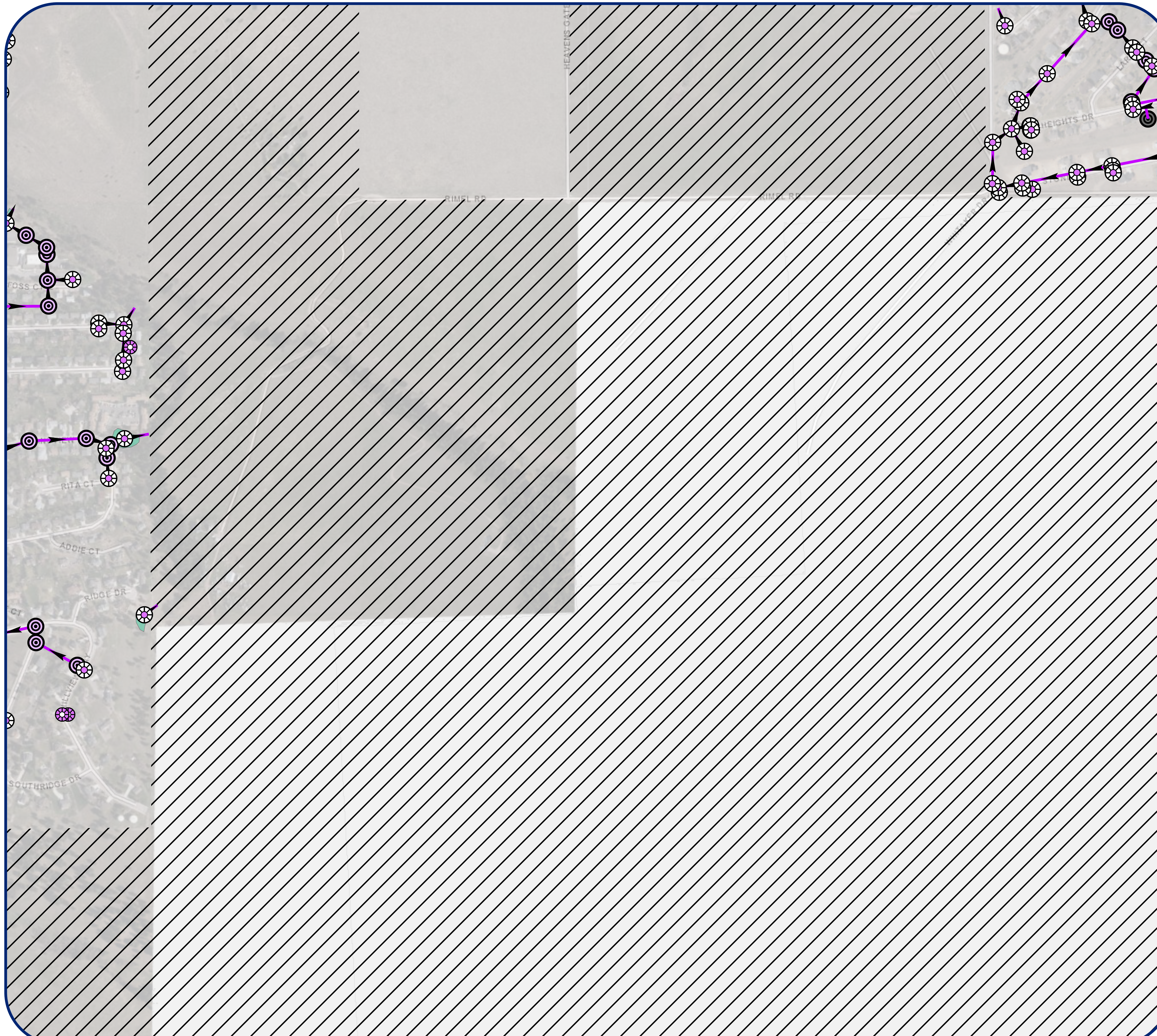

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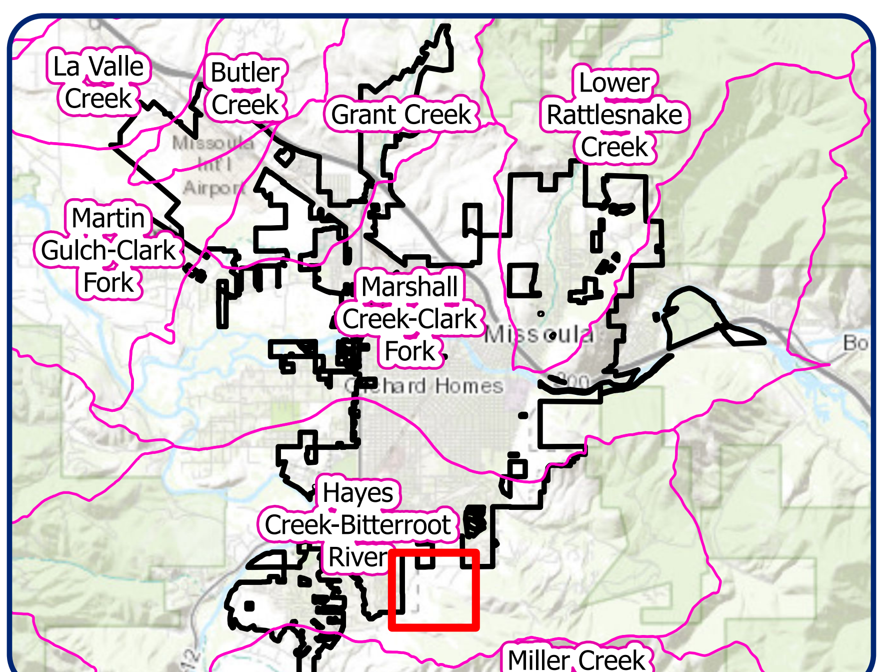

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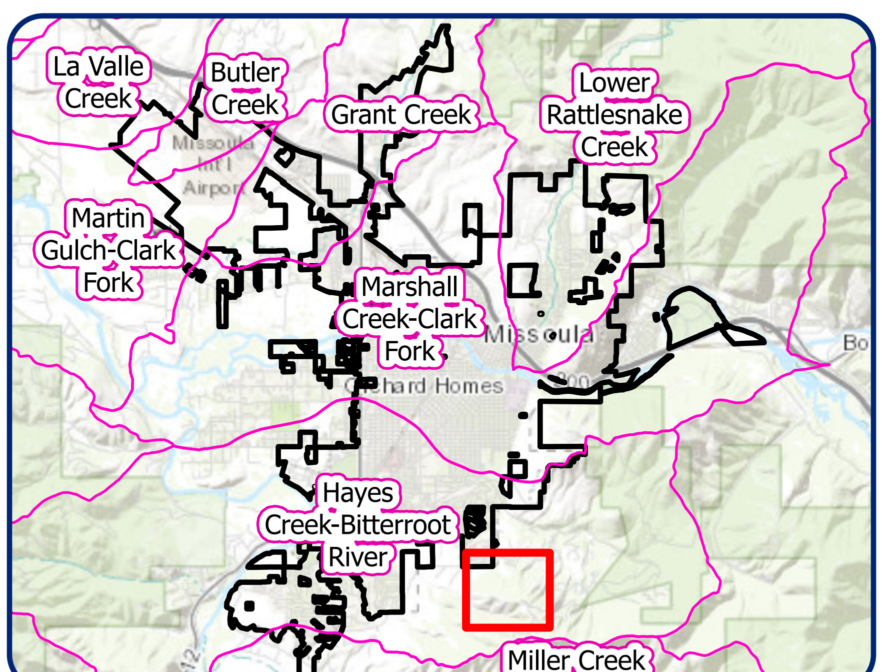

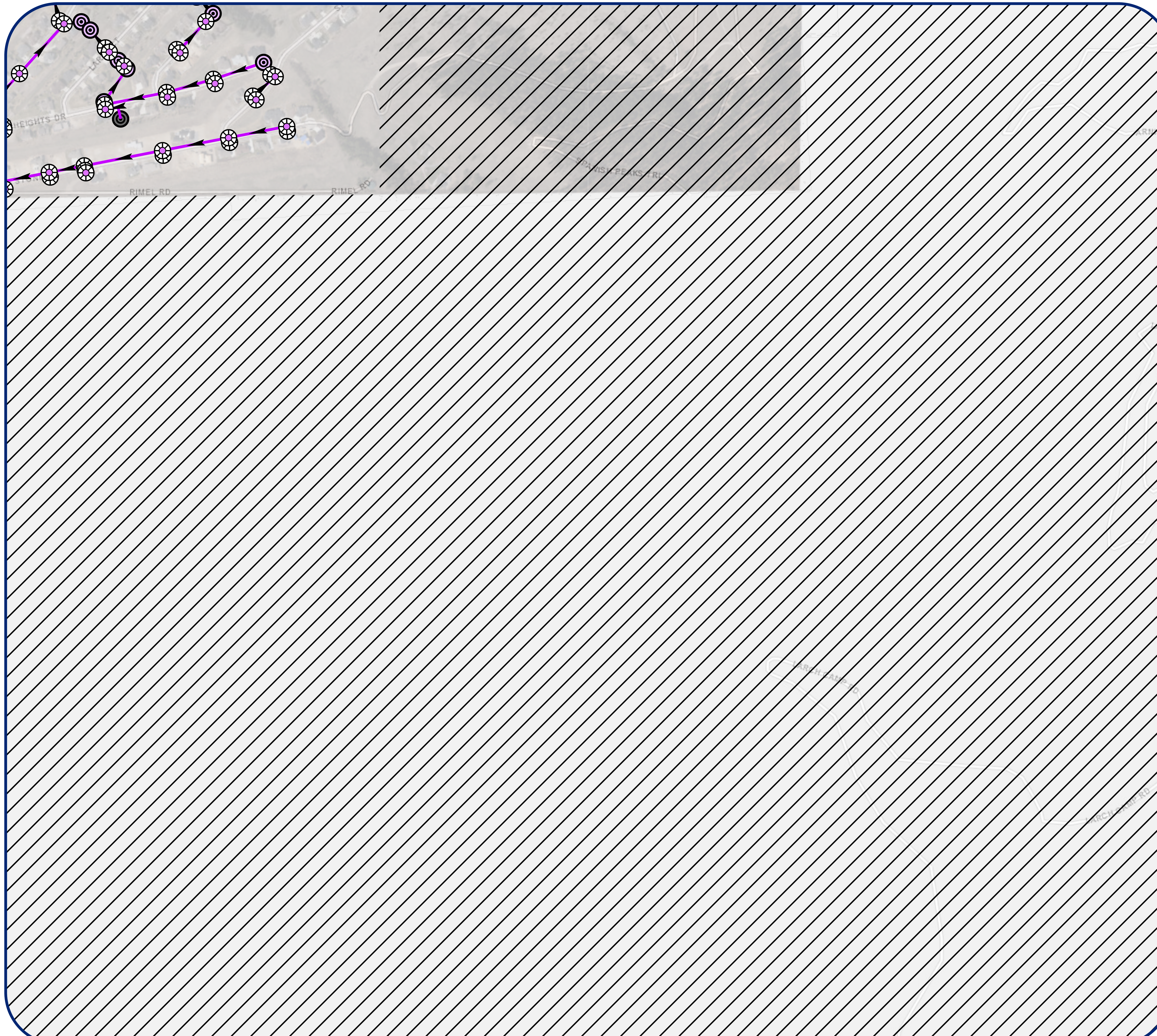

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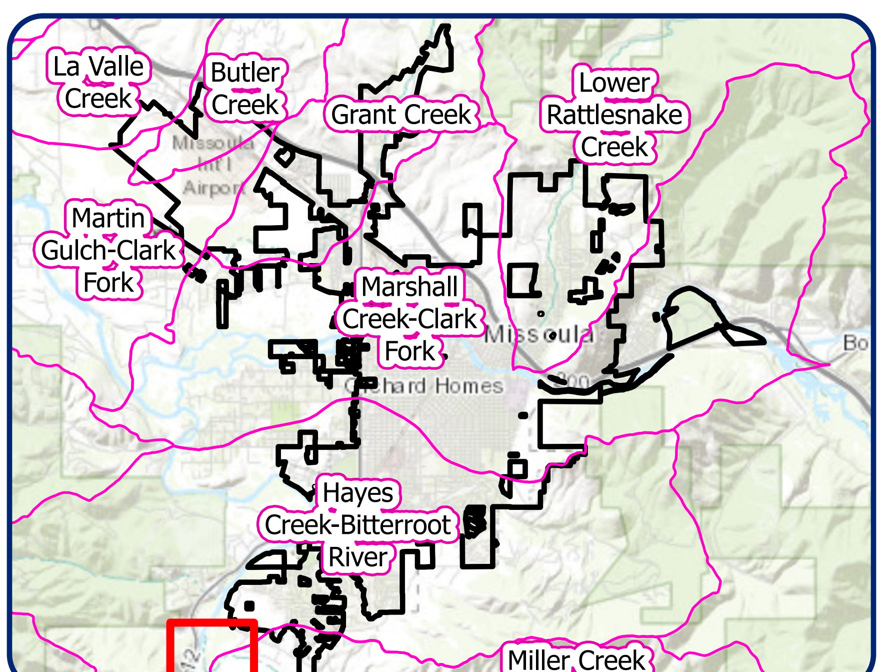

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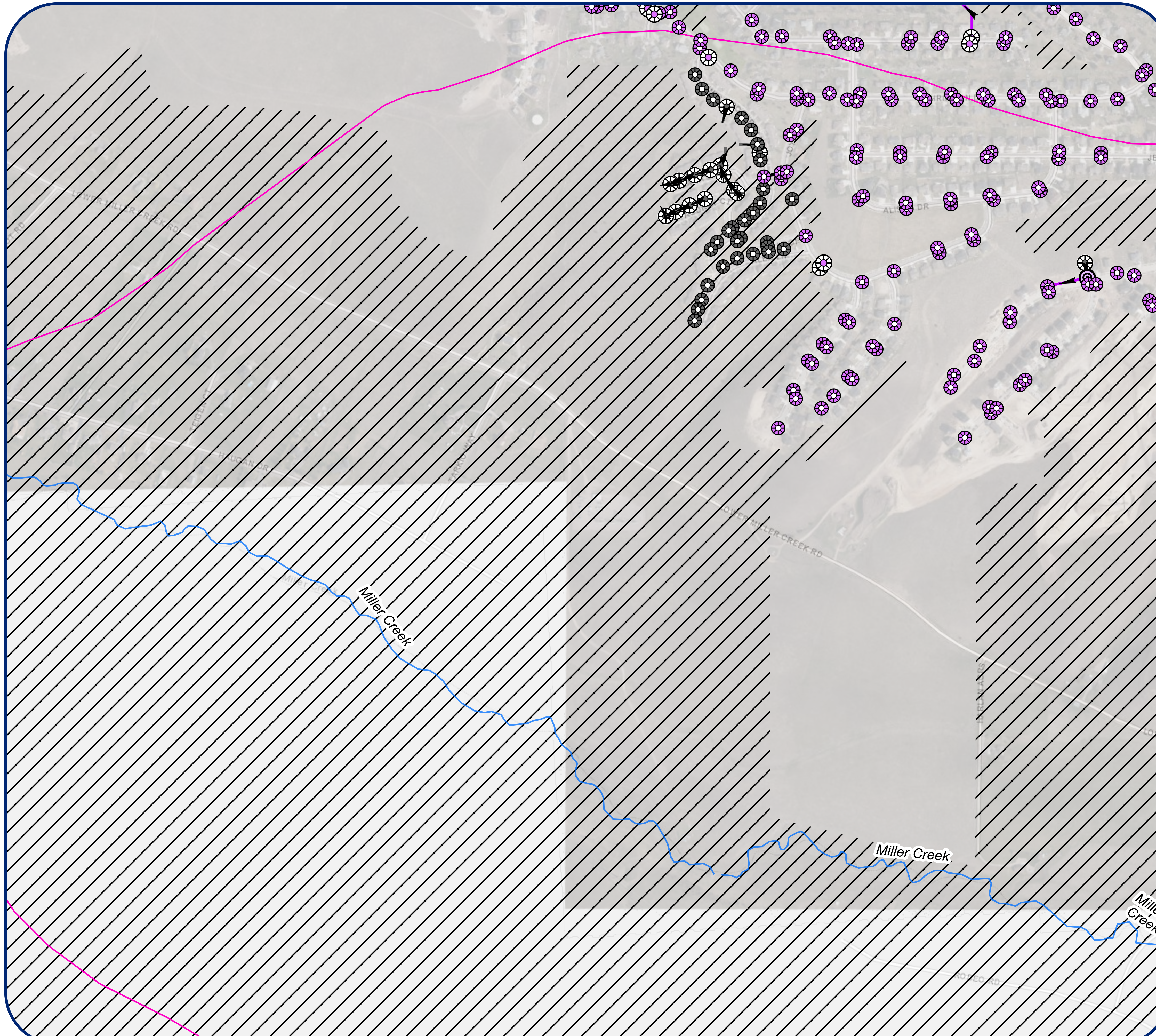
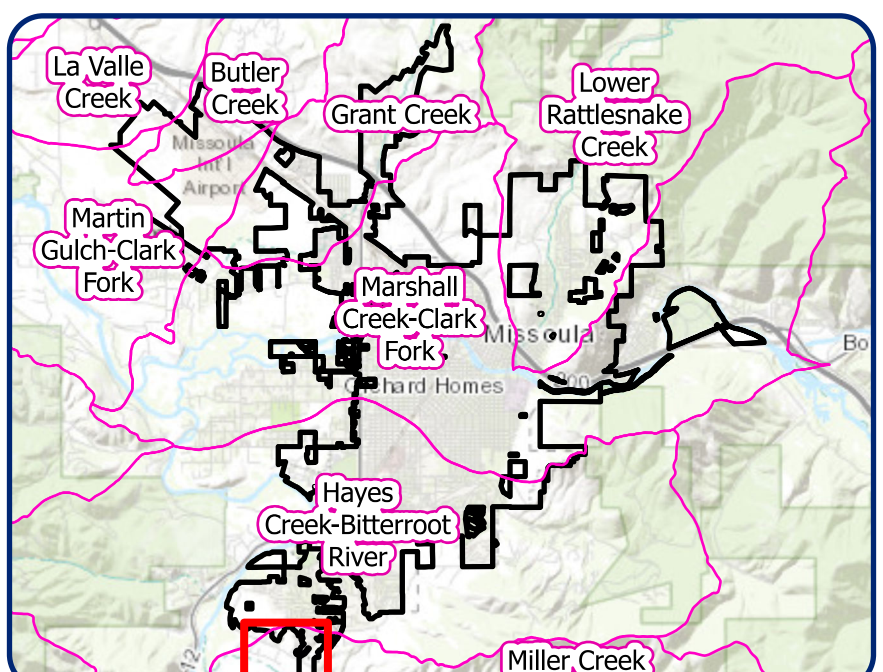
- Storm Flood Control
- Irrigation Ditch
- Basin

Reference Layers:
- Non-City Property
- Sub-Watershed Boundary
- River
- Stream





STORM WATER

City of Missoula

0 500 1,000 2,000 Feet

N

City Infrastructure:

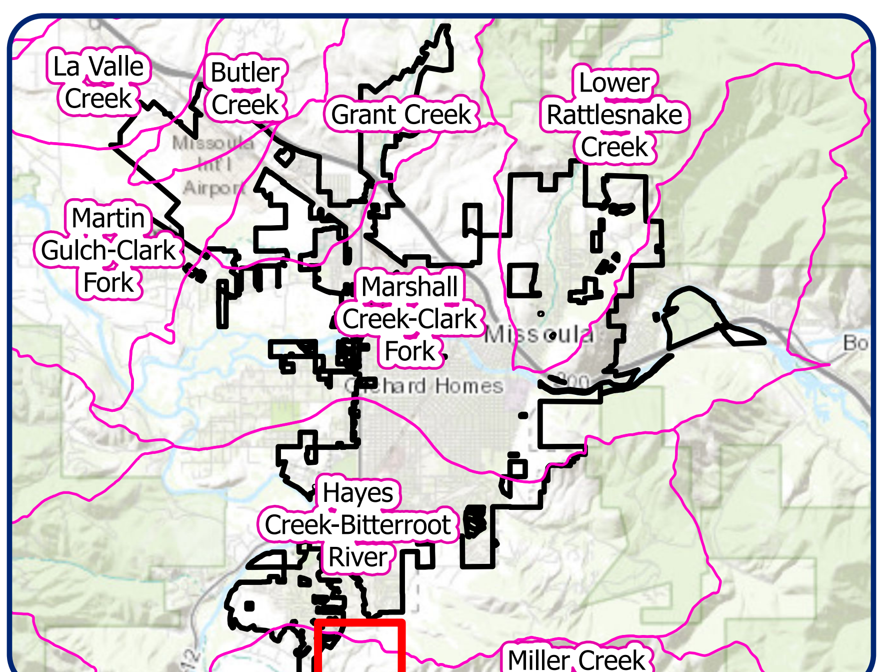
- Drywell
- Inlet
- Manhole
- Discharge Point
- Gravity Main
- Open Channel / Swale
- Infiltration Chamber
- Culvert
- Storm Flood Control
- Treatment Structure
- Detention Basin
- Retention Basin
- Basin

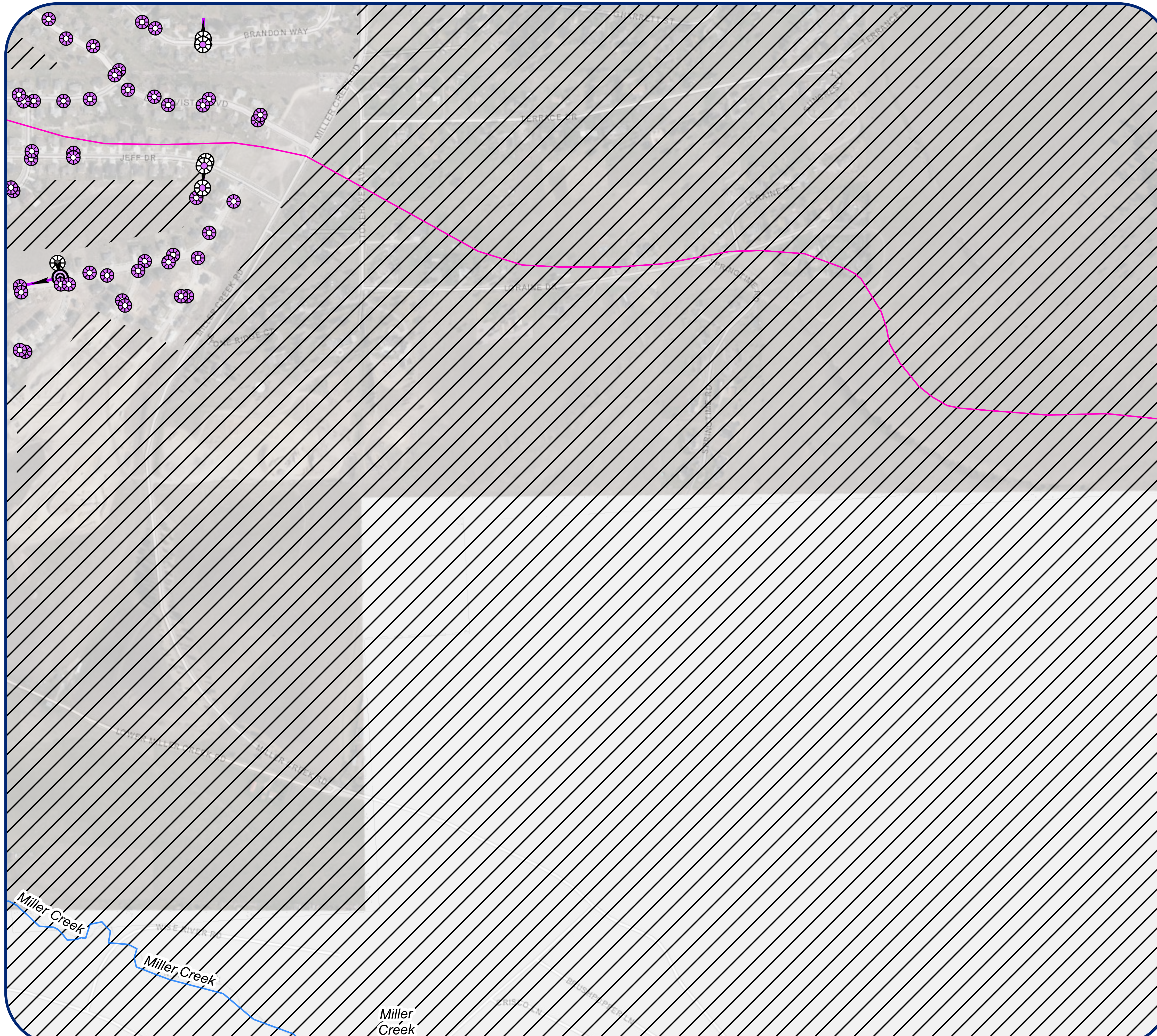
Other Infrastructure:

- Drywell
- Inlet
- Manhole
- Discharge Point
- Gravity Main
- Open Channel / Swale
- Infiltration Chamber
- Culvert
- Storm Flood Control
- Irrigation Ditch
- Basin

Reference Layers:

- Non-City Property
- Sub-Watershed Boundary
- River
- Stream





Appendix B

Missoula Valley Water Quality District Documents

Missoula Public Health
City-County Health Department

Missoula City-County Health Department
Water Quality District
301 W Alder|Missoula MT 59802-4123
www.missoulacounty.us/wqac
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 enforcement of 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. After-hours response is available depending on the severity of the complaint.

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.*

Additionally, the City of Missoula Storm Water Utility also prohibits illicit discharges through Municipal Code (13.27.200). It states:

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.

However, response to illicit discharges is conducted according to this ERP and as referenced in 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.

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 13.26.080 Missoula Municipal Code 13.27.200
Effluent from Septic Tanks	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Car Wash Wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Improper Oil Disposal	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Radiator flushing disposal	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Laundry wastewaters	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Spills from Roadway accidents	Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200
Improper disposal of auto and household toxics	Missoula City County Health Code, Regulation 1, Missoula Municipal Code 13.26.080 Missoula Municipal Code 13.27.200

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 (i.e. oil sorbent materials). If necessary, the department may secure contractors necessary to reduce the spread of contamination (i.e. vactor truck or excavator).

Typical enforcement procedure is as follows,

Complaint Receipt $\xrightarrow{\text{(1-3 days)}}$ Investigation $\xrightarrow{\text{(1-3 days)}}$ Notification to responsible party via Notice of Violation (NOV)

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 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 Public Health
City-County Health Department

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

Appendix C
Outfall Priority and Reconnaissance

Outfall Priority and Reconnaissance
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

City of Missoula
Public Works and Mobility Department
Storm Water Utility Division
1345 West Broadway
Missoula, Montana 59802

February 2021

Contents

TABLES

1 Introduction – Outfall Priority

In compliance with the City of Missoula's MS4 General Permit, the City must conduct dry weather inspections of all outfalls by the end of the current permit cycle (2021). These outfalls vary in importance; some have higher potential for illicit discharge than others. The MS4 permit also requires the City of Missoula to establish a ranking system that identifies the most important outfalls. After all of the outfalls were inspected in 2020, a ranking system was created using the data collected. Seven factors were observed that contributed to the importance of an outfall: pipe diameter, inlet count, land use, illicit discharge history, whether there were any septic systems in the drainage area, overflow potential, and whether the outfall drained into an impaired water body. This report documents how these seven factors were used to calculate a quantifiable ranking system for the importance of Missoula's 42 outfalls. This document only accounts for the outfalls owned and maintained by the city; outfalls owned by MDT and private entities are not included.

1.1 Outfall Priority Ranking Methods

Step #1: Data Collection

The first step was to record the information needed to calculate the importance rank (Table 1). For each outfall, the following information was gathered:

- Pipe Diameter: The diameter of each pipe in inches was recorded using the Storm Water Utility GIS.
- Inlet Count: This was gathered from the Storm Water Utility GIS using the "select by polygon" tool. The "inlet count" number represents how many inlet structures drain into the outfall. If an outfall had more than 80 inlets, it was given "80+".
- Land Use: Using an Orthophoto, the predominant land use for each outfall drainage area was identified and given one of the following categories: Road, Residential, Commercial, Urban, Industrial, Institutional, Farming, or Unknown.
- Illicit Discharge History: This category was designed to differentiate outfalls that have had a history of illicit discharge. If an outfall had no such history, it was labeled as "unlikely". If there had previously been signs of potential illicit discharge, it was labeled "possible". Finally, if an outfall had previously shown signs of obvious illicit discharge, it was labeled "likely".
- Septic Systems: Using GIS septic system data from the Missoula Public Health Department, the number of septic systems within each outfall drainage area was recorded.

- Overflow Potential: If an outfall was at high risk of overflow or flooding, it was labeled “high”, if it had a moderate risk it was labeled “Medium” and if it had low risk it was labeled “Low”
- Impaired Water Bodies: This was gathered from the Storm Water Utility GIS. If the receiving water of an outfall was an impaired waterway, it was labeled “yes”. On the other hand, if the receiving water was not impaired, it was labeled as “no”.

Table 1. Outfall summary

Outfall-#	Outfall-ID	Pipe Diameter	Inlet Count	Land Use	Illicit Discharge History	Septic Count	Impaired Water Body	Overflow Potential
1	S05-64-OF1	18"	7	Commercial	Unlikely	0	No	Low
2	S05-64-OF2	42"	64	Urban	Unlikely	0	No	Low
3	S06-16-OF	42"	80+	Residential	Unlikely	2	No	Low
4	S06-24-OFA	12"	2	Residential	Unlikely	0	No	Low
5	S06-24-OFB	12"	2	Residential	Unlikely	0	No	Low
6	S06-24-OFC	12"	2	Residential	Unlikely	0	No	Low
7	S06-67-OF1	12"	2	Residential	Unlikely	1	No	Low
8	S102-OF-1	18"	10	Road	Unlikely	0	No	Low
9	S16-48-OF1	12"	2	Residential	Unlikely	0	No	Low
10	S16-48OF2	12"	3	Residential	Unlikely	1	No	Low
11	S211-OF	Unknown	4	Commercial	Unlikely	0	Yes	Low
12	S487-OF	48"	40	Urban	Unlikely	0	No	Low
13	S86-35-0F	42"	80+	Residential	Unlikely	15+	No	Low
14	S93-76-2	24"	6	Residential	Unlikely	0	No	Low
15	S93-76-G2	12"	1	Residential	Unlikely	0	No	Low
16	S93-76-L2	36"	28	Residential	Unlikely	0	No	Low
17	S97-5-1A	18"	5	Residential	Unlikely	0	No	Low
18	SNA-1516	24"	6	Urban	Unlikely	0	Yes	Low
19	SNA-1520	18"	21	Urban	Unlikely	0	No	High
20	SNA-1521	30"	80+	Urban	Unlikely	1	No	Low
21	SNA-1524	10"	2	Commercial	Unlikely	0	No	Low
22	SNA-1526	15"	14	Urban	Possible	0	No	Low
23	SNA-1527	Unknown	1	Unknown	Unlikely	0	No	Low
24	SNA-1531	12"	3	Road	Unlikely	0	No	Low
25	SNA-1532	12"	1	Road	Unlikely	0	No	Low
26	SNA-1535	12"	3	Commercial	Unlikely	0	No	Low
27	SNA-1560	18"	1	Road	Unlikely	0	No	Low
28	SNA-1561	30"	1	Road	Unlikely	1	No	Low
29	SNA-1562	30"	22	Residential	Unlikely	0	No	Low
30	SNA-1563	30"	30	Residential	Unlikely	0	No	Low
31	SNA-1566	12"	2	Residential	Unlikely	0	No	Low

Outfall-#	Outfall-ID	Pipe Diameter	Inlet Count	Land Use	Illicit Discharge History	Septic Count	Impaired Water Body	Overflow Potential
32	SNA-1571	12"	2	Residential	Unlikely	0	Yes	Low
33	UNK-15	15"	0	Industrial	Unlikely	0	No	Low
34	UNK-31	12"	0	Unknown	Unlikely	0	No	Low
35	UNK-37	16"	10	Urban	Unlikely	0	No	Low
36	UNK-50	12"	0	Road	Unlikely	0	No	Low
37	UNK-51	12"	0	Road	Unlikely	0	No	Low
38	UNK-52	14"	1	Residential	Unlikely	1	No	High
39	UNK-8	12"	0	Unknown	Unlikely	0	No	Low
40	UNK-53	27"	2	Residential	Unlikely	0	No	Low
41	UNK-54	Unknown	1	Residential	Unlikely	0	No	High
42	UNK-55	24"	21	Residential	Unlikely	15+	No	Low

Step #2: Data Manipulation

A scoring system was used to rank each variable for each outfall. Because all of the variables carried different relevance in determining outfall importance, each variable had a unique scoring system. A description of the scoring system for each category is given below.

- Pipe Diameter: If an outfall pipe is large, it was designed to accommodate more discharge. Therefore, the pipes with a larger diameter were deemed more important. 22 different categories were created in order to group the pipe sizes. These categories were broken up by two-inch increments. The smallest pipe in our inventory is 4 inches wide. Thus, the first category was 4-5 inches. The largest pipes in our inventory are 42 and 48 inches wide. The largest category was 42+. Table #2 shows the corresponding importance score for each pipe size category.

Table 2. Pipe diameter importance score

Pipe Diameter	Importance Score
4-5"	0
6-7"	1
8-9"	2
10-11"	3
12-13"	4
14-15"	5
16-17"	6
18-19"	7
20-21"	8
22-23"	9
24-25"	10

Pipe Diameter	Importance Score
26-27"	11
28-29"	12
30-31"	13
32-33"	14
34-35"	15
36-37"	16
38-39"	17
40-41"	18
42+"	19

- Inlet Count: If an outfall has more inlets that drain to it, it has a higher potential for illicit discharge and is more important. More inlets give more potential for illegal dumping. The score for this category was the exact number of inlets the outfall had. If an outfall had 5 inlets draining to it, it was given a score of 5. If there were 20 inlets, it was given a score of 20. This method was used in order to guarantee that the outfalls with the most inlets were given the highest scores.
- Illicit Discharge History: In compliance with the MS4 permit, the storm water utility is required to conduct dry weather inspections of every outfall every permit cycle. Thus, we have a record of outfalls that have had history of illicit discharge. If an outfall has no history of illicit discharge, it was given 0 points. If there was possible history of illicit discharge, it was given 5 points. If there was likely history of illicit discharge, it was given 20 points.
- Land Use: Because illicit discharge potential changes depending on land use, each land use category was given a different importance score which can be seen in table #3. If an outfall only drains a road, with no buildings in the area, it has low potential for illicit discharge and thus has the lowest importance score. Residential neighborhoods are slightly more important to monitor because citizens could potentially be dumping paint or other household products. Commercial areas are more important than neighborhoods because businesses are consistently dealing with substances that would be harmful if disposed of improperly. Farming areas are important to monitor because regular pesticide and fertilizer runoff can be very harmful to wildlife. The second most important land use classification was urban; outfalls that drain urban downtown areas have the oldest infrastructure and they are at risk of illicit discharge from city activities. The most important land use was industrial because of the risk of heavy metals that is possible with industrial activities.

Table 3. Land use importance scores

Land Use Type	Importance Score
Road	1
Residential	5
Commercial	10
Farming	12
Urban	13
Industrial	15

- Septic Systems: If there are septic systems within the drainage area of an outfall, that outfall will be at a higher risk of contamination from bacteria such as E.Coli. Therefore, outfalls with septic systems in their drainage areas were considered more important than those with sewer systems. If there was anywhere from 1-5 septic systems, the outfall was given a score of 5. Table #4 shows the corresponding importance scores for the amount of septic systems in an outfall area.

Table 4. Septic system importance scores

Septic Systems	Importance Score
0	0
1 through 5	5
6 through 10	10
10 through 15	15
15+	20

- Overflow Potential: Some outfalls are more prone to flooding and overflow than others. There are multiple factors that can cause flood potential: (1) A clogged inlet or drywell can overload an outfall that was not designed to have all of the discharge it is receiving, (2) A flap gate on the end of an outfall pipe can be shut closed during high water which can backlog the system, (3) a pipe can be undersized for the amount of discharge it is designed to receive. These factors were all considered when deciding the overflow potential for each outfall. If the outfall had no risk of overflow, it was given a score of 0. If it had medium risk, it was given a score of 10. If it had a high risk, it was given a score of 15.
- Impaired Water Bodies: If a water body is already impaired, it is more important to protect it and prevent further damage. Therefore, if an outfall drains into an impaired waterbody, it was given an extra 5 points. If it drains into an unimpaired water body, it was given no points. The

four impaired water waterways within our system include: Bitterroot River, Clark Fork River, Grant Creek, and Miller Creek.

Step #3: Calculations

Once all the data was collected and manipulated, all of the scores for each outfall were added together using an excel spreadsheet in order to calculate total scores for each outfall (table #5).

Table 5. Summary of outfall scores

Outfall-#	Outfall-ID	Pipe Diameter	Inlet Count	Land Use	Illicit Discharge History	Septic Systems	Impaired Water Body	Overflow Potential	Total Score
1	S05-64-OF1	7	7	10	0	0	5	0	**29**
2	S05-64-OF2	19	64	13	0	0	5	0	**101**
3	S06-16-OF	19	80	5	0	5	5	0	**114**
4	S06-24-OFA	4	2	5	0	0	0	0	**11**
5	S06-24-OFB	4	2	5	0	0	0	0	**11**
6	S06-24-OFC	4	2	5	0	0	0	0	**11**
7	S06-67-OF1	4	2	5	0	5	0	0	**16**
8	S102-OF-1	7	10	1	0	0	5	0	**23**
9	S16-48-OF1	4	2	5	0	0	0	0	**11**
10	S16-48OF2	4	3	5	0	5	0	0	**17**
11	S211-OF	6	4	10	0	0	5	0	**25**
12	S487-OF	19	40	13	0	0	5	0	**77**
13	S86-35-0F	19	80	5	0	20	5	0	**129**
14	S93-76-2	10	6	5	0	0	0	0	**21**
15	S93-76-G2	4	1	5	0	0	0	0	**10**
16	S93-76-L2	16	28	5	0	0	5	0	**54**
17	S97-5-1A	7	5	5	0	0	5	0	**22**
18	SNA-1516	10	6	13	0	0	5	0	**34**
19	SNA-1520	7	21	13	0	0	5	15	**61**
20	SNA-1521	13	81	13	0	5	5	0	**117**
21	SNA-1524	3	2	10	0	0	5	0	**20**
22	SNA-1526	5	14	13	5	0	5	0	**42**
23	SNA-1527	0	1	0	0	0	0	0	**1**
24	SNA-1531	4	3	1	0	0	0	0	**8**
25	SNA-1532	4	1	1	0	0	0	0	**6**
26	SNA-1535	4	3	10	0	0	5	0	**22**
27	SNA-1560	7	1	1	0	0	0	0	**9**
28	SNA-1561	13	1	1	0	5	0	0	**20**
29	SNA-1562	13	22	5	0	0	0	0	**40**
30	SNA-1563	13	30	5	0	0	0	0	**48**
31	SNA-1566	4	2	5	0	0	0	0	**11**
32	SNA-1571	12	2	5	0	0	5	0	**24**

Outfall-#	Outfall-ID	Pipe Diameter	Inlet Count	Land Use	Illicit Discharge History	Septic Systems	Impaired Water Body	Overflow Potential	Total Score
33	UNK-15	5	0	15	0	0	5	0	**25**
34	UNK-31	4	0	0	0	0	0	0	**4**
35	UNK-37	6	10	13	0	0	0	0	**29**
36	UNK-50	4	0	1	0	0	5	0	**10**
37	UNK-51	4	0	1	0	0	5	0	**10**
38	UNK-52	5	1	5	0	5	0	15	**31**
39	UNK-8	4	0	0	0	0	5	0	**9**
40	UNK-53	11	2	5	0	0	0	0	**18**
41	UNK-54	0	1	5	0	0	0	0	**6**
42	UNK-55	10	21	5	0	20	0	0	**56**

1.2 Results

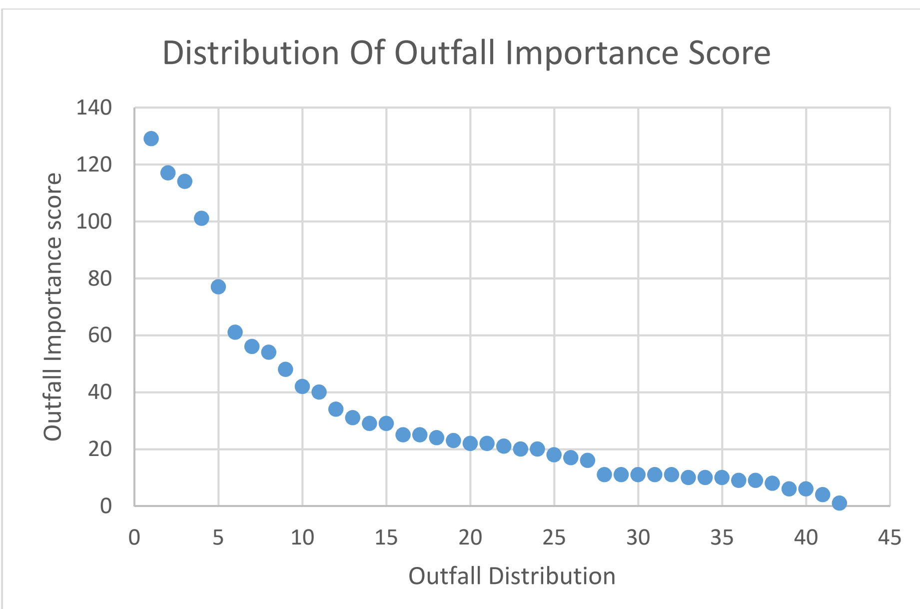
Table 6. Outfall priority rank summary

Outfall-#	Outfall-ID	Location Description	Overall Importance Rank
13	S86-35-0F	Pattee Creek Outfall to Bitterroot River	**129**
20	SNA-1521	Brennan's Wave outfall	**117**
3	S06-16-OF	44 Ranch outfall	**114**
2	S05-64-OF2	West of Orange Street Bridge, North bank	**101**
12	S487-OF	Hilda Street outfall from Fifth and Sixth	**77**
19	SNA-1520	Clay Street Outfall	**61**
42	UNK-55	Gharrett Street Drainage Outfall	**56**
16	S93-76-L2	At Prospect and Grant Creek (North)	**54**
30	SNA-1563	Just Upstream of Grit Chamber	**48**
22	SNA-1526	West of Railroad Bridge off Broadway	**42**
29	SNA-1562	To Takima Park and Pattee Creek	**40**
18	SNA-1516	Behind Missoulian Building	**34**
38	UNK-52	Rattlesnake Creek near Creekwood Rd	**31**
1	S05-64-OF1	Fox Site	**29**
35	UNK-37	Rattlesnake Creek near Front St	**29**
11	S211-OF	East side of Rattlesnake Creek on Broadway	**25**
33	UNK-15	East of Madison Street Bridge on irrigation ditch	**25**
32	SNA-1571	Clark Fork River Near Daniel Drive	**24**
8	S102-OF-1	Drains middle section of Reserve, south of bridge	**23**
17	S97-5-1A	North of freeway on Grant Creek Road	**22**
26	SNA-1535	Clark Fork River near Owen Street	**22**
14	S93-76-2	On Grant Creek from lower detention pond	**21**
21	SNA-1524	Near Scott and Broadway at billboard	**20**

28	SNA-1561	To Pattee Creek from inlet on Pattee Canyon Drive	**20**
40	UNK-53	Grant Creek Village near Jasper Ln	**18**
10	S16-48OF2	Orchard Homes Irrigation Ditch near Hiberta Street	**17**
7	S06-67-OF1	Orchard Homes Irrigation Ditch near Summerfield Dr	**16**
4	S06-24-OFA	Orchard Homes Irrigation Ditch East of Short Street	**11**
5	S06-24-OFB	Orchard Homes Irrigation Ditch East of S06-24-OFA	**11**
6	S06-24-OFC	Orchard Homes Irrigation Ditch East of S06-24-OFB	**11**
9	S16-48-OF1	Orchard Homes Irrigation Ditch near Hiberta Street	**11**
31	SNA-1566	At Prospect and Grant Creek	**11**
15	S93-76-G2	On Grant Ceek from Comstock Court	**10**
36	UNK-50	On Clark Fork River near Taco John's	**10**
37	UNK-51	On Clark Fork River near Taco John's	**10**
27	SNA-1560	To Pattee Creek from inlet on Pattee Canyon Drive	**9**
39	UNK-8	At Fox Site	**9**
24	SNA-1531	Rattlesnake Creek Near Front Street	**8**
25	SNA-1532	Rattlesnake Creek Near Front Street	**6**
41	UNK-54	End of Mike's Way Cul-de-sac	**6**
34	UNK-31	Northeast side/end of Lolo Street Bridge	**4**
23	SNA-1527	On Rattlesnake Creek near pedestrian bridge	**1**

This table shows the final overall importance rank for each outfall and the location description of that outfall. The most important outfalls are at the top of the table.

Graph 1. Distribution of outfall importance scores



There are 42 points on this graph. Each point represents an outfall. The purpose of this graph is to display the distribution of importance scores. Most outfalls received a score below 50.

1.3 Conclusion and Discussion

The three most important city owned outfalls in Missoula, according to this ranking system, are the Pattee Creek outfall, Brennan's wave outfall, and the 44 ranch outfall. These outfalls have the highest count of inlets. Some outfalls with low inlet counts ranked high on the list due to various factors such as overflow potential or land use. There are many outfalls throughout the city that only drain one or two inlets; for the most part, these outfalls received a very low ranking.

It is crucial to monitor storm water outfalls in order to prevent illicit discharge and protect freshwater systems. While all sites should be looked at, some outfalls are much more important than others. These important sites will be prioritized over less important sites. The methods outlined in this document can be used by any municipality to rank outfall importance. However, there are some limitations to this method.

First, there is a high degree of subjectivity used in this method. For example, choosing how much importance to place on pipe diameter or land use. Second, there are gaps in the Storm Water GIS data which caused some degree of uncertainty when calculating "inlet count" or recording "pipe diameter". Third, the ranking of outfall importance constantly needs to be updated. For example, when there is a report of illicit discharge, the importance ranking of that outfall must increase.

2 Introduction – Outfall Reconnaissance

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 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.

2.1 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 89 outfalls within the City's MS4 boundary, 42 are owned by the City and 47 are owned by other (Montana Department of Transportation, private, or unknown). 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 inspected 39 outfalls in 2020, completing the inventory of all identified outfalls by the end of this permit cycle.

Table 7. 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
15	UNK-31	6/1/2020	Rattlesnake Creek	No	Unlikely
16	UNK-17	6/1/2020	Rattlesnake Creek	No	Unlikely
17	UNK-24	6/2/2020	Rattlesnake Creek	No	Unlikely
18	SNA-1570	6/2/2020	Rattlesnake Creek	No	Unlikely
19	UNK-22	6/2/2020	Rattlesnake Creek	No	Unlikely
20	SNA-1569	6/2/2020	Rattlesnake Creek	No	Unlikely
21	SNA-1568	6/2/2020	Rattlesnake Creek	No	Unlikely
22	SNA-1534	6/2/2020	Rattlesnake Creek	No	Unlikely
23	UNK-27	6/2/2020	Rattlesnake Creek	No	Unlikely
24	SNA-1531	6/2/2020	Rattlesnake Creek	No	Unlikely
25	UNK-16	6/3/2020	Clark Fork River	No	Unlikely
26	S100-OF	6/3/2020	Clark Fork River	No	Unlikely
27	UNK-33	6/3/2020	Clark Fork River	No	Unlikely
28	SNA-1571	6/3/2020	Clark Fork River	No	Unlikely
29	SNA-1542	6/3/2020	Clark Fork River	No	Unlikely
30	S06-24-OFA	6/4/2020	Orchard Homes Irrigation Ditch	No	Possible
31	S06-24-OFB	6/4/2020	Orchard Homes Irrigation Ditch	No	Unlikely
32	S06-24-OFC	6/4/2020	Orchard Homes Irrigation Ditch	No	Unlikely
33	S16-48-OF2	6/4/2020	Orchard Homes Irrigation Ditch	No	Unlikely
34	S16-48-OF1	6/4/2020	Orchard Homes Irrigation Ditch	No	Unlikely

35	S06-67-OF1	6/4/2020	Orchard Homes Irrigation Ditch	No	Unlikely
36	UNK-32	6/4/2020	Flynn Lowney Ditch	No	Unlikely
37	UNK-49	6/8/2020	Pattee Creek	No	Unlikely
38	S09-50-OF	6/8/2020	Clark Fork River	No	Unlikely
39	SNA-1522	6/8/2020	Clark Fork River	No	Unlikely
40	SNA-1514	6/8/2020	Clark Fork River	No	Unlikely
41	SNA-1526	6/8/2020	Clark Fork River	No	Possible
42	SNA-1524	6/8/2020	Clark Fork River	No	Unlikely
43	SNA-1525	6/8/2020	Clark Fork River	No	Unlikely
44	UNK-8	6/9/2020	Clark Fork River	No	Unlikely
45	S05-64-OF1	6/9/2020	Clark Fork River	No	Unlikely
46	SNA-1535	6/9/2020	Clark Fork River	No	Unlikely
47	S1038-OF	6/9/2020	Clark Fork River	No	Unlikely
48	UNK-37	6/9/2020	Missoula Irrigation Ditch	No	Unlikely
49	UNK-15	6/9/2020	Missoula Irrigation Ditch	No	Unlikely
50	UNK-52	6/30/2020	Rattlesnake Creek	No	Unlikely
51	S487-OF	7/14/2020	Clark Fork River	No	Unlikely
52	SNA-1516	7/14/2020	Clark Fork River	No	Unlikely
53	SNA-1520	7/14/2020	Clark Fork River	No	Unlikely

2.2 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 8. 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

2.3 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)

2.4 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)

2.5 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)

2.6 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)

2.7 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.

2.8 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)

2.9 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 9. 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

2.10 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 10. 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

2.11 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)

2.12 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)

2.13 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)

2.14 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)

2.15 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)

2.16 UNK-31 Rattlesnake Creek near Lolo Street

This outfall is located in a suburban neighborhood and drains directly into Rattlesnake Creek. It was unclear if this site is still active; it might be an old unused outfall. There are no inlets that feed this corrugated metal pipe (the surrounding area has drywells only). There was no flow during the inspection on 6/1/2020. When this drain does discharge water, it would most likely be groundwater. There were no signs of illicit discharge and no sediment build up in the pipe.

Photo 26. UNK-31 (June 1, 2020)

2.17 UNK-17 Rattlesnake Creek near Mountain View Drive

This outfall drains from farmland and residential land directly into Rattlesnake Creek. The pipe is elevated off the ground by a cement structure. An irrigation ditch runs perpendicular to the outfall pipe. At the end of the outfall, there is an erosion prevention structure. The pipe is completely free of sediment and there was no sign of illicit discharge. There was no flow coming out of it during inspection (6/1/2020). During high rainfall, this site could potentially be at risk for polluting nutrients due to its proximity to farming.

Photo 27. UNK-17 Outfall Pipe, (6/1/2020)

Photo 28. UNK-17 Irrigation Ditch Outfall, (6/1/2020)

Photo 28. UNK-17 Erosion Prevention, (6/1/2020)

Photo 29. UNK-17 Irrigation ditch, (6/1/2020)

2.18 UNK-24 Rattlesnake Creek near Vine Street

The source for this outfall is uncertain. It is possible that inlets on a nearby street feed this outfall. It is also possible that this is an unused piece of infrastructure. According to the Storm Water Utility GIS, this piece of infrastructure is not connected to any gravity mains or inlets. The pipe is corrugated metal with a 12” diameter and extends into Rattlesnake Creek. There are rocks in the pipe although they would not impede the flow of water. During inspection, there was no flow coming out of the pipe (6/2/2020). There was no sign of illicit discharge.

Photo 30. UNK-24 Outfall Pipe, (6/2/2020)

2.19 SNA-1570 Rattlesnake Creek near Vine Street

This outfall drains water from an inlet located on Greenough Drive. It also drains an inlet located near I-90 and therefore, needs to have high flow capacity. Directly before the outfall, an open channel provides storm water to the pipe. This channel is susceptible to debris fill; there was sediment and branches in the pipe at inspection. The outfall consists of one large 25” corrugated metal pipe with a smaller 6” steel pipe inside of it. At the time of inspection (6/2/2020), there was no flow in the pipe. Discharged water exits the larger corrugated metal pipe approximately 10’ above the creek. The smaller steel pipe feeds a separate corrugated metal pipe that extends down closer to the creek surface. There was no sign of illicit discharge.

Photo 31. SNA-1570 Outfall Pipe, (6/2/2020)

Photo 32. SNA-1570 clogged channel (6/2/2020)

2.20 UNK-22 Rattlesnake Creek near Vine Street

This outfall is a 10 in (in diameter) corrugated metal pipe. According to Storm Water Utility GIS, the map does not show source of origin of storm water, but the storm water does drain directly above Rattlesnake Creek. This outfall has no damage. Water does not submerge this pipe, and no sediment and/or rocks are present within the pipe. As of 2 June 2020, flow is not present and there is no sign of illicit discharge.

Photo 33. UNK-22 Outfall Pipe (6/2/2020)

2.21 SNA-1569 Rattlesnake Creek near Vine Street

The source for this outfall is uncertain. It is possible that inlets on a nearby street feed this outfall. It is also possible that this is an unused piece of infrastructure. According to the Storm Water Utility GIS, this piece of infrastructure is not connected to any gravity mains or inlets. The pipe is reinforced concrete with an 8” diameter and it drains directly above the Rattlesnake Creek. There are no rocks or sediment in the pipe. There is some trash right beneath the outfall but nothing extreme. During inspection, there was no flow coming out of the pipe (6/2/2020). There is no sign of illicit discharge.

Photo 34. SNA-1569 Outfall Pipe, (6/2/2020)

2.22 SNA-1568 Rattlesnake Creek near W I90 Highway & W Greenough Dr

This outfall is a 15 in (in diameter) corrugated metal pipe. Its source of storm water is from a nearby inlet on the Greenough Drive, which drains directly into Rattlesnake Creek. This outfall has damage due to minor corrosion and there are deposit stains from the flow line. Water does not submerge this pipe, and no sediment and/or rocks are present within the pipe. According to Storm Water Utility GIS, the map does not show a culvert that should connect to the nearby inlet. As of 2 June 2020, flow is not present and there is no sign of illicit discharge.

Photo 35. SNA-1568 Outfall Pipe (6/2/2020)

Photo 36. SNA-1568 Minor Corrosion and stains inside Out Pipe (6/2/2020)

2.23 SNA-1534 Rattlesnake Creek near E Broadway St & Monroe St

This outfall is a 16 in (in diameter) reinforced concrete pipe. According to Storm Water Utility GIS, the map shows the pipe connected to an inlet from a commercial parking lot source. The storm water does drain directly into Rattlesnake Creek. There is an excessive amount of vegetation, which needs clearing and cleaning for proper drainage of storm water. There is also flow line stains present inside the pipe. Water does not submerge this pipe, and no sediment and/or rocks are present within the pipe. As of 2 June 2020, flow is not present and there is no sign of illicit discharge.

Photo 37. Outfall Pipe SNA-1534 with excessive vegetation (6/2/2020)

2.24 UNK-27 Rattlesnake Creek near E Front St & Burger King

The source for this discharge point in uncertain. Most likely, this pipe is no longer operational and is fed by nothing. According to the Storm Water Utility GIS, there are no gravity mains or inlets connected to this pipe and none were located during inspection. The pipe is 4" in diameter and made of clay. Sediment is completely clogging this pipe and there was no flow coming through upon inspection (6/2/2020). There were no signs of illicit discharge.

Photo 38. Outfall Pipe UNK-27 partially filled with sediment (6/2/2020)

2.25 SNA-1531 Rattlesnake Creek near E Front St & Burger King

Inlets located on E Front Street and a nearby parking lot drain to this outfall. The discharge goes directly into the RattleSnake Creek. The pipe is reinforced concrete and measures at 12" in diameter. Upon inspection, there was no flow coming out of the pipe and nothing blocking potential flow (6/2/2020). There were no signs of illicit discharge.

Photo 39. Outfall Pipe SNA-1531 (6/2/2020)

2.26 UNK-16 Clark Fork River near Van Buren St

Inlets on Van Buren St and Broadway drain into this 4" PVC outfall pipe. The discharge goes directly into the Clark Fork River from a predominately commercial drainage area. This outfall is located right next to a larger HDPE pipe that most likely drains the majority of storm water at this site. Thus, this smaller pipe might be unused or it might be a supplemental drainage pipe. Upon inspection, there was no flow coming out of the pipe and nothing blocking potential flow (6/3/2020). There were no signs of illicit discharge.

Photo 40. UNK-16 outfall pipe (6/3/2020)

2.27 S100-OF Clark Fork River near Van Buren St

Inlets on Van Buren St and Broadway drain into this 28" HDPE outfall pipe. The discharge goes directly into the Clark Fork River from a predominately commercial drainage area. This outfall is located right next to a smaller PVC pipe. Upon inspection, there was no flow coming out of the pipe and nothing blocking potential flow (6/3/2020). There were no signs of illicit discharge.

Photo 41. S100-OF outfall pipe (6/3/2020)

2.28 UNK-33 Clark Fork Near the UM Stadium

Inlets located near the Stadium and nearby parking lots feed this outfall. The discharge from this site goes into a small channel that leads directly to the Clark Fork River. Storm water flows out of a 27” reinforced concrete pipe. After the outfall pipe, the water flows through an additional pipe on the ground before it reaches the channel. This second pipe might be used for erosion protection. Heavy machinery is used in the drainage area. Therefore, this site is at considerable risk for illicit discharge. During inspection, there was a slight trickle coming out of the pipe (6/3/2020). There were no signs of illicit discharge during inspection.

Photo 42. UNK-33 Outfall Pipe, (6/3/2020)

Photo 43. UNK-33 Channel, (6/3/2020)

2.29 SNA-1571 Clark Fork River near Daniel Dr

Inlets on Daniel Drive drain into this 12” corrugate metal outfall pipe. The discharge goes directly into the Clark Fork River from a residential suburban neighborhood. Upon inspection, there was a slight trickle coming out of the pipe and nothing blocking potential flow (6/3/2020). There were no signs of illicit discharge.

Photo 44. SNA-1571 Outfall Pipe. (6/3/2020)

2.30 SNA-1542 Clark Fork River near N Easy St

An inlet on Broadway drains into this 15” corrugate metal outfall pipe. The discharge goes directly into the Clark Fork River. Upon inspection, there was no flow out of the pipe and nothing blocking potential flow (6/3/2020). There were no signs of illicit discharge. On the top of the pipe, there are some holes in the metal. Although, these holes do not impact the functionality of the pipe.

Photo 45. SNA-1542 Outfall Pipe. (6/3/2020)

2.31 S06-24-OFA Orchard Homes Irrigation Ditch East of Short St & South of Juneau CT

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe. According to Storm Water Utility GIS, the map does show a gravity main connected to two nearby inlets on Juneau CT, which drains directly into Orchard Homes Irrigation Ditch. The source of storm water is from surrounding suburban residential neighborhood. This outfall has a grated lid, which needs to reattached or replaced. There are partial deposit stains from the flow line and oil. Water does not submerge this pipe, and no sediment and/or rocks are present within the pipe. As of 4 June 2020, there are signs of illicit discharge, such as a white oil sheen (due to gasoline/oil), and a foul odor (due to sewage and gasoline). There was no flow coming out of the pipe during inspection. The property owner explained how the outfall routinely has a foul odor.

Photo 46. S06-24-OFA Outfall Pipe (6/4/2020)

Photo 47. S06-24-OFA Outfall Pipe (6/4/2020)

2.32 S06-24-OFB Orchard Homes Irrigation Ditch East of S06-24-OFA & South of Juneau CT

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe, and has a grated lid. The Storm Water Utility GIS map shows a gravity main connected to two nearby inlets on Juneau CT, which drains directly into Orchard Homes Irrigation Ditch. The source of storm water is from a surrounding suburban residential neighborhood. Trash, sediment, and rocks are partially filling up the pipe and have potential for clogging. There were no flow during inspection (6/4/2020) and there were no signs of illict discharge. Although, given that there was illicit discharge in the nearby outfall (S06-24-OFA), this site has potential for illicit discharge.

Photo 47. S06-24-OFB Outfall Pipe (6/4/2020)

Photo 48. S06-24-OFB Outfall Pipe (6/4/2020)

2.33 S06-24-OFC Orchard Homes Irrigation Ditch near East of S06-24-OFB & South of Juneau CT

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe, and has a grated lid. The Storm Water Utility GIS map shows a gravity main connected to two nearby inlets on Juneau CT, which drains directly into Orchard Homes Irrigation Ditch. The source of storm water is from a surrounding suburban residential neighborhood. Trash, sediment, and rocks are partially filling up the pipe and have potential for clogging. There were no flow during inspection (6/4/2020) and there were no signs of illict discharge. Although, given that there was illicit discharge in the nearby outfall (S06-24-OFA), this site has potential for illicit discharge.

Photo 49. S06-24-OFC Outfall Pipe (6/4/2020)

2.34 S16-48-OF2 Orchard Homes Irrigation Ditch near Hiberta St

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe, and has a metal grated trash catcher. There is a plastic apron around the pipe. Two inlets on Hiberta St drain to this outfall. The storm water drains into a wetland that is connected to Orchard Homes Irrigation Ditch. The pipe has sediment build up but is not at high risk of clogging. Vegetation is slightly excessive right around the outfall. There was no flow during inspection (6/4/2020) and no signs of illicit discharge.

Photo 50. S16-48-OF2 Outfall Pipe (6/4/2020)

2.35 S16-48-OF1 Orchard Homes Irrigation Ditch near Hiberta St

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe, and has a metal grated trash catcher. There is a plastic apron around the pipe. Two inlets on Hiberta St drain to this outfall. During inspection (6/4/2020), there was construction near the inlets and they both had sediment collectors known as witch's hat. The storm water drains into a wetland that is connected to Orchard Homes Irrigation Ditch. The pipe is new and has no sediment build up, rocks, or trash. There was no flow during inspection (6/4/2020) and no signs of illicit discharge.

Photo 51. S16-48-OF1 Outfall pipe (6/4/2020)

2.36 S06-67-OF1 Orchard Homes Irrigation Ditch near Summerfield Dr

This outfall is a 12 in (in diameter) corrugated plastic/HDPE pipe. According to Storm Water Utility GIS, the map does show a gravity main connected to two nearby inlets on Summerfield, which drains directly into Orchard Homes Irrigation Ditch. The source of storm water is from surrounding suburban residential neighborhood. There are no signs of illicit discharge. This outfall has a grated lid with an apron. Water does not submerge this pipe, and partial sediment is present within the pipe. As of 4 June 2020, there are no signs of illicit discharge. There was no flow coming out of the pipe during inspection. There is an excessive amount of vegetation around the outfall, making it difficult to locate. This needs clearing as soon possible.

Photo 52. S06-67-OF1 Outfall pipe (6/4/2020)

Photo 53. S06-67-OF1 Outfall pipe (6/4/2020)

Photo 54. S06-67-OF1 Outfall pipe (6/4/2020)

2.37 UNK-32 Flynn Lowney Ditch near Beaver St

This outfall has an 8" PVC pipe that drains directly into the Flynn Lowney Ditch. Right across the bike path, there is an apartment building that pipes its roof runoff to this location. During inspection, there was no flow coming out of the pipe and there were no signs of illicit discharge. Although, there was trash at this site.

Photo 55. UNK-32 Outfall pipe (6/4/2020)

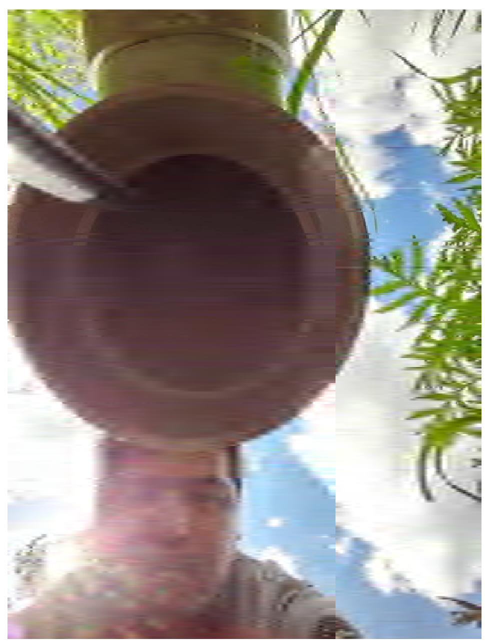


Photo 56. UNK-32 Outfall pipe selfie (6/4/2020)

2.38 UNK-49 Pattee Creek near Takima Dr

This outfall is a 12" corrugated metal pipe that flows from inlets on Takima Drive into a wetland area that eventually goes into Pattee Creek. Before 6/8/2020, this outfall was completely buried under 2-3 feet of thick soil. On 6/8/2020, this outfall was uncovered but a path still needs to be cleared so the discharge can get to Pattee Creek. This job will need an excavator. Once the end of the pipe was uncovered, trapped water came out. Currently, this outfall has a high potential of flooding and needs maintenance. There was no sign of illicit discharge.

Photo 57. UNK-49 Outfall Pipe (6/8/2020)

Photo 58. UNK-49 Outfall Pipe (6/8/2020)

2.39 S09-50-OF Clark Fork River near Ogren Park

This outfall is an 18” corrugated metal pipe that has a metal flap/cover that opens when water flows. Inlets located in the baseball field parking lot drain into the Clark Fork River via this outfall. Before the water discharges, it passes through a hydrodynamic separator. During the inspection, there was no flow coming out of the pipe and there was no signs of illicit discharge (6/8/2020).

Photo 59. S09-50-OF Outfall Lid (6/8/2020) Photo 60. S09-50-OF Outfall Pipe (6/8/2020)

Photo 61. S09-50-OF Outfall Pipe (6/8/2020)

2.40 SNA-1522 Clark Fork River near Taco Johns

This outfall is a 10” corrugated metal pipe that drains from an inlet on Broadway directly into the Clark Fork River. The pipe is in good condition although there was a very small amount of sediment in the pipe during inspection. There was no flow and no signs of illicit discharge during inspection (6/8/2020).

Photo 62. SNA-1522 Outfall Pipe (6/8/2020)

2.41 SNA-1514 Clark Fork River East of Railroad bridge

This outfall is an 18” reinforced concrete pipe that drains inlets on Broadway directly into the Clark Fork River. After the water exits the pipe, it flows approximately 12 feet down a concrete erosion prevention ramp into the river. The pipe and ramp are in good condition. There was no flow or signs of illicit discharge during inspection (6/8/2020).

Photo 63. SNA-1514 Outfall Pipe (6/8/2020)

2.42 SNA-1526 Clark Fork River West of Railroad Bridge

This outfall is a 15” corrugated metal pipe that drains inlets on Broadway directly into the Clark Fork River. After the water exits the pipe, it flows approximately 20 feet down a stream path made by storm water before it hits the Clark Fork River. The pipe has minor corrosion but is mostly in good shape. There was very little flow during inspection (6/8/2020). The trickle of storm water coming out of this pipe was causing bubbling and was murky brown. Illicit discharge from this site is possible. Also, there is high potential for bank erosion at this site because the storm water must travel across dirt and roots before it reaches the river.

Photo 64. SNA-1526 Outfall Pipe (6/8/2020)

Photo 65. SNA-1526 Outfall Pipe (6/8/2020)

2.43 SNA-1524 Clark Fork River South of W Broadway St & Hawthorne St

This outfall is a 10 in (in diameter) reinforced concrete pipe. According to Storm Water Utility GIS, the map shows a gravity main connected to two inlets near the crossroad of Hawthorn St & Cedar St, which drains directly into the Clark Fork River. The source of storm water is from surrounding commercial buildings. There are no signs of illicit discharge. Water does not submerge this pipe, and no sediment is present within the pipe. As of 8 June 2020, there are no signs of illicit discharge, but there is an abundance of trash.

Photo 66. SNA-1524 Outfall Pipe (6/8/2020)

Photo 67. SNA-1524 Outfall Pipe (6/8/2020)

2.44 SNA-1525 Clark Fork River South of W Broadway St & Southeast of Scott St

This outfall is an 18 in (in diameter) reinforced concrete pipe. According to Storm Water Utility GIS, the map shows gravity mains connected to four inlets (three inlets on W Broadway St, and one on Scott St), which drains directly into the Clark Fork River. The source of storm water is from surrounding commercial buildings. There are no signs of illicit discharge. Water does not submerge this pipe, and no sediment is present within the pipe. As of 8 June 2020, there are no signs of illicit discharge.

Photo 68. SNA-1525 Outfall Pipe (6/8/2020)

2.45 UNK-8 Clark Fork River near Owen St

This outfall is a 12” HDPE pipe. It drains inlets from Broadway and Owen Street directly into the Clark Fork River. The pipe is in good condition and has no sediment build up. There is a little bit of trash near the outfall. This site has a considerable risk of erosion. The discharge must travel across land approximately 10 feet before it reaches the Water. Nearby banks are considerably eroded. During inspection on June 9, 2020 there was no flow coming out of the pipe and no signs of illicit discharge. The S05-64-OF1 pipe is located approximately 6’ beneath this pipe. These two outfalls most likely drain from the same area.

Photo 69. UNK-8 Outfall Pipe (6/9/2020)

Photo 70. UNK-8 Outfall Pipe (6/9/2020)

2.46 S05-64-OF1 Clark Fork River near Owen St

This outfall drains inlets from Broadway and Owen Street directly into the Clark Fork River. Rocks are mostly covering the pipe. It has considerable amount of sediment built up inside of it. Rock fall has damaged the outside of the pipe. There is trash near the discharge point. This site is at considerable risk of erosion. Nearby banks are considerably eroded. During inspection on June 9, 2020, there was no flow coming out of this pipe and no signs of Illicit discharge.

Photo 71. S05-64-OF1 Outfall Pipe Photo, (6/9/2020)

2.47 SNA-1535 Clark Fork River near Owen St

This outfall drains inlets on west Front street directly into the Clark Fork River. The pipe is reinforced concrete that has a 12" diameter with a rubber rim ring on the outside of the pipe. It is in good condition with no rocks or sediment inside. There was no flow and no signs of Illicit discharge during inspection on June 9, 2020.

Photo 72. S05-64-OF1 Outfall Pipe Photo, (6/9/2020)

2.48 S1038-OF Clark Fork River near Clark Fork Riverside Retirement Home

This outfall drains inlets on Broadway and Main Street directly into the Clark Fork River the pipe is corrugated metal with a 36" diameter. After the water exits the pipe, it runs down a 12' long ramp made of concrete into the river. The ramp prevents erosion. During inspection on June 9, 2020 there was no flow coming out of the pipe and no signs of illicit discharge. There was a small amount of trash during inspection.

Photo 73. S1038-OF Outfall Pipe Photo, (6/9/2020)

Photo 74. S1038-OF Outfall Ramp Photo, (6/9/2020)

2.49 UNK-37 Missoula Irrigation Ditch near Hazel St

There are inlets on Hazel and 3rd street that supposedly drain to this outfall. Although, in its current condition, it would be unable to drain anything. The 16" clay pipe is heavily damaged in every aspect. During inspection on June 9, 2020, there is no flow coming out of the pipe and no signs of illicit discharge. This pipe is completely full of sediment and needs replacement.

Photo 75. UNK-37 Outfall Ramp Photo, (6/9/2020)

Photo 76. UNK-37 Outfall Ramp Photo, (6/9/2020)

2.50 UNK-15 Missoula Irrigation Ditch near Madison St

The source for this outfall is uncertain. It could potentially be an overflow pipe for the nearby pumping station. According to the Storm Water Utility GIS, there are no gravity mains or inlets connected to it. If this outfall is active, the discharge would go directly into the Missoula Irrigation Ditch. The pipe is 15” in diameter and made of steel. It is elevated off the ground approximately 8’. There was no flow and no signs of illicit discharge during inspection. The pipe is old but in good condition.

Photo 77. UNK-15 Outfall Pipe Photo, (6/9/2020)

2.51 UNK-52 Rattlesnake Creek near CreekWood Rd

This outfall drains a cul-de-sac on CreekWood Rd directly into a Rattlesnake Creek tributary. The pipe is 14 inches in diameter and made of reinforced concrete. The inlet for this outfall is located at the bottom of a big hill that receives a lot of runoff during weather events. Along CreekWood drive, there is a clogged drywell. This faulty drywell can overload the outfall. Upon inspection, it was raining very hard and had substantial discharge. No measurements were taken and there were no signs of illicit discharge. During large rain events, this site could be at risk of flooding.

Photo 78. UNK-52 Outfall Pipe Photo, (6/30/2020)

2.52 S487-OF Clark Fork River near end of S 4th St E and Toole Park

This outfall is 48 in (in diameter) corrugated metal pipe. According to Storm Water Utility GIS, the map shows gravity mains connected to six inlets (three inlets on 5th Street and Hilda Avenue, and three on 6th Street and Hilda Avenue), which drains directly into the Clark Fork River. The source of storm water is from surrounding residential homes. There are no signs of illicit discharge. Water does not submerge this pipe (when there isn't high river flow), and no sediment is present within the pipe. As of 14 July 2020, there are no signs of illicit discharge.

Photo 79. S487-OF Outfall Pipe (7/14/2020)

Photo 80. S487-OF Outfall Pipe (7/14/2020)

2.53 SNA-1516 Clark Fork River near S Higgins Ave Bridge and behind the Missoulian Bldg.

This outfall is 24 in (in diameter) reinforced concrete pipe. According to Storm Water Utility GIS, the map shows gravity mains connected to five inlets on South Higgins Avenue and 4th Street, which drains directly into the Clark Fork River. The source of storm water is from surrounding commercial buildings. Water does not submerge this pipe (when there isn't high river flow), and no sediment is present within the pipe. As of 14 July 2020, there are no signs of illicit discharge.

Photo 81. S-1516 Outfall Pipe (7/14/2020)

Photo 82. S-1516 Outfall Pipe (7/14/2020)

2.54 SNA-1520 Clark Fork River near Levasseur St and behind Bess Reed Park boundary wall

This outfall is 18 in (in diameter) reinforced concrete pipe. According to Storm Water Utility GIS, the map shows gravity mains connected to nine inlets (one inlet on Levasseur Street and Clay Street, two on Clay Street, three on Clay Street and E Front Street, and two on Washington Street and E Main Street), which drains directly into the Clark Fork River. The source of storm water is from surrounding Ultra-Urban residential and commercial buildings. There are no signs of illicit discharge. Water partially submerge this pipe (but is submerged when there isn't high river flow), and no sediment is present within the pipe. As of 14 July 2020, there are no signs of illicit discharge.

Photo 83. S-1520 Outfall Pipe (7/14/2020)

Photo 84. S-1520 Outfall Pipe (7/14/2020)

Photo 85. S-1520 Outfall Pipe (7/14/2020)

Appendix A

Outfall Reconnaissance/Sample Collection Data Sheets

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)?

MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS

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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

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:	

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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)
- [x] 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
[x] **Pipe**	[x] RCP [ ] CMP [ ] PVC [ ] HDPE [ ] Steel [ ] Other: ____	[x] Circular [ ] Elliptical [ ] Box [ ] Other: ____	[x] Single [ ] Double [ ] Triple [ ] Other: ____	Diameter/Dimensions: 12"	In Water: [x] No [ ] Partially [ ] Fully With Sediment: [x] No [ ] Partially [ ] Fully
[ ] **Open drainage**	[ ] Concrete [ ] Earthen [ ] rip-rap [ ] Other: ____	[ ] Trapezoid [ ] Parabolic [ ] Other: ____		Depth: ____ Top Width: ____ Bottom Width: ____	
[ ] **In-Stream**					
Flow Present?	[ ] Yes [x] 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		

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Section 3: Quantitative Characterization

<table>
<tr><th colspan="5">FIELD DATA FOR FLOWING OUTFALLS</th></tr>
<tr><th colspan="2">PARAMETER</th><th>RESULT</th><th>UNIT</th><th>EQUIPMENT</th></tr>
<tr><td rowspan="2">☐Flow #1</td><td>Volume</td><td></td><td>Gallon</td><td>Bucket</td></tr>
<tr><td>Time to fill</td><td></td><td>sec</td><td></td></tr>
<tr><td rowspan="4">☐Flow #2</td><td>Flow depth</td><td></td><td>In</td><td>Tape measure</td></tr>
<tr><td>Flow width</td><td>_____’ _____”</td><td>Ft, In</td><td>Tape measure</td></tr>
<tr><td>Measured length</td><td>_____’ _____”</td><td>Ft, In</td><td>Tape measure</td></tr>
<tr><td>Time of travel</td><td></td><td>S</td><td>Stop watch</td></tr>
<tr><td colspan="2">Temperature</td><td></td><td>°C</td><td>Multi-probe</td></tr>
<tr><td colspan="2">pH</td><td></td><td>pH Units</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Conductivity</td><td></td><td>µg/L</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Dissolved Oxygen</td><td></td><td>mg/L</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Total Dissolved Solids</td><td></td><td>mg/L</td><td>Multi-probe</td></tr>
</table>

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'

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	☒ Circular	☒ Single	Diameter/Dimensions: 18" ?	In Water: ☒ No ☐ Partially ☐ Fully
	☐ PVC	☐ HDPE	☐ Elliptical	☐ Double		
	☐ Steel		☐ Box	☐ Triple		
	☐ Other: ______		☐ Other: ______	☐ Other: ______		With Sediment: ☐ No ☐ Partially ☒ Fully
☐ Open drainage	☐ Concrete		☐ Trapezoid		Depth: ______	
	☐ Earthen		☐ Parabolic		Top Width: ______	
	☐ rip-rap		☐ Other: ______		Bottom Width: ______	
	☐ Other: ______					
☐ 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

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

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

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 (Missoula 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

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
- ☒ 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): 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	☒ Circular	☒ Single	Diameter/Dimensions: 36" ?	In Water: ☒ No ☐ Partially ☐ Fully
	☐ PVC	☐ HDPE	☐ Elliptical	☐ Double		
	☐ Steel		☐ Box	☐ Triple		With Sediment: ☒ No ☐ Partially ☐ Fully
	☐ Other: ______		☐ Other: ______	☐ Other: ______		
☐ **Open drainage**	☐ Concrete		☐ Trapezoid		Depth: _____	
	☐ Earthen		☐ Parabolic		Top Width: _____	
	☐ rip-rap		☐ Other: _____		Bottom Width: _____	
	☐ Other: _____					
☐ **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

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

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:	

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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

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

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

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)?

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

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

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

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: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57 / Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.89475436 / Longitude: -113.97396673	GPS Unit: iPhone 8 / GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known):
Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57⁰	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436⁰	Longitude: -113.97396673⁰	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ________

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
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Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

<table>
<tr><th colspan="5">FIELD DATA FOR FLOWING OUTFALLS</th></tr>
<tr><th colspan="2">PARAMETER</th><th>RESULT</th><th>UNIT</th><th>EQUIPMENT</th></tr>
<tr><td rowspan="2">☐Flow #1</td><td>Volume</td><td></td><td>Gallon</td><td>Bucket</td></tr>
<tr><td>Time to fill</td><td></td><td>sec</td><td></td></tr>
<tr><td rowspan="4">☐Flow #2</td><td>Flow depth</td><td></td><td>In</td><td>Tape measure</td></tr>
<tr><td>Flow width</td><td>_____' _____"</td><td>Ft, In</td><td>Tape measure</td></tr>
<tr><td>Measured length</td><td>_____' _____"</td><td>Ft, In</td><td>Tape measure</td></tr>
<tr><td>Time of travel</td><td></td><td>S</td><td>Stop watch</td></tr>
<tr><td colspan="2">Temperature</td><td></td><td>°C</td><td>Multi-probe</td></tr>
<tr><td colspan="2">pH</td><td></td><td>pH Units</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Conductivity</td><td></td><td>µg/L</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Dissolved Oxygen</td><td></td><td>mg/L</td><td>Multi-probe</td></tr>
<tr><td colspan="2">Total Dissolved Solids</td><td></td><td>mg/L</td><td>Multi-probe</td></tr>
</table>

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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
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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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57⁰	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436⁰	Longitude: -113.97396673⁰	GPS Unit: iPhone 8	GPS LMK #:
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Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential (High Density)
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- ☐ Commercial
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- ☐ Institutional
- Other: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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)

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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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
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Land Use in Drainage Area (Check all that apply):

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Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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	
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	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

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
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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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57° / Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.89475436° / Longitude: -113.97396673°	GPS Unit: iPhone 8 / GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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
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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 flow measurements were collected due to the fact that there is now signs of illicit discharge, and therefore, no samples of water were collected.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57º / Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.89475436º / Longitude: -113.97396673º	GPS Unit: iPhone 8 / GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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 flow measurements were collected because there are no signs of illicit discharge. Therefore, no samples were collected for the lab. This is a private outfall as well.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57º Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.89475436º Longitude: -113.97396673º	GPS Unit: iPhone 8 GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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)?

Even though there were signs of illicit discharge, at the time of inspection, a cleaning crew went out there to clean the outfall. The outfall was just clogged and had small amounts of illicit discharge. So, it's overall characterization for illicit discharge is unlikely.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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:	

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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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57° / Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.89475436° / Longitude: -113.97396673°	GPS Unit: iPhone 8 / GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		Photo #s:	

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

- [ ] Industrial
- [ ] Ultra-Urban Residential (High Density)
- [x] Suburban Residential
- [ ] Commercial
- [ ] Open Space
- [ ] Golf Course
- [ ] Institutional
- Other: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
[x] **Pipe**	[ ] RCP [ ] CMP [ ] PVC [ ] HDPE [x] Steel [ ] Other: ____	[x] Circular [ ] Elliptical [ ] Box [ ] Other: ____	[x] Single [ ] Double [ ] Triple [ ] Other: ____	Diameter/Dimensions: 25 in	In Water: [x] 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 [x] 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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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
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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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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 measurements of flow were taken because there was only one physical indicator sign of illicit discharge, and so, no water samples were collected.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57⁰	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436⁰	Longitude: -113.97396673⁰	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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 measures of flow were collected because there are no signs of illicit discharge, and so no water samples were collected.

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

[x] 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	[x] No			
2.	If yes, collected from:	[ ] Flow	[ ] Pool			
3.	Intermittent flow trap set?	[ ] Yes	[x] 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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____________

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming

Known Industries: ______________________

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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
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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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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)?

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattles

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: 25 in	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

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 measures of flow were collected because there are no signs of illicit discharge, and so, no water samples were collected.

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River	Outfall ID: S487-OF
Today's date: July 14	Time (Military): 0936
Investigators: Carver Butterfield and James Moxley	Form completed by: James Moxley
Temperature (°F): 58 / Rainfall (in.): Last 24 hours:	Last 48 hours: 0
Latitude: 46.86657442 / Longitude: -113.99251051	GPS Unit: Samsung Galaxy / GPS LMK #:
Camera: Samsung tablet	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): Urban residential neighborhood

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		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		12.2	°C	Multi-probe
pH		7.77	pH Units	Multi-probe
Conductivity		101.2	µS/cm	Multi-probe
Specific Conductivity		134.5	µS/cm	Multi-probe
Total Dissolved Solids		88	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)?

No measurements of flow were taken because they weren't any signs of illicit discharge, and therefore, no water samples were collecte

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River		Outfall ID: SNA-1516	
Today's date: July 14, 2020		Time (Military): 1004	
Investigators: Carver Butterfield and James Moxley		Form completed by: James Moxley	
Temperature (°F): 60	Rainfall (in.): Last 24 hours:	Last 48 hours: 0	
Latitude: 46.86719250	Longitude: -113.99633109	GPS Unit: Collector	GPS LMK #:
Camera: Samsung tablet		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): 4th street

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 ”	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		12.2	°C	Multi-probe
pH		7.77	pH Units	Multi-probe
Conductivity		101.2	µS/cm	Multi-probe
Specific Conductivity		134.5	µS/cm	Multi-probe
Total Dissolved Solids		88	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 measurements of flow were taken because they weren ' t any signs of illicit discharge, and therefore, no water samples were collect

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River		Outfall ID: SNA-1520	
Today's date: July 14, 2020		Time (Military): 9:00	
Investigators: Carver Butterfield and James Moxley		Form completed by: Carver Butterfield	
Temperature (°F): 55	Rainfall (in.): Last 24 hours: 0	Last 48 hours: 0	
Latitude: 26.86722777	Longitude: -113.99352036	GPS Unit: Trimble R2	GPS LMK #:
Camera: iPhone 8		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): Drains buildings and streets from downtown directly into Clark fork

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		12.2	°C	Multi-probe
pH		7.77	pH Units	Multi-probe
Conductivity		101.2	µS/cm	Multi-probe
Specific Conductivity		134.5	µS/cm	Multi-probe
Total Dissolved Solids		88	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)?

Appendix D

Illicit Discharge Detection and Elimination

Date	Address	Street Name	Complaint Type	Action Taken	Description
1/16/2020	5920	Sandpiper Drive	Chemical	Went onsite. Water discharging was non-contact coolant water (source was Missoula water) from potassium acetate production. Smell was from off-gassing acetic acid from the process not the water. Discharge was going into onsite ditch not the city of Missoula storm system. I explained to Pat Brooks and other people onsite that this was not a water quality violation. Talked to plant owner and followed pipe to the heat exchanger where it originated. Sent email to city stormwater and wastewater and will attach in file.	Marie from city stormwater called to report an illicit discharge going on right now at Pelican Chemicals. She said they have a 2-1/2 inch hose discharging directly into the stormdrain. When approached employees advised that Todd Seib had instructed them that it was ok.
2/4/2020	7002	Max Drive	Sediment	He is in city limits and the drain is a sump. I visited the site and had his permission to walk on his property. Steve indicated that the lot is scheduled for seeding and turf this spring. Documented evidence of erosion and sediment transfer with photos. Called Bull Frog and explained violation. Sent NOV	Steve called and said Bull Frog Spas emptied the spa from the house above him (7013) and the water eroded away sediment from his property and carried it to the stormdrain
2/18/2020	225	North 2nd Street	Trash	The property database shows no stormwater infrastructure onsite that drain to surface waters. I located the drain in the photo and looked into it with flashlight. There was evidence of prolonged use as an ashtray. I rang the doorbell and spoke to a staff member about the complaint. She said no one had ever told them they couldn't do it. I told her I'd follow up with a letter and order to clean out the drain. Drafted NOV and sent to facility. Manager called back and said they vacuumed the drain (Nash) and installed an ashtray.	cigarette butts being disposed of into storm drain at laundry facility

Date	Address	Street Name	Complaint Type	Action Taken	Description
2/24/2020	1801	Kensington Avenue	Petroleum		Diesel and other fluids all over the ground by the bike trail.
3/9/2020	715	Edith Street	Chemical	I visited the alley and found two cans of paint that had been run over and a collection of other old paint cans. I talked with the resident (Erin) of the house about proper disposal of latex and water-based acrylic versus the oil-based stains. The cans that were run over were mostly full of dried out product but one of them was an oil-based stain that was not completely dried. I directed her to shovel up the remaining visually impacted dirt and dispose of it.	Half a can of paint is tipped over and spilling in alley
3/23/2020	1850	Idaho Street	Chemical	I visited site and took photos. Area was clean and storm drain was clean as well. Complaint apparently referred to activities/spills that had occurred in 2019 and came from a former employee. ProSweep under new ownership. I recommended to Kim that part of the enforcement response involve a prevention plan and storm drain protection, similar to what I had asked former owner to do. Emails and photos in complaint file.	Kim from DEQ copied envhealth email on a violation letter DEQ sent to Pro Sweep about a large (1000 gal +)sealant/tar spill.

Date	Address	Street Name	Complaint Type	Action Taken	Description
3/27/2020	2350	South Reserve Street	Sewage	Received complaint via paragon and got a call from Charlie and text from Emily about it at 1:29pm. It involved a private sump but called Tracy Campbell at city storm water told her we might need a vac truck (Pat Brooks) to come out. Got there around 2pm. Three RVs onsite, didn't knock or see anyone. Drain near one of campers was covered in dried toilet paper. Took photos. Met Pat onsite and he said he would pump it out in next hour. City will charge property owners for work. Photographed spot on 3/31, lot had spray painted message of "no dumping" presumably by wastewater, and only one trailer left. Wrote NOV and passed on to Land and Travis to approve and send.	Colony of RV's dumping sewage down the storm drain. There is TP all around the drain.

Date	Address	Street Name	Complaint Type	Action Taken	Description
3/30/2020	6	Campus Drive	Trash	I visited site of complaint and took photos of what looked to be black rubber fragments and green plastic pellets. It was piled up along Kim Williams trail with evidence of it in the grass behind buildings as well. Looks like astroturf underlayment. I contacted Parks and UM Facilities Management (Brian Kerns) to see if anyone knew what it was and why it was there. It doesn't seem close enough to the river to pose a threat to the water. Appears to be more of a solid waste/illegal dumping issue (Reg 3 of Health Code). After a series of emails I heard back from Paul Trumbley on 4/1/20: "I spoke with John this morning and the rubber is from plowing snow from the field in Grizzly Stadium. He is going to get the labor crew out there with some equipment and rakes to clean it up the best we can".	Via email: "Do you know what is that material that UM dumps in such quantities between the Kim Williams trail and the Facility Services compound?. It is tiny green and black pellets -- about the size of quinoa. There's massive amounts of it -- ready to blow or wash into the river. I recall asking about it a few years ago -- can't recall what they told me it was. I brought some home and put it in water to see if it dissolved. hasnt yet. Looks like it might be little plastic beads. Anyway seems like a bad thing to let wash into the river. Montana law saws to not dump waste near a waterway where it is likely to wash into the waterway"
4/22/2020	1840	South Higgins Avenue	Sediment	Visited location but could not confirm soil pile	Soil pile near storm drain at the corner of Higgins and Woodworth. Was unable to confirm soil pile. Possible miscommunication of location.

Date	Address	Street Name	Complaint Type	Action Taken	Description
4/27/2020	1944	Birch Street	Other	Investigated location and observed a pipe from the back of the building as well as some moisture but no puddling. Contacted Mountain States Repair and spoke with Joe. Joe said that pipe was a drain from the roof and didn't know what the source of the smell could be. It appear this site has not had a P2 inspection since 1996, I said we'd be in touch in the coming months regarding an inspection.	Substance being discharged from pipe at the back of Mountain States Autobody Repair at 1944 Birch Street. Assigned to Martin.
4/29/2020	2415	Mullan Road	Trash	Investigated abandoned camp and notified the property manager (Dexter Royes 860 680 4111) that it should be cleaned up. He said he'd get it taken care tomorrow.	A homeless family was living here and they have now left, but there are wood pallets and a bicycle left behind, and they are ready to go into the river. Assigned to Martin.
5/4/2020	2340	South 3rd Street	Chemical		Methane leak that has been going on for weeks. Burning incense in the store to cover it up.
5/6/2020	127	East Sussex Avenue	Petroleum	Visited location. Found spill, it was about 1'x 3' in size. About 3 qts of used oil were nearby in open containers. I spoke with residents of house, they indicated it was from their roommate, Jack Kinney. I explained how to clean it up and followed up with a letter to Jack. Will circle back on Monday to ensure it has been cleaned up.	Oil in Alley
5/11/2020	3901	Brooks Street	Petroleum	Relatively small spill (less than a ft diameter). Fire must have already been onsite as there was cat litter and an absorbent pad. I spoke with the management and instructed them to sweep it up and throw it away.	Leaking Toyota Van - approximately 1 gallon

Date	Address	Street Name	Complaint Type	Action Taken	Description
5/13/2020	1803	Kensington Avenue	Petroleum	Visited location and observed a number of junk vehicles, many leaking oil, as well as a oil spots on road. Large drip tray with rainwater and red substance (maybe diesel). At least two open containers containing motor oil. A barbed wire fence was recently installed along the bike path as well. Was able to reach two of three tenants by phone, they agreed to move waste oil indoors. Also spoke with Jim Marshall, the owner of all three properties, I warned him that this issue is ultimately his reposnsibility. NOV mailed on 5/27/2020. CC'd to Jim Marshall. Coordinating with Charmell Owens (City compliance officer) on compliance. Jim Biondich (Junk vehicle coordinator) is working on a separate NOV.	Complainant says that her son bikes the trail that runs beside this property and there is Diesel and other fluids all of the ground. Ongoing water quality and junk car issues at this location.

Date	Address	Street Name	Complaint Type	Action Taken	Description
5/20/2020	6155	Showdown Lane	Sediment	I informed Lisa-Kay at DEQ and Tracy Campbell of City of Missoula stormwater utility about this complaint. SWPPP requirements are in place and overseen by these agencies. To assess the water quality related side of this complaint I visited the site and documented sediment runoff into the roadway and sumps. I followed up with a call to Lloyd Twite (240-2581) the owner/contractor of the subdivision. He apologized and said all BMPs were fixed and that the road was cleaned. I explained that washing the sediment off the road and into storm drains is not a proper practice and that preventative BMPs are needed to keep sediment from leaving the site. I visited again on 5/21 but observed no additional BMPs and observed more sediment leaving Bigfork Ln. I communicated with city stormwater and issued an NOV.	The complainant called today and told me that the stormwater from this rain event is again washing out the road and inundating houses at the end of Showdown Lane. He said the issue is that the Maloney Ranch, and maybe other upgradient subdivisions, do not have adequate stormwater facilities installed to prevent this. He stated that his lawyer is coming out today to take pictures and they are going to file a class action law suit. He also wanted to follow up with whoever was responsible for enforcing stormwater requirements on subdivisions

Date	Address	Street Name	Complaint Type	Action Taken	Description
6/1/2020	1465	Lincoln Hills Drive	Signage	Elena talked with complainant and it seems that the pesticide application was taking place on the homeowners association land. I directed the complainant to contact the homeowner association contact to see if more information and signage could be found through this manner. As far as more information regarding pesticides and herbicides, I directed her to the Weed District. She thought there might also be application of pesticides by the City of Missoula on the roadway. I sent her this link: https://www.ci.missoula.mt.us/1100/Vegetation-Management and gave her the number for public works. She is going to let me know if she determines what pesticide/herbicide is being applied so we can see if it is a water quality concern or complaint she wants us to address as a water quality issue. Reassigned to Martin Viereckl on 6/1.	"Spraying without telling the residents. No signage or communication about them spraying pesticides. People are walking up and down all the time and breathing it in. Don't know if it's the city doing this or not. For a long time they have been spraying the open space behind the house at 9 September Drive, maybe the neighborhood association, but maybe it's the city doing the spraying. All of the citizens should be informed when they are spraying in the area." Complainant wants to know who is doing the spraying and where the spray is being applied.
6/5/2020	4921	North Reserve Street	Other	Visited site and confirmed odor and solid waste issues. Referred complaint to Kyle Crapster in Land Group who has worked on a related complaint previously.	His complaint was about the condition and public safety of the "car wash" by Dominos on North Reserve. He feels it is a public safety hazard do to the condition and that it is emitting a terrible odor. Complaint originally left with Commissioner's office; summary forwarded to Env Health by Annie Cathey. No further information.

Date	Address	Street Name	Complaint Type	Action Taken	Description
6/5/2020	600	North Curtis	Other	followed up with complainant and heard from Julie Merritt with the City of Missoula. The ditch is flowing albeit slow. Stagnant water is a not a violation of the health code or the water quality ordinance. I offered to find the contact info for the ditch maintenance company.	Water accumulated in ditch along 600 block of N Curtis St.
6/8/2020	1805	Philips Street	Petroleum	Visited location and observed a white Honda sedan leaking automotive fluid. Spoke with tenant at 1805 Phillips Street Unit B, who owns the sedan. He said he is aware that his car is leaking brake fluid and he is the process of selling it. While I was there he began putting down kitty litter to absorb the fluid. He also had a plastic bin lid he was planning to place under the vehicle to collect any further leakage. I also observed another area with oil residue closer to the sump. According to the neighbors the tenant at apartment A parks in that spot, but he was out. I left my card at the door. Neighbors also mentioned that someone is throwing cigarette butts into the storm sump as well.	Engine oil leaking into the storm drain. Ongoing problem, according to anonymous caller who left a message on Saturday 6/6/20.
6/11/2020	32	Campus Drive	Signage	Contacted Brian Kerns at UM facilities and let him know of the city of Missoula Municipal Code requirements for notification. Specifically that the words "pesticide application" are required.	Signage for pesticide applications must specifically contain the phrase "pesticide application" if the product has an EPA pesticide registration number. Signs used recently across the university have not included this phrase but rather "broad-leaf weed control".

Date	Address	Street Name	Complaint Type	Action Taken	Description
6/12/2020	2100	Bow Street	Signage	Spoke with Amanda at Trugreen who agreed to make the necessary changes to future signage. Also sent a formal letter to the owner of Trugreen in Missoula, Robin Seavy-Roberts with details on the required changes.	Complainant called to report improper signage used by Trugreen when applying herbicide at the Southside Lions Park on 6/11/2020. The signs did not specifically use the words "pesticide application" and were not weather-resistent as required by the municipal code.
6/16/2020	1805	Phillips Street	Petroleum	Visited site today and found two vehicles each with multiple flat tires. The photos submitted by complainant shows oil sheen near dry well in parking lot. No oil sheen or visible contamination was visible today but both vehicles are upgradient and leaks would be expected to enter this dry-well. Drafted and sent warning letter/leaking vehicle notice to property owner and re-assigned complaint (wrote a new complaint) to our junk vehicle coordinator for the two vehicles.	There is a disabled vehicle at 1805 Phillips St leaking oil into the storm drain for the past two and a half months during and after a rainstorm(rear of the building) Tamarack Property Management was notified June 10, 2020 by email/picture of the oil leaking into the catch basin. Their response given by email was: "That oil is of no or little concern". The little oil in the catch basin is not enough to make anybody sick" "It is not a public health concern"
7/6/2020	2312	Skyline Drive	Petroleum	Contacted Economy Excavating and Landscaping. Spoke with David. He said he was aware of the leaking equipment but said he thought it was contained to the trailer. He said he'd be sending someone to the site to put some absorbent down. Followed up with complainant to let him know of the situation.	The property owners across the street hired a contractor to connect their property to the sewer. The contractor's equipment leaked considerable amount of oil onto the street in several locations including the gutter. The location is on a hill that drains directly to a storm water inlet a half a block away. It's clearly not best practices. I hope the responsible party cleans it up before it rains.

Date	Address	Street Name	Complaint Type	Action Taken	Description
7/15/2020	3000	South Russell Street	Chemical	Visited the described location and found a dry well inlet with dried white-looking liquid splashed on it. I located a maintenance worker onsite who explained that he rinsed concrete mud into the sump. He thought it was the same as clay or mud and didn't know it was a contaminant. I explained that only storm water is permitted to enter these dry wells and to clean the sump. He immediately went to work on removing the dried mud. I explained that he should remove the drain cover and remove any visible concrete washout from inside the sump as well.	Someone clearly dumped white paint down the storm drain in the south parking lot of the YMCA on Russell. The parking lot that is far south and has the entrance to the pre school. I have a photo
7/20/2020	143	Woodworth Avenue	Petroleum	Investigated and found material to be rusty water with leaves. Looks like an old hot water heater sawed in half. Instructed property owner that this could be poured onto the ground and the tank disposed of through Pacific recycling or the landfill.	large tank of oily substance. Owner doesn't know what to do with it. Needs some advice.
7/20/2020	1101	South Avenue West	Other	Visited the Fairgrounds on 7/21/20 and located two dry wells that were located in front of the animal housing/ice rink area. These dry wells are located directly under washing nozzles. I emailed director of the Fairgounds (Emily Brock) and explained the issue. She replied on 7/23 and no use of these is slated for this year and they are in the process of connecting a new livestock area to city sewer. Will follow up with her on abandonment/repurposing of these drains.	There is a dry well located in the animal washing area at the County Fairgrounds. I have indicated its approximate location on the attached screen shot. I believe there is even a sign next to it, pointing to ‘sump’. I thought I had a pic but I can’t find it. If you need me to get one, I can ask my crew to take one this week.

Date	Address	Street Name	Complaint Type	Action Taken	Description
7/21/2020	4245	Fox Farm Road	Sediment	Visited location of complaint on 7/21/2020 at around 12:30 pm. Did not observe any discoloration of the creek at the address listed. Spoke with complainant who showed me pictures of the creek which was quite turbid in the photos. See Sharepoint folder. Travis Contacted Rob Roberts who is heading removal of an intake dam up stream from this complaint project for Trout Unlimited. Rob said they have permits for short-term turbidity events as the result of project activities. He said this event was likely the result of the installation of a dewatering pump at the project site.	Complainant reported that rattlesnake creek was running a milky white color from 9am to about 11am, near her home at 4245 Fox Farm Rd in the Rattlesnake neighborhood.
7/27/2020	825	East Front Street	Trash	Looked at the area on 7/29/20 and it looks like the Clark Fork Trash Line cleaned the area up.	There is a major trash dump underneath the Van Buren bridge – on the north side of the river. Also lots of aluminum cans in that trash – so some things worth recycling. Some of it looks pretty nasty – gloves, masks, and likely extra sturdy garbage bags needed.

Date	Address	Street Name	Complaint Type	Action Taken	Description
7/30/2020	1900	Burlington Avenue	Sediment	7/30/20 I contacted Brian Hensel by phone and left a message. Emailed him as well. Received an auto reply to contact Kevin O'Brien. I informed the city stormwater utility as well. Visited site and noticed that the road in front of the dry-well had been covered in asphalt recently. I contacted Kevin and he confirmed that crews were at that site yesterday sweeping the road to prepare it for chip seal. I explained that this isn't an approved discharge method and he agrees. He is looking into what happened (he suspects a door came open on accident) and I'm waiting on a reply. Both city storm water and Brian confirmed that they recognized the photo. Brian said they do not dump into storm drains but that the photos are from when they were relocating pooling water from a clogged drain to an unclogged drain, a routine practice when there are rain events.	City street cleaning trucks are dumping waste water down the stormdrain.
8/4/2020		Mount Jumbo “L”	Chemical		Paint peelings and chips from the "L" are polluting the hillside below, spreading with the wind for a hundred yards downhill

Date	Address	Street Name	Complaint Type	Action Taken	Description
8/5/2020	114	Bentley Park Loop	Petroleum	Visited site on 8/5/2020. Observed what looked like a small chemical burn in the grass next to the alley at the address, also saw evidence that whatever substance was applied to the grass was washed into the alley and eventually entered a sump on the west end of the alley. Spoke with Jessica the resident there. She said she spilled a small amount of gasoline on her grass when filling her weed wacker. I warned her that washing gasoline into a storm conveyance was a violation of the water quality ordinance and in the future to fill gas tools over a plastic container to catch spillage.	Chemicals were recently dumped in private yard in the middle of the night. Likely chemicals to do with meth manufacturing. Water sprinkled over the chemical area for a few days, then yesterday area was flooded with water. That water ran into the alley and down into the storm drain.

Date	Address	Street Name	Complaint Type	Action Taken	Description
8/13/2020	3665	Grant Creek Road	Petroleum	Travis Ross and Martin Viereckl visited the site later on the morning of 12th and met with Steve Hanson. He told us that he suspected the spill was much less than 400 gallons because the person using the pump filled many containers before the pump malfunctioned. Hanson said the filter was cross-threaded and cause it to fail when pressure increased when the pump was shut off. He said the emergency shut-off button was pressed to stop the spill. Hanson estimated the spill was closer to 40 gallons. Travis inspected the separator system and confirmed that it did not overflow to a nearby dry well. The oil water separator was missing a "sanitary T". Hanson reported the spill to the DEQ spill line after our request to do so. While at the site Travis noticed some staining on pavement around the back of the building. Apparently, wastewater from a barrel cleaning system was being improperly discharged to the ground. An NOV with corrective actions was issued regarding the wastewater and requiring that a sanitary T is installed.	Jim Erven responded to a diesel gas spill at the gas station listed above on the morning of 8/12/2020 after he was alerted by 911. Pump six apparently malfunctioned and spilled onto pavement and into a nearby sand/oil separator. Originally the fire department estimated the spill was 400 gallons based on the meter.

Date	Address	Street Name	Complaint Type	Action Taken	Description
8/17/2020	3125	Expo Parkway	Petroleum	Spoke to Luke on the phone and visited site. There were 2 trailers and 3 RVs there today parked near the end of the cul-de-sac. I didn't see any tell-tale evidence of septage in the closest two storm dry-wells. There were oil spots on the road but nothing that I could say was definitively associated with the RVs. I coordinated with Tracy from storm water and wrote a Violation Warning letter that also included the applicable city codes that deal with sewage disposal and storm water. Missoula PD officer and Bea Happ met me onsite on Aug 19th and we attached the letters to the 5 campers (one occupant owns two of the RVs and we spoke to him and only gave him one letter, and an additional trailer arrived since the 18th). A couple more fluid spills were present. As of today (Aug 21) two of the trailers have been removed. The Missoula PD is continuing to visit the site to move campers along and issue citations. I asked Tracy and PW to apply kittly litter and do a "sweep" of the road as there are a few small spills to address.	The construction guy called, said his name too fast and had to take another call, but there are campers along the road there and they are dumping stuff down the storm drain, there is oil underneath the mobile homes and their trash is blowing every where and sticking on the construction fence. He is calling the police, but not sure what is being dumped down drain.
8/20/2020	3125	Expo Parkway	Petroleum	This is a repeat complaint of an issue that has already been addressed. See Paragon #2020-0817-8969.	Campers are parked along the roadway leaking fluids onto the pavement. Complainant is concerned that if it rain these fluid will wash down into the stormdrain.

Date	Address	Street Name	Complaint Type	Action Taken	Description
8/20/2020	1805	Philips Street	Petroleum	This appears to be a redundant complaint from the 17th. Visited location and no significant fluid spill was observed. If a gasoline leak occurred it has likely evaporated given the heat	Silver Chevy parked in parking lot with a "fuel" puddle under the gas tank. It's in the 1st stall by a green truck. Spill looks pretty bad. The owner of the chevy is in jail
8/25/2020	2900	Expo Parkway	Petroleum	Visited site. All campers and RVs are gone and no significant fluid spills present.	Old camper in the cul de sac, by the Motel 6, is leaking oil into the street. There is a red tag on the vehicle so it may be being tagged by law enforcement, but this complaint is regarding the oil spills on the street.
9/8/2020	2129	Livingston Avenue	Other	Investigated on 09/08/2020. A large RV parked at the location listed above was leaking water (not gasoline) from the engine area onto the street directly over a sump. Likely and issue with the water pump. The complainant put down a bucket to collect the drip. The water was odorless and a little dirty. I left my card with the complainant and on the door of the RV. Returned on the morning of 09/09/2020 and the RV had been moved. No further action required.	Complainant called to report an RV leaking possible gasoline into a sump at 2129 Livingston Ave.

Date	Address	Street Name	Complaint Type	Action Taken	Description
9/9/2020	2929	Expo Parkway	Petroleum	9/10/2020 Visited location and found a blue minivan covered in tarps parked in cul-de-sac. No one came out of the vehicle and I couldn't see inside. What looked to be a 12" x 24" stain of engine oil was under the rear of the vehicle. I posted a "Leaky Vehicle Notice" to the vehicle and called Charmell Owens at the City to alert her to the potential "parking for purpose of camping" violation. 9/11/20 Occupant of vehicle called and left a message at office explaining that he received the notice and that the stain was there when he arrived. This is a de minimus amount of oil and not likely to pose a threat to the nearest storm dry-well.	Luke called and said the original Rv's and campers moved on but new vehicles are back and there is a blue van that is really leaking fluid onto the road and it is by a storm drain. See 2020-0817-8969 for previous complaint from same area but different RV's and Campers. He is also calling the police again about the vehicles.
9/16/2020	1712	River Road	Other	Called the property management company for trailer court and informed them of the issue. Asked for them to communicate with their lawn care system and distribute information with tenants informing them that it is not acceptable and against the ordinance to dispose of lawn clippings where they could enter a waterway	a lawn service is dumping their grass clipping off the bank and he is worried they are going to get into the river.

Date	Address	Street Name	Complaint Type	Action Taken	Description
10/2/2020	544	Bigfork Road	Sediment	Not Resolved	Existing homeowners are experiencing storm water runoff erosion and damage to homes due to the recent build out of a newly platted subdivision called, "Linda Vista Twenty Second Supplement", Book 38, Page 8 that was filed on August 28, 2019 and is located in Missoula, MT. Homes like 5436 and 5444 Bigfork Road, Missoula, MT 59803 have had storm water intrusion in the crawlspace/basements. Homes serviced by Showdown Lane such as 6155 Showdown Lane, Missoula, MT 59803 have had their driveways and roads eroded due to the outlet of the regional storm water pond located at 6431 Lower Miller Creek Road, Missoula, MT 59803. This water storage facility (Storm Water Pond) has overly steepened sides and is adjacent to five single family residences. If a breech were to occur on this dam there would be loss of property or potentially worse. This is an earthen dam and likely should be constructed and regulated by the state as such. Additional high density development is proposed for Lot 29 and Lot 1

Date	Address	Street Name	Complaint Type	Action Taken	Description
10/9/2020	1114 Creek Crossing Road		Petroleum	I received this complaint on Oct 14, 2020. Contacted complainant to find out if he has a more specific location. Located the Yellowstone Pipeline crossings online and contacted local Phillips 66 terminal. Our LEPC also has a map we should get access to. Met staff onsite and we walked both banks north and south of pipeline and did not observe any sheen. They shut line down and ran a leak test. Nothing found. Suspect he sheen observed was a biological decay sheen. In the future the best number to call is the one on the placards. Will update our contact list.	Complainant saw a sheen in Rattlesnake cr near pipeline crossing. Email: Hi there, I was walking by Rattlesnake Creek earlier today, just downstream of where the petroleum pipeline crosses, and I came across an oil slick among the rocks at the edge of the stream (see attached picture). Perhaps it's naturally-occurring, but given the location, it seemed suspicious. I wanted to pass it along in case that's something that you monitor. Thanks, Brad

Date	Address	Street Name	Complaint Type	Action Taken	Description
10/9/2020	544	Bigfork Road	Sediment	This a recurring complaint that primarily concerns stormwater pollution prevention plans and the stormwater ordinance. DEQ and City Stormwater are responsible for enforcement. Sent to Tracy Campbell at city.	From a City Complaint form: Existing homeowners are experiencing storm water runoff erosion and damage to homes due to the recent build out of a newly platted subdivision called, "Linda Vista Twenty Second Supplement", Book 38, Page 8 that was filed on August 28, 2019 and is located in Missoula, MT. Homes like 5436 and 5444 Bigfork Road, Missoula, MT 59803 have had storm water intrusion in the crawlspace/basements. Homes serviced by Showdown Lane such as 6155 Showdown Lane, Missoula, MT 59803 have had their driveways and roads eroded due to the outlet of the regional storm water pond located at 6431 Lower Miller Creek Road, Missoula, MT 59803. This water storage facility (Storm Water Pond) has overly steepened sides and is adjacent to five single family residences. If a breech were to occur on this dam there would be loss of property or potentially worse. This is an earthen dam and likely should be constructed and regulated by the state as such. Additional high density development is p

Date	Address	Street Name	Complaint Type	Action Taken	Description
10/14/2020	320	International Drive	Petroleum	Complaint came in on 10/6/20 and I responded same day. Not sure why above it lists 10/14 but I can't edit that field I found the RV in question. A large container was in place to capture leaks. No storm drains nearby and no actual spilled product. Not a water quality issue at this point.	The police department received the following information regarding a motor home that has been parked on International, around the 200 blk, license plate 5-28628B, that is leaking fluid. Complainant drove by there and a black plastic container is in place to “catch” the fluid.
10/21/2020	3927	Saxony Place	Sediment	Met Tracy and contractor onsite. Explained that sludge should be scooped up, dried out, and discarded. ProSweep is coming out to clean up the remainder.	Mostad cut curb and left the concrete dust behind. Rain resuspended the dust and there is now concrete sludge in curbline and dragging along road.

Date	Address	Street Name	Complaint Type	Action Taken	Description
12/7/2020	100	Madison Street	Chemical	I visited the site and did not see evidence of any staining in the bank ice of Rattlesnake CR or Clark Fork River. I could not see how any fluid would reach the Clark Fork River directly from the building. I emailed the complainant to get more information as to the date, location, and quantity of the release. I did not hear back so I called the hotel on 12/10/20 and asked to speak with the GM. He was unavailable. I then received a call from Missoula 911 and Radley Watkins from the Conservation District about a glycol leak at the same location estimating 1200 gallons released. Martin V and I visited the site and the GM (Dan Monahan) and one of his staff members showed me the area where the pipe had broke. Apparently contractors (Blackfoot and JML) were replacing fiber optic cable and drilled into the chiller pipe that runs from the hotel out to the chiller located near the raised bank of the creek. Staff noticed the chiller wasn't working properly and a drop in fluid levels in the boiler room and had JTL investigate and the broken pipe was found and fixed. Based on the fluid drop in the reservoir there was approximately 20 gallons lost to the soil. Fluid was a water/propylene glycol mix. I sent a Complaint Inspection letter to all responsible parties that notifies them that this is not an approved non-stormwater release with no further action to be taken at this time.	On 12/7/20 I received a complaint through David Erikson at the Missoulian from a message he received from Dan Monahan at the Doubletree that a chiller pipe broke and coolant (glycol) had spilled into the Clark Fork river.

STORM WATER

City of Missoula

0 1 2 4 Miles

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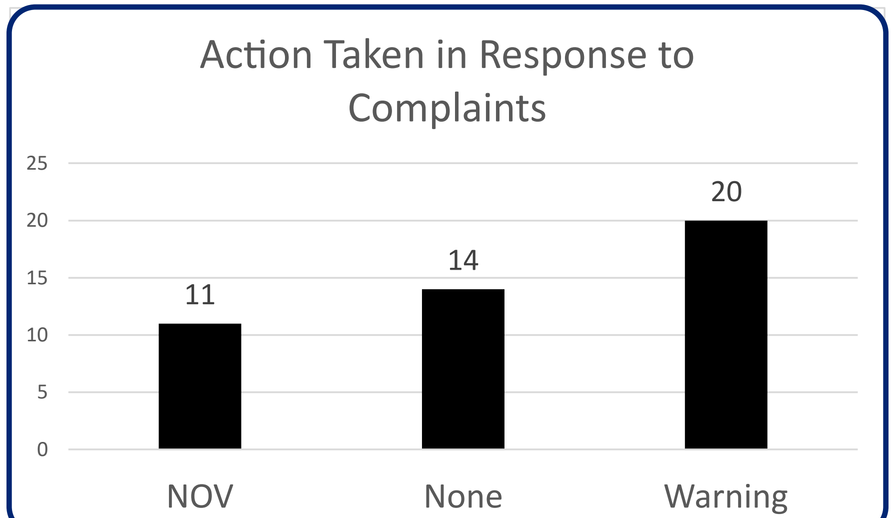
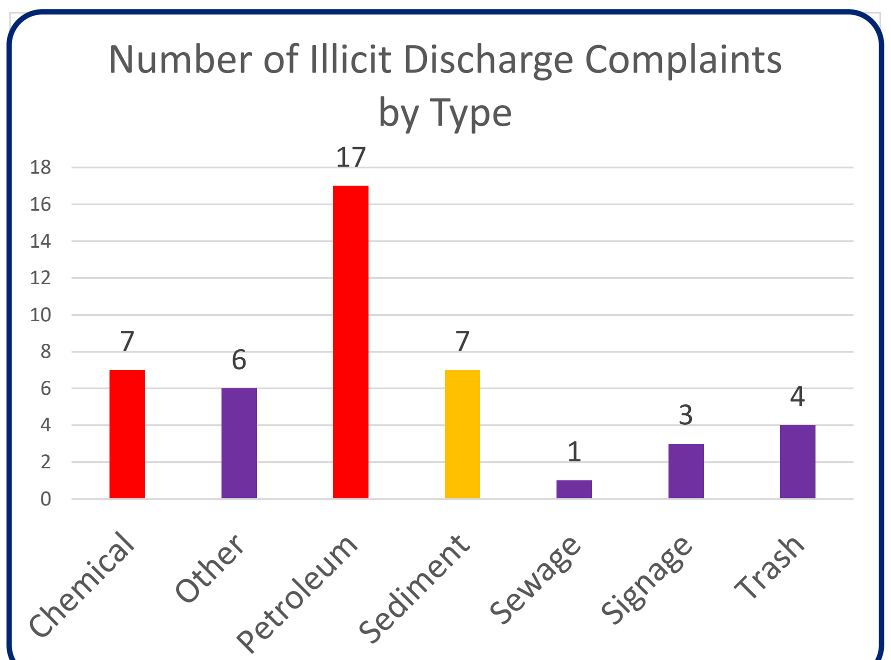
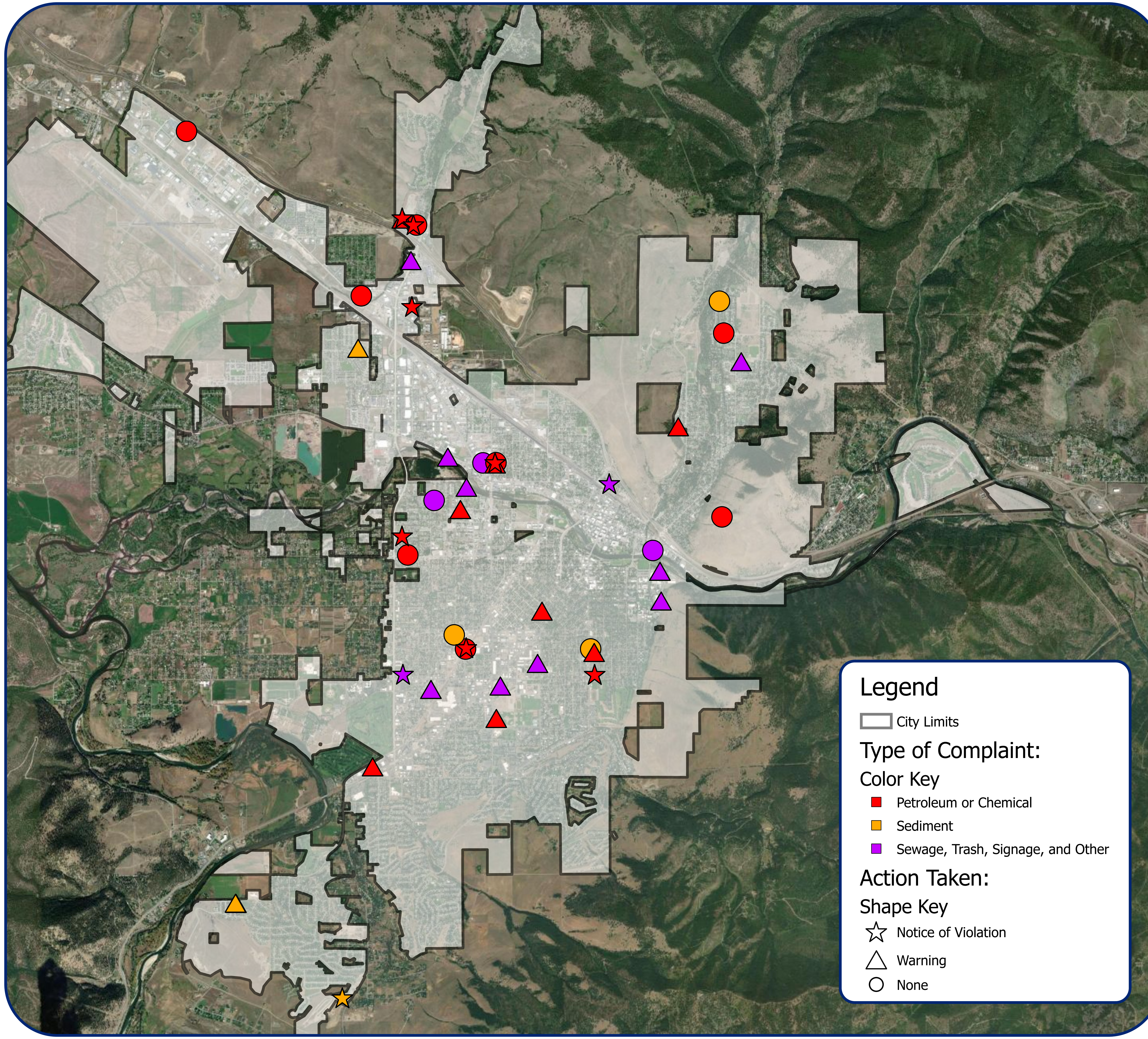
Illicit Discharge Complaints

Missoula Valley Water Quality District







Appendix E

Public Works Standards and Specifications Manual - Excerpts

Missoula City Public Works
Standards and Specifications Manual

CHAPTER 6 – STORM WATER SYSTEM

November 18, 2020

CHAPTER 6 – STORM WATER SYSTEM

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CHAPTER 6 – STORM WATER SYSTEM

6.1 Introduction

6.1.1 References

A. *Montana Public Works Standard Specifications* (MPWSS), 6th Edition, 2010 – by purchase only

B. US DOT FHA Hydraulic Engineering Circular-14– Hydraulic Design of Energy Dissipators for Culverts and Channels

C. US DOT FHA Hydraulic Engineering Circular-15 – Design of Roadside Channels with Flexible Linings

D. US DOT FHA Hydraulic Engineering Circular-22 – Urban Drainage Design Manual

E. US DOT FHA Hydraulic Design Series-5, Hydraulic Design of Highway Culverts

F. Montana Department of Environmental Quality Circular-8: Montana Standards for Subdivision Storm Water Drainage (DEQ-8)

G. General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)

H. *AASHTO Drainage Manual* Chapter 7 with MDT Changes, Hydrology

I. *AASHTO Drainage Manual* Chapter 9 with MDT Changes, Culverts

J. *AASHTO Drainage Manual* Chapter 10 with MDT Changes, Bridges

K. *AASHTO Drainage Manual* Chapter 13 with MDT Changes, Storm Drainage Systems

L. *Montana Post-Construction Storm Water BMP Design Guidance Manual*

M. Montana Department of Transportation's *Erosion and Sediment Control Best Management Practices Manual*

N. Montana Department of Transportation's *Hydraulics Manual*

O. Minnesota Pollution Control Agency' *Minnesota's Stormwater Manual*

6.1.2 Appendices

A. Appendix 6-A – Storm Water Management Site Plan Review Checklist

B. Appendix 6-B – Storm Water Site Evaluation Form

C. Appendix 6-C – Storm Water Drainage Report Content

D. Appendix 6-D – Private Storm Water Facility Maintenance Covenant and Access Easement

E. Appendix 6-E – Operation and Maintenance Requirements

F. Appendix 6-F – Test Pit Infiltration Test Method

6.1.3 Standard Modifications to MPWSS

A. Specifications not specifically contained herein related to storm water improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), 6th Edition, 2010 and the following City of Missoula Modifications to the MPWSS, which are located in Appendix 2-A:

1. SECTION 01400 Contractor Quality Control and Owner Quality Assurance
2. SECTION 02221 Trench Excavation and Backfill for Pipelines and Appurtenant Structures
3. SECTION 02724 Insulation
4. SECTION 02720 Storm Drain Systems

5. SECTION 02740 Pipe Casings

6.1.4 Standard Drawings

A. Standard drawings related to storm water system improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), 6th Edition, 2010 Standard Drawings and the 600-series of the City of Missoula Standard Drawings contained in Appendix 2-B.

6.1.5 Design Criteria

A. The storm water design criteria presented in this Chapter are based on standard engineering practice for storm water management, modified to suit the needs of the City of Missoula. The design of storm water facilities may need to exceed minimum standards presented here in order to provide adequate protection from flooding. The City will conduct review of drainage plans and reports for compliance with requirements set forth in this Chapter. The City's review is not an endorsement of the plan or approval or verification of the engineering data and plans. The Applicant is exclusively responsible for ensuring that the design, construction drawings, constructions, and record drawings comply with acceptable engineering practices and this Manual.

6.1.6 Deviations from these standards

A. Any requests for deviations for the standards outline in this chapter shall follow requirements in Section 3.6.1 of this Manual.

6.2 General Requirements

6.2.1 Design Requirements

A. Minimum storm water controls are required for developments with land disturbance $\geq$ 2500 square feet.

B. Using the Storm Water Site Evaluation Form found in Appendix 6-B, projects are classified as low, medium, and high priority and must meet minimum standards set for each priority level. Medium and high priority developments must provide a Storm Water Management Site Plan and report for permanent water quality treatment facilities to manage runoff from the post-developed site conditions.

C. A Storm Water Management Site Plan Review Checklist is provided in Appendix 6-A.

D. The minimum design standards stated in this chapter apply to the management of storm water in a post-construction environment.

E. Requirements for storm water erosion and sediment control during construction is covered in Chapter 8 - Erosion Control.

F. Low Impact Development (LID)/Green Infrastructure

1. LID/Green Infrastructure is highly prioritized by the City of Missoula. While it is currently not required, in the future credits or incentives may be implemented.
2. LID practices are intended to manage storm water as close to its source as practicable by 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.

3. Examples include bioretention facilities, green roofs, vegetative biofilters, and permeable pavements.
4. LID/green infrastructure practices aim to preserve, restore, and create green space using soils, vegetation, and rainwater harvest techniques.
5. Additional information is found in the *Montana Post-Construction Storm Water BMP Design Guidance Manual* and in *Minnesota's Stormwater Manual* from the Minnesota Pollution Control Agency.
6. Successful implementation of LID/green infrastructure is accomplished using strategies and standards that meet two or more of the major objectives below.
    - **a.** Flood and peak discharge control.
    - **b.** Water quality control.
    - **c.** Multi-parameter controls, including aquifer recharge and channel protection.
    - **d.** Habitat protection and ecological sustainability.

G. **Low Priority Sites**. The requirements in this section apply to those projects classified as low priority using the Storm Water Evaluation Form.

1. Improvement plans shall include a grading and drainage plan sheet addressing requirements listed in Section 6.2.2 of this chapter.
2. Projects that disturb 1-acre or greater during construction shall adhere to water quality treatment requirements in Section 6.2.6 of this chapter.
3. The following minimum requirements apply to this classification:
    - **a.** Site grading shall follow specific requirements established in/on the plat, subdivision conditions of acceptance or any covenants that apply.
    - **b.** The finished grade of the ground shall slope away from the house.
    - **c.** Roof drainage facilities shall be installed to divert storm water away from the foundation of the structure.
    - **d.** Roof drainage facilities directed toward unfinished landscaping shall be equipped with sediment bags and/or energy dissipaters until landscaping is established.
    - **e.** Storm water shall not be concentrated onto an adjacent property. Storm water from impervious surfaces shall be routed over a minimum length of 15 feet of pervious surfaces before flowing off site or must follow mitigation techniques approved by Missoula Storm Water Utility Division. These techniques may include the use of swales, dry wells, or piped connections to dry wells or French drains. The slope of the pervious surfaces shall be no greater than 8% for lawns and 2% for other surfaces.
    - **f.** The finished grade shall be contoured to move storm water away from both on- and off-site structures. This includes consideration of:
        1. Storm water from impermeable surfaces such as roofs, driveways, and sidewalks on the subject property; and
        2. Storm water coming onto the site from adjacent properties.

g. Storm water shall not affect structures on adjacent parcels and shall be configured to direct storm water to vegetated areas.
h. Storm water to or from the site shall be not be impeded or accelerated.
i. Irrigation shall be installed and used in a manner that does not affect adjacent properties.
j. Developers are encouraged to utilize LID and green infrastructure methods for managing storm water.

4. The elevation of residential dwellings and other lot features shall be established to ensure storm water runoff from the 100-year storm does not inundate buildings.
5. Erosion and sediment controls shall be installed per requirements in Chapter 8.
6. Finished grade slopes may not exceed 50%.
7. Use of LID/green infrastructure techniques is encouraged.

H. **Medium and High Priority Sites**. The requirements in this section apply to those projects classified as medium and high priority using Storm Water Site Evaluation Form (Appendix 6-B). The storm water management systems for these projects shall be designed, signed, and sealed by a registered professional engineer in the State of Montana. These projects shall adhere to the minimum requirements listed for low priority projects as well as the following:

1. Post-Development Runoff Control Requirements
   a. Post-development storm water from the project shall be completely retained and infiltrated on site for the 100-year storm event; or
   b. Post-development storm water from the project shall be released from the site at pre-developed peak flow rates for the 100-year storm event; or
   c. Post-development storm water shall be routed through an adequate storm water conveyance to a regional storm water facility for which it was designed. This requires prior approval by City Engineering.
2. Projects shall meet post-construction water quality control requirements in Section 6.2.6.
3. The Storm Water Management Site Plan shall meet the requirements in Section 6.2.2 and a design report shall be provided in accordance with Section 6.2.3.
4. Projects shall include a Private Storm Water Facilities Maintenance Covenant and Access Easement (Appendix 6-D) filed with the Missoula County Clerk and Recorder, along with an Operations and Maintenance (O&M) Manual (Appendix 6-E). The O&M Manual, recorded covenant for maintenance and easements, and accurate record drawings shall be included in the final project closeout, prior to City approval of the facilities.
   a. Projects that propose to infiltrate, evapotranspire, and/or capture for reuse all post-development storm water on-site—without the use of piped conveyance—shall be exempt from the requirements of a Private Storm Water Facilities Maintenance Covenant and Access Easement and O&M Manual. The owner will still be responsible for all maintenance required to ensure facilities are operating as designed.
5. Natural drainage patterns shall remain unaltered where applicable.
6. Use of LID/green infrastructure techniques is encouraged.

6.2.2 Plan Requirements

A. Storm Water Management Site Plan. Storm water system improvement plans shall comply with the general requirements in Section 3.2 of this Manual and shall at a minimum include:

1. The area of each lot;
2. Locations of existing and proposed driveways, buildings, wells and drainfields; Locations, sizes, and design details of existing and proposed storm water facilities;
3. Locations of natural and constructed drainage way and streams;
4. Floodplains as delineated by FEMA or local floodplain authorities;
5. Existing and proposed contours at 1-foot intervals;
6. Direction of drainage flow adjacent and across the site, along each street, and at each intersection;
7. Drainage basin and sub-basin limits with analysis points used for design
8. Existing storm water management facilities including irrigation ditches, roadside swales, open channels, storm sewers, culverts, detention ponds, etc.
9. Location and design details of any proposed detention facilities, retention facilities, infiltration facilities, and erosion control measures;
    a. Where dry wells are proposed they shall be labeled with the total drainage area and total impervious area draining to the structure
10. Profile sheets of proposed conveyance structures and storm drain systems shall be required;
11. Drainage easements, both on and off site, proposed and existing;
12. Details for outfalls, BMPs, other drainage structures and access streets;
13. Spot elevations and grades of features - back of curb, sidewalk, driveway (at garage door), finished floor at threshold of structure, street intersection monuments, bench marks, temporary bench marks, location of existing and proposed storm water structures;
14. Cross-hatching indicating spill curb/gutter differentiating it from catch curb/gutter;
15. Curb/gutter alignment;
16. Flow grades on asphalt (street) surface and curb/gutter sections;
17. Directional flow arrows and % grade.

6.2.3 Design Report

A. Storm Water Drainage Report. Shall follow the report format in Appendix 6-C and include the following:

1. Peak flow attenuation requirements and a description of how they are met;
2. Water quality treatment description;
3. Description of existing drainage facilities function (natural or constructed);
4. Acceptable Methods for calculating runoff.
5. Pre-development basin conditions exhibit, including flow patterns, off-site runoff contributions, land cover assumptions, curve numbers and/or runoff coefficients, soil types, time of concentration paths, and analysis points;

6. Post-development basin conditions exhibit, including proposed development, drainage infrastructure locations, flow patterns, off-site runoff contributions, land cover assumptions, curve numbers and/or runoff coefficients, soil types, time of concentration paths, and analysis points;
7. Identification of potential existing wetlands, nearby waterbodies, and depth to groundwater (if applicable);
8. Soil information including soils maps, soil descriptions, and hydrologic soil group;
9. Infiltration facilities. Soil profiles and infiltration testing data per Section 6.2.4;
10. Supporting Information & Calculations. Includes site photos, design graphs, charts, Nomograph, maps, figures, time of concentration calculations, software input/output, hydraulic grade line calculations for storm drain systems, inlet spread width and bypass flow calculations, and all related hydrologic and hydraulic calculations;
11. Down Gradient Impact Analysis. Analysis and discussion of any existing downstream drainage issues and potential impacts to adjoining parcels and/or existing storm water infrastructure. Analysis shall adhere to Section 6.2.7.
12. Inlet capacity and spread-width calculations
13. The report shall be based on the outline in Appendix 6-B

B. Geotechnical Report.

1. A geotechnical report shall be provided for projects meeting the requirements in Section 6.2.4.
2. A minimum of one test pit (or boring) and one infiltration test shall be provided for every USDA soil classification type that will be used for infiltration.
3. A minimum of one soil test pit (or boring) and one infiltration test shall be provided within 300 LF of each infiltration facility.
4. Soil profiles showing thickness of soil layers and designation of USDA soil classifications must be provided for each pit/boring.
5. Soil infiltration tests shall be performed per the technique in Appendix 6-F, DEQ-8, Appendix C or the *Montana Post-Construction Storm Water BMP Design Guidance Manual*, Appendix C. In some areas, the City has unusually high soil infiltration rates relative to other locations around the State, therefore test procedures may need to be adapted. Methods other than those listed may be acceptable if approved by the City Engineer.
6. If dry wells are proposed for storm water management, field testing the infiltration rate of a nearby existing dry well may be used in place of test pits (or borings) and infiltration tests. The tested dry well must be within 300 LF of the proposed dry well. Dry wells shall be tested at their expected operational water level. Dry wells shall be pre-soaked for an appropriate amount of time before infiltration testing. Pre-soaking shall achieve a constant infiltration rate if possible. Two methods are acceptable for performing the dry well infiltration test after the pre-soak period:
    a. Falling Head Test. The dry well shall be presoaked by filling the dry well with a minimum one-foot depth of water and continuously kept at that level for a

minimum of two hours or until infiltration rates stabilize to within 10% over a 30-minute interval. The dry well shall then be filled to the top of the slotted barrel or a minimum of 2 feet. The water level shall be allowed to drop a minimum of 2 feet and the time recorded. This procedure shall be repeated until four consecutive readings do not vary more than 10%. An average of the four readings will be used as the infiltration rate.

   b. Average Constant Rate. The dry well shall be filled to the expected operational water level and continuously kept within ± 2 feet of that level for 2 hours or until infiltration rates stabilize to within 10% over a 30-minute interval, while water levels are recorded. After water levels have stabilized, measurements shall be taken at intervals no greater than 10 minutes for a minimum of 1 hour. The average of the measurements taken over this 1 hour period shall be the infiltration rate.

7. Regardless of the method used to determine infiltration rates, a safety factor shall be applied in order to account for long-term degradation of infiltration rates as the dry wells accumulate sediment. The safety factors below are a minimum. The engineer performing the site analysis and infiltration tests may recommend a safety factor greater than those shown based on-site specific conditions.

   a. Where pre-treatment is provided before the infiltration facility the minimum factor of safety shall be 2.0. Pretreatment shall be a catch basin piped to a solid-lid dry well, a vegetated swale with a minimum of 8-feet of travel distance along the swale before discharge into a dry well, or other methods approved by the Utility Engineer.

   b. Where no pre-treatment is provided before the infiltration facility the minimum factor of safety shall be 3.0.

8. Where storm water infiltration is proposed in areas where it is suspected by the Public Works Department that the infiltrated storm water will have an impact on groundwater elevation which may affect facilities or structures a groundwater assessment shall be included in the report. This shall include an assessment of the potential storm water impact to on- or off-site facilities or structures. The assessment will also demonstrate that impacts to groundwater elevation or flow, resulting from the proposed infiltration system will be confined to the property.

9. Groundwater monitoring may be required based on the surrounding hydrological and hydrogeological data and/or if there is evidence of groundwater in test pits. Sufficient perforated pipes shall be installed to adequately define the groundwater conditions in the proposed infiltration area(s). The perforated pipes shall be installed at a depth at least five-feet below the proposed bottom of infiltration facility. For a dry well this is the bottom of the sump rock. These test wells shall be monitored at a frequency which will establish the peak seasonal groundwater depth. Results may not be accepted when precipitation or snow pack water equivalent is more than 20% below historical average.

6.2.4 Storm Water Infiltration

A. If infiltration facilities (including dry wells) are proposed for storm water management, there are two acceptable methods for selecting the design infiltration rate for soils:

1. **Reference Infiltration Rate** – For infiltration facilities that have less than 8,000 sf of total contributing drainage area, a design infiltration rate may be selected from a standard reference table source, such as Table 2 in Appendix C of DEQ Circular 8, or Table 2.1-1 in DEQ Circular 4.
2. **On-site Soil Investigation** – For infiltration facilities with greater than 8,000 sf of drainage area, non-standard drainage systems, or projects located within or draining to a drainage problem or study area as recognized by the City of Missoula, a signed and sealed geotechnical report must be provided by a registered professional engineer with relevant experience in infiltration and soils testing and licensed in the State of Montana. The report shall meet the requirements in Section 6.2.3.B.
   a. In areas where there has been a long-standing record of satisfactory performance of dry wells and no drainage problems are known to exist, the minimum requirements outlined in this section may be reduced or waived after a formal written request from the project engineer has been reviewed and accepted by City Engineering.

6.2.5 Regional Storm Water Facilities

A. Some areas within the City are served by existing regional storm water facilities that help provide conveyance, peak flow attenuation, and/or water quality treatment. Developments that propose to use existing regional facilities must be treated on a case-by-case basis in consultation with the City Engineer. In general, to utilize regional facilities, the capacity of the facility and the capacity of the conveyance to the facility must be examined. Depending on the capacity and function of the regional facility, projects may be responsible for providing supplementary conveyance, capacity, and/or water quality treatment meeting requirements in Section 6.2.6.

6.2.6 Storm Water Quality Control

A. Using the Storm Water Site Evaluation Form, all medium and high priority developments must provide plans for permanent water quality treatment facilities to manage runoff from the post-developed site conditions.

B. Storm water management controls shall be designed to infiltrate, evapotranspire, and/or capture for reuse the post-construction runoff volume generated from the first 0.5 inch of rainfall from a 24- hour storm preceded by 48 hours of no measurable precipitation. Design guidance is provided in the Montana Post-Construction Storm Water BMP Design Guidance Manual (MTDEQ, 2017). If dry wells are used to meet this requirement, each dry well contributes a volume of 160 ft^3 of storage to the Runoff Reduction Volume. If the volume of the sump is not adequate to contain the Runoff Reduction Volume (RRV), then the Runoff Treatment Flow Rate (RTF) can be calculated using the formula in the Montana Post-Construction Storm Water BMP Design Guidance Manual. The bottom area of the dry well, 61.23 ft^2 (based on a dry well installed per City standards with a diameter of 8.83 ft) shall be used in the calculation. The dry well shall be considered adequate if the infiltration rate is larger than the RRF.

C. Developments that cannot meet 100% of this runoff reduction requirement must

1. Treat onsite using controls expected to remove 80% TSS; or
2. Manage off site within the same sub-watershed with controls designed to infiltrate, evapotranspire, and/or capture for reuse; or
3. Treat off site within the same sub-watershed using controls expected to remove 80% TSS.

D. All new storm water outfalls to a named waterbody shall be approved by the City Utility Engineer. Any new storm water outfall to a named waterbody will be required to implement BMPs to the maximum extent practicable to reduce pollutant discharges as approved by the City Utility Engineer.

E. Compliance with storm water requirements does not necessarily result in compliance with the Missoula Valley Water Quality Ordinance 13.26.092 which prohibits activities that may allow pollutants to contaminate our local water resources.

6.2.7 Hydrology

A. Drainage System. The City storm water system is composed of two elements: The Minor Drainage System and the Major Drainage System. The Minor Drainage System consists of the components that have been historically considered as part of the storm water system such as pipes, inlets, dry wells, etc. The Major Drainage System provides overland relief for storm water flows exceeding the capacity of the Minor Drainage System, to minimize health and life hazards, damage to structures, and interruption to traffic and services.

1. Minor Drainage System. The Minor Drainage System consists of curbs, gutters, ditches, culverts, storm drains (and other conduits), open channels, pumps, detention/retention basins, infiltration facilities, and outfalls. The Minor Drainage System shall be designed to carry runoff from the peak flow rate from the 10-year storm event.
2. Major Drainage System. The Major Drainage System consists of pathways that are provided for runoff to safely flow to natural or engineered channels. The Major Drainage System shall be designed to safely carry runoff from the 100-year storm, without inundating structures and drain fields, overtopping roadways, or interrupting traffic and emergency services. Flows from the 100-year storm event can be carried in the urban street system (within acceptable depth criteria), open channels, storm pipes, and other conveyance facilities.

B. Design Storm Depth. The design storm depths in Table 6-1 are based on the 24-hour storm duration at the Missoula International Airport as published in MDT Hydraulics Manual Chapter 7, Appendix B (MDT, 2017).

Table 6-1 – Design Storm Depths

	2-yr, 24-hr storm (in)	10-yr, 24-hr storm (in)	100-yr, 24-hr storm (in)
Missoula Airport	1.17	1.66	2.28

C. Design Storm Intensity. Design storm intensities shall be based on the time of concentration used for the drainage basin. Design storm intensities shall be referenced from the Missoula International Airport as published by the MDT Hydraulics Manual Chapter 7, Appendix B.

D. Hydrologic Methods. Acceptable hydrologic methods for calculating runoff rates and storage requirements are below. Procedures for use of these methods can be found in HEC-22, Chapter 3.

1. Rational Method. May be used to determine runoff peak flow for the design of conveyance systems for contributing areas less than 5 acres. Rational Method may not be used for volume-based calculations or routing.
2. SCS Curve Number Method. May be used to determine runoff volume and peak flow for the design of conveyance systems, storage facilities, and routing effects for contributing areas less than 1,920 acres. The SCS Type II rainfall distribution shall be used for the analysis.
3. EPA SWMM. Consult the City Utility Engineer for approval for use of this method.

E. Time of Concentration. Time of concentration shall be calculated using the TR-55 Method to determine the time is takes for storm water to travel from the most distant point of a drainage basin to a specific point of interest.

1. The minimum time of concentration shall be 5 minutes.
2. Sheet flow length shall be limited to a maximum of 300 feet in undeveloped areas and 150 feet in developed areas.
3. For multiple drainage areas, the longest time of concentration must be selected.

F. Drainage Basin Delineation. The total area, including off-site or up-gradient areas that contribute to the storm water on a site, must be included in the analysis. Large drainage basins shall be divided into sub-basins and evaluated separately based on contributions to individual facilities. Include all elements of off-site drainage basins, such as undeveloped sites, developed sites, and off-site drainage facilities. A final analysis shall always be conducted at the point where runoff finally discharges from a site.

G. Pre- and Post-Development Conditions. Pre-development runoff shall be calculated based on conditions prior to any development. Post-development runoff shall be calculated based on proposed developed conditions. When the extent of impervious areas is unknown (such as on individual residential lots), an assumed estimate must be provided.

H. Allowable Off-Site Release Rates. A project shall not release runoff off site at a rate more than the peak pre-development runoff rate, unless the site is contained within a comprehensive drainage plan designed to allow off-site discharge to a regional collection facility. Runoff from a developed site shall leave the site in the same manner and location as in the pre-development condition. Flow may not be concentrated onto down-gradient properties where sheet flow previously existed.

I. Up-Gradient Analysis. Design of conveyance structures for a project must account for any up-gradient flows passing through the site.

J. Down-Gradient Analysis. A down-gradient analysis shall be conducted to identify and evaluate potential adverse impacts to downstream properties due to increased runoff from the proposed development. Adverse impacts may include receiving more runoff than pre-developed conditions, increased erosion, increased flooding, or change in historical runoff patterns such that pre-development runoff conditions concentrated at a single discharge location may cause increased erosion. This analysis shall continue through down-gradient areas to the point where the adverse impacts are deemed negligible, or to a point where the contributing drainage area is 1% (or less) of the total drainage area. The analysis shall include at a minimum:

1. Visual inspection of the site and down-gradient areas.
2. A site map that clearly identifies the project boundaries, study area boundaries, down-gradient flow path, and any existing or potential areas identified as problematic.

3. Pre- and post-development hydraulic capacities (flow rate and volume) for the 10-year and 100-year storm events.
4. Existing or potential off-site drainage problems that may be aggravated by the project.
5. The condition and capacity of the conveyance route, including existing and proposed elements, potential backwater conditions on open channels, constrictions or low capacity zones, surcharging of enclosed systems, and localized flooding.
6. The presence of existing natural or constructed land features dependent upon pre-developed surface or subsurface drainage patterns.
7. Existing or potential erosive conditions such as scour or unstable slopes onsite or downgradient of the project.
8. Flood areas identified on FEMA maps.
9. If there are existing or potential off-site drainage problems down gradient of the project, the project must demonstrate that the proposed storm water system has been designed to meet the following conditions:
    a. The storm water runoff (volume and flow rate) leaves the site in the same manner as that of the pre-developed condition.
    b. The proposed design does not influence existing drainage problems or create a new drainage problem.
10. If down-gradient release of runoff is at a rate or volume greater than the pre-developed condition, then potential adverse impacts on down-gradient property and drainage infrastructure (due to an increase in storm water rate, volume, velocity, and flow duration) shall be addressed and mitigated.

6.2.8 Private Connections

A. Private storm water system connections to the public storm water system may be approved by the City.

B. Connections shall be entirely owned and maintained by the owner of the development in which the connection was installed. A Private Storm Water Facility Maintenance Covenant and Access Easement shall accompany the Storm Water Management Site Plan.

C. Connection must include backflow prevention or other accommodations on site to prevent storm water from the City storm water system from surcharging onto private property and causing damage and/or flooding.

D. The maximum pipe diameter allowed will depend on an evaluation of the capacity of the City storm water system and approval from the City Utility Engineer.

E. Pumped connections to the City storm water system are not allowed.

F. Lateral connections within the right-of-way and public easements shall be made at right angles.

G. Core-drill or appropriate fitting directly on the main line. Connection to adjacent catch-basins/manhole shall only be made with approval from the City Utility Engineer.

6.3 Design Standards

A. Storm water facilities shall be designed to control the conveyance, storage, and flow rate of storm water runoff. Facilities include conveyance systems such as channels, pipes, gutters, and culverts that are designed to deliver storm water from a receiving point to a discharge location without surcharging or causing surface flooding for a specified design storm.

B. Conveyance systems shall generally be designed to convey the expected post-development peak flow without overtopping curbs during a 10-year storm event and without inundating buildings, or inundating drainfields during a 100-year event.

C. The use of green infrastructure/LID is highly encouraged as discussed in Section 6.2.1 and the *Montana Post-Construction Storm Water BMP Design Guidance Manual* (MDEQ, 2017).

6.3.1 Streets

A. Design standards for streets are contained in Section 7.3.1. Specific storm water design standards for streets are contained in Table 6-2 and Table 6-3.

Table 6-2 – Maximum Street Spread Width for 10-year Storm Event

Street Classification	Design Standard
Local	No curb overtopping. Flow may spread to crown of street.
Collectors	No curb overtopping. Flow spread must leave at least one, 11 foot lane free of water, 5 feet either side of the street crown.
Arterials	No curb overtopping. Flow spread must leave at least two, 11 foot lanes free of water, 10 feet each side of the street crown or median.

Table 6-3 – Maximum Depth for 100-year Storm Event

Street Classification	Design Standard
Local and Collectors	The depth of water at the gutter flow line shall not exceed 18 inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.
Arterials	To allow for emergency vehicles, the depth of flow at the street crown shall be no more than six inches. Residential dwellings and public, commercial, and industrial buildings shall not be inundated at the ground line unless flood-proofed.

B. Where no curbing exists, storm water encroachment shall not extend beyond the right of way during the 100-year storm event, unless accommodated by a drainage easement.

6.3.2 Gutters

A. Design standards for streets are contained in Section 7.3.8.

B. Standard gutter designs are published in City of Missoula Standard Drawings 740-745.

C. Runoff shall not overtop the curb during the 10-year rainfall event.

D. Minimum gutter running slope is 0.4%.

E. Gutter flow calculations shall be performed using methods in the HEC-22 Manual.

6.3.3 Inlets

A. Standard inlet design is published in City of Missoula Standard Drawing 600 and 601. Other inlet types may be approved by the City Utility Engineer if additional inlet interception capacity is necessary.

B. Inlets shall be located at grade low points, prior to pedestrian crossings, and/or at street intersections. Additional inlet spacing is based on interception capacity of the inlets, gutter geometry, flow bypass, and allowable spread.

C. Where installed in roadways, inlet grates shall be sloped to match the running slope and cross slope. Where curbing exists inlets shall be installed in the curb and shall be City of Missoula Standard combination curb inlet frame and grate.

D. Curb cuts may be used to convey storm water into boulevards and swales. Curb cuts shall be sized to intercept the design flow.

E. Maximum inlet spacing shall be 400 feet. Additional inlets shall be included to meet flow depth and spread width requirements for the 10-year storm.

F. Bypass flow at inlets shall be less than 0.1 cfs at intersections and at project boundaries.

G. Inlets placed in sag locations shall use a 50% clogging factor for sizing and placement.

H. The interception capacity, spread widths, and required spacing shall be determined in accordance with the procedures described in Section 4.3 and 4.4 of the HEC-22 Manual.

I. Design deviations from standards shall be evaluated using Section 4.4.6.2 of the HEC-22 Manual.

6.3.4 Storm Drains

A. Storm drainage infrastructure shall comply with the City's best practices for wet utility construction, as listed in Chapter 4 of this Manual.

B. Manhole lids and rings shall comply with City of Missoula Standard Drawings 604A, 604B, and 605. Manholes shall comply with City of Missoula Standard Drawing 612-1, 612-2, or 612-3.

C. Trench, bedding, and backfill shall be in conformance with City of Missoula Modification to MPWSS Section 02221 and City of Missoula Modification to MPWSS Section 01400.

D. Storm drains shall operate in a non-pressurized flow conditions during the 10-year storm event. Storm drains may be designed to surcharge during the 100-year storm event as long as the requirements of Section 6.3.1 regarding street flow depths are not violated.

E. Slopes must maintain a flow velocity of at least 2.5 ft/sec but not more than 12 ft/sec during the 10-year storm event. A minimum slope of 1% is preferred unless the minimum flow velocity can be achieved.

F. Minimum diameter of pipes shall be 12 inches for public main lines and laterals, and 6 inches for private connections. Pipe sizes shall only increase in the downstream direction.

G. Materials for storm drains shall comply with City of Missoula Modification to MPWSS 02720.

H. Design deviations from standards shall be evaluated using Chapter 6 and 7 of the HEC-22 Manual.

I. The minimum clearance distances from other utilities listed in Table 5-1 shall be maintained.
J. Manholes are required where two or more storm drains converge, pipe sizes change, changes in alignment, or changes in grade and shall be sized according to with City of Missoula Standard Drawing 612-1, 612-2, or 612-3. Maximum manhole spacing along storm drains is 400 feet for storm drain diameters up to 36 inches and 500 feet for storm drain diameters up to 60 inches.
K. 30-inch diameter catch basins are allowed if depths do not exceed 6 feet.
L. Maximum manhole depth shall be 20 feet without special safety provisions such as intermediate platforms and minimum diameter rises of 48 inches.
M. Water main crossings shall be designed to prevent freezing due to minimal clearance from storm drains and insulation installed per City of Missoula Modification to MPWSS Section 02724.
N. Avoid crossing other utilities at highly acute angles. The angle measure between utilities shall be between 45° and 90°.
O. Energy dissipation or erosion protection measures shall be required when outfall velocities exceed the permissible velocity of the soil or channel lining during the 2-year storm event. Design energy dissipation measures in accordance with FHWA HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels. See Section 6.3.7 for outfall requirements.
P. Where required by City Utility Engineering or the jurisdictional authority (i.e. railroad, Interstate (MDT), etc.), storm drains shall be installed through a casing. Casing requirements shall conform with City of Missoula Modification to MPWSS Section 02740, or jurisdictional standards.

6.3.5 Open Channels

A. Procedures for designing open channel conveyance systems including Manning's roughness factors (n), are contained in Chapter 5 of the HEC- 22 Manual.
B. Channels shall be located no closer than 10 feet from any structural foundation measured from the edge of the channel at the top of the freeboard elevation.
C. Shear stresses on channel side slopes shall be evaluated during the 2-year storm event to ensure adequate erosion protection and slope stability. This analysis shall include the bare soil condition immediately after construction as well as the final vegetation or lining of the channel. Temporary lining may be required until final vegetated conditions are achieved.
D. Channels must be designed with a full-flow capacity to safely convey the 100-year storm event with a minimum of 0.5 feet of freeboard.
E. Design of a low-flow channel shall be required to account for sustained low flows.
F. Side slopes shall be no steeper than 4H:1V for grass-lined channels requiring maintenance by mowing, 3H:1V for unmaintained native grass-lined channels and 2H:1V for all other stabilized channels.
G. Vegetated channels shall be maintained to ensure that vegetation does not limit the conveyance capacity of the facility.

6.3.6 Drainage Culverts

A. Culverts shall be designed using the procedures contained in HDS-5, Hydraulic Design of Highway Culverts.
B. Culverts shall be designed with capacity to allow the safe passage of peak flows without overtopping

roadways during the Minor Storm event or inundating buildings and drainfields during the Major Storm event. The roadway flow depth restrictions in Section 6.3.1 apply during roadway overtopping conditions.

C. Sizing must account for all upstream flow contributions.

D. The minimum culvert diameter is 12 inches.

E. A minimum velocity of 2.5 feet per second and a minimum slope of 0.5% during the Minor Storm event is required to prevent sediment accumulation through the culvert.

F. Minimum and maximum cover shall be in accordance with the pipe manufacturer recommendations.

G. Energy dissipation or erosion protection measures shall be required when outfall velocities exceed the permissible velocity of the soil or channel lining during the 2-year storm event. Design energy dissipation measures in accordance with FHWA HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels. See Section 6.3.7 for outfall requirements.

H. Flared end treatments for culverts and inlets shall be required inside the right-of-way for the purpose of enhancing crash safety.

I. A safety grate or trash rack with maximum clear spacing of 4 inches for child safety is required for all culverts over 30 inches in diameter.

6.3.7 Outfalls

A. Use the methods of Chapter 7.1.5 of the HEC-22 Manual as well as HEC-14 to address storm water discharge and erosion protection at outlet points. Design considerations include backflow, erosion protection, and energy dissipation methods.

B. The adequacy of the receiving channel must be analyzed for capacity and stability against erosion during the 10-year storm event.

6.3.8 Bridges

Hydraulic sizing for bridges across major drainages shall conform to the requirements of the AASHTO Drainage Manual Chapter 10 with MDT Changes, Bridges.

6.3.9 Detention Facilities

A. Detention facilities shall discharge a peak flow rate equal to or less than the pre-development peak flow rate for the 2-year, 10-year, and 100-year 24-hour storm events. Outlet facilities must safely accommodate the peak flow from the 100-year storm event with a minimum of 1 foot of freeboard and without damage to the facility from erosion.

B. Storm water shall not be held in a storage facility for more than 72 hours, unless designed for the purposeful creation of wetland and wildlife habitat.

C. Outlet structures must take into account exit velocities and erosion control requirements contained in Section 6.3.7 of this chapter and Chapter 8 of the HEC-22 Manual. Minimum orifice diameter without screening in 6 inches. The minimum diameter for outlet conduits shall be 12 inches. The HEC-22 Manual shall be used for additional design requirements such as, anti-seep collars placed on outlet conduits through embankments.

D. All detention facilities with constructed berms two feet or greater in height shall include a provision for non-erosive control of emergency overflows. This overflow spillway shall be designed to have the capacity to pass the 100-year post-developed peak flow with a freeboard of 1.0 foot minimum and shall be designed per Section 6.3.7. Overflows shall be directed to a safe discharge path to protect adjacent and downstream properties from damage.

   1. The full width of the spillway shall be armored with riprap and extended downstream to where emergency overflows enter the conveyance system. The armoring may have four inches of topsoil and grass cover.
   2. Designers may choose to design the outflow structure with an emergency bypass that can route the 100-year post-developed peak flow through the structure and out to the conveyance system in which case an emergency spillway is not required.

E. If storage facilities are used in conjunction with water quality facilities, designs must follow recommendations in the *Montana Post-Construction Storm Water BMP Design Guidance Manual*.

F. Storage facilities shall be at least 3 feet above the seasonally high groundwater table.

G. Embankments more than four feet in height shall be constructed as recommended by a geotechnical engineer. Depending upon the site, geotechnical recommendations may be necessary for lesser embankment heights. The height of an embankment is measured from the top of the berm to the catch point of the native soil at the lowest upstream or downstream elevation.

H. Maximum water depth shall not exceed 6 feet during the 100-year event.

I. Designers are encouraged to design detention facilities with irregular and curved shape to look natural. Avoid straight lines and regular shapes where possible.

J. Side slopes shall be no steeper than 4H:1V, preferably flatter, for vegetated basins requiring maintenance by mowing, and 3H:1V, preferably flatter, for unmaintained native grass-lined basins. Safety benches should be installed for large facilities to provide a method for people and animals that inadvertently enter, to exit the basin.

K. Bottom slopes shall be no less than 1% to promote drainage across vegetated surfaces and shall include the design of a low-flow channel where runoff enters in a concentrated manner.

L. The maximum water surface elevation during the 100-year storm event shall be at least 1-foot below adjacent ground, finished floors, top of foundation or any other entry point vulnerable to flooding.

M. Detention facilities shall be located such that adequate access, maintenance, and operation needs are met. Maintenance access easements shall be provided where appropriate for full access.

N. Fencing is generally required on drainage facilities with the first overflow at two or more feet above the pond bottom, drainage facilities with retaining walls 2.5 feet high or taller, or drainage facilities located adjacent to schools, daycares, or similar facilities. Fencing shall be a minimum of four feet tall and provide visual access to the facility.

O. Detention facilities shall be landscaped to provide for slope stability, erosion control and low maintenance. Landscape materials shall be compatible with storm water quality treatment and the function of the drainage facility. Utilized plant species native to the Missoula area to the maximum extent possible. Vegetation on embankments shall be limited to shallow rooted varieties. Points of inflow to the facility shall be armored to prevent erosion.

P. Maintenance shall be performed by the HOA or commercial site owner, unless this responsibility is accepted by the City. Maintenance will be required to remove invasive plants and debris.

Q. Storage facilities may be designed with multi-purpose use, such as athletic fields, parks, play areas, and picnic areas with written approval of the Parks and Trails Design/Development Manager from Missoula Parks and Recreation. Measures must be taken to ensure amenities are anchored and maintained and access to the site must comply with Americans with Disabilities Act (ADA) requirements. Runoff from the 2-year event shall be stored away from multiple use areas.

R. Setback and clearance requirements to surrounding existing conditions contained in Table 6-4 shall be maintained.

Table 6-4 – Minimum Clearance Requirements for Placement of Detention Facilities

Element	**Minimum Distance Required**
Floodplains	Outside 10-year High Water Level (HWL) Work inside floodplain may require floodplain development permit
Buildings	50 feet horizontal up-gradient, 10 feet from outfalls
Top of 15% Slopes	50 feet horizontal
Septic Tanks/Drain Fields	30 feet horizontal up-gradient, 10 feet down-gradient
Shallow Water Wells	100 feet horizontal
Easements, Property Lines	20 feet horizontal
Schools, Nursing Home, Day Care	200 feet horizontal

6.3.10 Infiltration Facilities

A. Infiltration facilities include any features that use soil infiltration as the primary storm water management method, such as dry wells, French drains, boulder pits, retention basins, bioretention/bioinfiltration basins (without underdrains), and infiltration trenches.

B. If storage facilities are used in conjunction with water quality facilities, designs must follow recommendations in the *Montana Post-Construction Storm Water BMP Design Guidance Manual*.

C. These facilities are not appropriate for use with tight clays or other soils with low infiltration rates or in areas with a shallow water table.

D. There shall be a minimum 4-foot separation between the bottom of the infiltration facility or dry well and the seasonally high groundwater table. See Section 6.2.3.B for requirements.

E. Storm water shall not be held in an infiltration facility for more than 72 hours, unless pre-approved by the City Utility Engineer.

F. Infiltration facilities shall be designed according to the expected infiltration rate of the surrounding soils. Soil profiles and infiltration testing shall be performed per Section 6.2.4.

G. Dry Wells

1. Dry wells shall be designed using a minimum 8-foot depth as shown on City of Missoula Standard Drawings 616.
2. Dry well storage capacity shall be based on the structure size and the void space of the specified fill material surrounding the structure.

3. Dry wells shall be designed, at a minimum, to infiltrate the anticipated peak flow and volume from the 10-year storm event and drain within 72 hours.
4. The bottom of the sump rock of a dry well shall be installed at the depth that infiltration rate was tested. This depth is generally 10 feet and shall always be in a highly infiltrative gravel layer. Deeper dry wells can be utilized with prior permission from the Utility Engineer.
5. Dry wells are classified as Class V underground injection wells. An inventory form for each well must be submitted to the EPA. This form must be included with the design report.
6. A dry well approval is required under a City of Missoula excavation permit.

H. Setback and clearance requirements to surrounding existing conditions contained in Table 6-5 shall be maintained.

Table 6-5 – Minimum Clearance Requirements for Placement of Infiltration Facilities

Element	Minimum Distance Required
Floodplains	Outside 10-year High Water Level (HWL) Work inside floodplain may require floodplain development permit
Seasonal High Water Table	4 feet vertical
First Limiting Layer (bedrock, clay lens)	5 feet vertical
Buildings	50 feet up-gradient, 20 feet down-gradient
Top of 15% Slopes	50 feet horizontal
Springs	200 feet horizontal
Septic Tanks/Drain Fields	100 feet horizontal
Domestic Wells	100 feet horizontal
Easements, property lines	20 feet horizontal

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Dec. 1, 2020

____
DATE RECEIVED

POST-CONSTRUCTION STORM WATER MANAGEMENT SITE 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	☐	☐	☐

rev. Jan. 28, 2021

Storm Water Site Evaluation Form

This form is used for the Construction Site Inspection Frequency Determination and is completed by the applicant/owner.

Date:___________________

Project Name:____**Permit No.:**__________________

Address:____**Zip Code:**___________________

Project Area (acres):_________________________**Disturbance Area (acres):**_________________________

Applicant/Owner Representative:_________________________**Phone number:**_____________________

Owner Name:____**Phone Number:** 406 552-6364

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—the City of Missoula must inspect construction sites based upon their priority ranking.

Site Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 2.

Score	Priority	Inspection Frequency	Project Priority
6 to 11	Low	1. Once at commencement of construction after BMPs have been implemented	
12 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 67	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	

MISSOULA
PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Jan. 28, 2021

Site Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Project type	Subdivision with 5 or more units	7	
	TED with 5 or more units	7	
	Commercial site ≥ 0.5 acres	7	
	None of the above	0	
Proximity to waterbody (surface or dry well/groundwater)	≥ 1,500 feet	1	
	200 to 1,499 feet	5	
	< 200 feet	7	
	Discharge to waterbody	10	
Depth to groundwater	> 15 feet	1	
	≤ 15 feet	10	
Discharge to an impaired waterbody	No (dry well/groundwater, 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 non-compliance (applicant and/or owner)	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 Score	
6 to 11 = Low	12 to 30 = Medium	31 to 67 = 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 stop work order; fine(s); and/or suspension/revocation of City Business License.

Storm Water Drainage Report Content

The following is the minimum Storm Water Drainage Report requirements.

Cover Page

1. Name of Project
2. Address
3. Owner/Developer
4. Design Engineer
5. Submittal date and revision dates (if applicable)
6. Stamp and signature of Design Engineer

Introduction

1. Location
    a. Existing and proposed streets, roadways, and highways within and adjacent to the site or the area to be served by the drainage improvements
    b. Names of surrounding developments or properties including land use or zoning information
2. Description of Property
    a. Area in acres
    b. Ground cover (type of ground cover, vegetation, and condition)
    c. Existing land uses and known foreseeable future land uses
    d. Topographic features, steepness of slopes
    e. Drainage ways and receiving channels
    f. Existing drainage facilities
    g. Flood Hazard Zones
    h. Existing irrigation ditches
    i. Geologic Features (if applicable)
3. Previous drainage studies for the property (if any)
4. General Project Description
5. State or Federal Regulations (if applicable)
6. Geotechnical Report (attach if required)

Existing Site Conditions

1. Major Basin Description
    a. Reference to major drainage way planning studies such as flood hazard delineation report, major drainage way planning reports, and FEMA flood areas and flood hazards
    b. Major basin drainage characteristics and structures, existing and planned land uses within the basin
    c. Summary of off-site and on-site basin characteristics and runoff rates.
2. Sub-Basin Description
    a. Discussions of historic drainage patterns of the property.
    b. Discussions of off-site drainage flows and flow patterns and impact on development under existing and fully developed basin conditions.
    c. Summary of off-site and on-site basin characteristics and runoff rates.
3. Groundwater
    a. Identify potential groundwater issues

   b. Discuss groundwater investigations and results
   c. Discuss methods to manage groundwater impacts
4. Waterways and Wetlands
   a. Discuss any waterway and wetlands adjacent to or on the site
   b. Discuss methods to protect, preserve, and mitigate impacts to waterways and wetlands

Storm Water Design Criteria

1. Design Concepts
2. Drainage Criteria
   a. Application standards or exceptions
   b. Minor and Major Storm Frequencies
   c. Hydrologic Methods
      i. Rainfall
      ii. Design Storms
      iii. Storm Water Quality storm and treatment methods
      iv. Runoff methods and computer models
      v. Detention/infiltration calculation methods
      vi. Detention storage release rate calculation method
   d. Hydraulic Methods
      i. Design standards
      ii. Hydraulic models
      iii. Methods used to determine channel and storm sewer capacities
      iv. Methods used for design of hydraulic structures, outlet protection and erosion control
      v. Methods used for designing storm water pond outlet structures
3. Down-Gradient Analysis
   a. A down-gradient analysis shall be conducted to identify and evaluate potential adverse impacts to downstream properties due to increased runoff from the proposed development.
   b. This analysis shall continue through down-gradient areas to the point where the adverse impacts are deemed negligible, or to a point where the contributing drainage area is 1% (or less) of the total drainage area. The analysis shall include at a minimum:
      i. Visual inspection of the site and down-gradient areas.
      ii. A site map that clearly identifies the project boundaries, study area boundaries, down-gradient flow path, and any existing or potential areas identified as problematic.
      iii. Existing or potential off-site drainage problems that may be aggravated by the project.
      iv. The condition and capacity of the conveyance route, including existing and proposed elements, potential backwater conditions on open channels, constrictions or low capacity zones, surcharging of enclosed systems, and localized flooding.
      v. The presence of existing natural or constructed land features dependent upon pre-developed surface or subsurface drainage

patterns.

vi. Existing or potential erosive conditions such as scour or unstable slopes onsite or downgradient of the project.

vii. Flood areas identified on FEMA maps.

viii. If there are existing or potential off-site drainage problems down gradient of the project, the project must demonstrate that the proposed storm water system has been designed to meet the following conditions:
1. The storm water runoff (volume and flow rate) leaves the site in the same manner as that of the pre-developed condition.
2. The proposed design does not influence existing drainage problems or create a new drainage problem.

ix. If down-gradient release of runoff is at a rate or volume greater than the pre-developed condition, then potential adverse impacts on down-gradient property and drainage infrastructure (due to an increase in storm water rate, volume, velocity, and flow duration) shall be addressed and mitigated.

4. Analysis Point(s) where pre- and post-development flows are calculated

<u>Proposed Design</u>

1. Discussion of general conveyance concepts
2. Discussion of proposed drainage paths and patterns
3. Discussion of storm sewer design, including inlet and pipe locations and sizes, peak flow rates at analysis points, hydraulic grade lines, groundwater impacts, etc.
4. Discussion of street capacities, spread widths, and inlet bypass flow
5. Discussion of storm sewer outfall locations and design, including method of energy dissipation
6. Discussion of how the Storm Water Quality Control storm is addressed
7. Discussion of how runoff is conveyed from all outfall to the nearest public storm water system
8. Discussion of open channel and swale designs, including dimensions, alignments, tributary basins, peak flow rates, stabilization, water surface elevations, groundwater impacts, etc.
9. Discussion of easements, maintenance, and access aspects of the design
10. Discussion of facilities proposed offsite for the conveyance to a public storm drainage system.
11. Discussion of flooding hazards and describe minimum building elevations
12. Detention Ponds
    a. Discussion of detention pond designs, including tributary area, release rates, storage volumes, and water surface elevations, emergency overflow conditions, outlet structure design, etc.
    b. Discussion of the design of all water quality treatment BMPs
    c. Discussion of pond outfall locations and designs, including method of energy dissipation
    d. Discussion of easements, maintenance, and access aspects of the design
13. Infiltration Facilities
    a. Discussion of infiltration facility designs, including tributary area, infiltration rates, storage volumes, water surface elevations, emergency overflow conditions, groundwater impacts, etc.
    b. Discussion of the design of all water quality treatment BMPs
    c. Discussion of easements, maintenance, and access aspects of the design

Summary

1. Summary of proposed improvements
    a. Pre- and post-development flow rates
    b. Storm Sewer
    c. Culverts
    d. Open channels
    e. Detention storage
    f. Infiltration facilities
    g. Geotechnical/groundwater impacts
    h. On and off-site impacts and mitigation measures
2. Floodplain impacts
3. Compliance with applicable regulations and standards

References

1. Reference all criteria, reports, or other technical information used in development of the drainage report, calculations, and plan

Appendices

1. Background Data
    a. Applicable reports or report excerpts
    b. Floodplain maps
2. Hydrologic Computations
    a. Land uses, soil types, coverages
    b. Proposed land uses for project by basin
    c. Time of concentration and runoff coefficients for each basin
    d. Basin parameters used for modeling including basin area, length, slope, distance, and routing elements
    e. Minor and Major storm event peak runoff at analysis points for off-site and on-site flows
    f. Off-site historic and fully developed runoff computations at specific analysis points
    g. Hydrographs at critical analysis points
    h. Schematic diagram of hydrology model showing basins and routing elements and combinations of elements.
3. Hydraulic Computations
    a. Culvert capacities and inlet/outlet protection
    b. Storm sewer capacity, including energy grade line (EGL) and hydraulic grade line (HGL) elevations
    c. Gutter capacity as compared to allowable spread width
    d. Storm inlet capacity
    e. Open channel or swale capacities
    f. Detention area volume capacity and outlet capacity calculations, depths of detention basins, outlet configuration, emergency spillway sizing calculations
    g. Downstream capacity for the Major Storm.
4. Detention/Infiltration Facility Computations
    a. Facility sizing calculations including discussion of infiltration capacity
    b. Stage-storage calculations
    c. Storm Water Quality Control calculations

After recording, return to:
City Clerk, City of Missoula
435 Ryman
Missoula, MT 59802

Private Storm Water Facility Maintenance Covenant and Access Easement

This Maintenance Covenant and Access Easement (“Agreement”) is made this [INSERT DAY] day of [INSERT MONTH], [INSERT YEAR], between [INSERT OWNER NAME HER] (“Owner”) whose address is [INSERT OWNER ADDRESS HERE] and the City of Missoula, 435 Ryman, Missoula, Montana 59802, a municipal corporation under the laws of the state of Montana (the “City”).

RECITALS

A. Owner is the owner and developer of certain real property located in the City of Missoula, Missoula County, Montana, legally described as follows, and commonly known as (the “Development”):

B. Owner has developed or will develop at the Development, private storm water management facilities as further described below:

   List the type, quantity, and location of all private storm water facilities proposed and constructed within the development.

   ____
   ____
   ____
   ____
   ____
   ____

C. The City has approved construction plans submitted by Owner for the Development, including the on-site storm water facilities as described above (together with any other storm water facilities that may hereafter be constructed on the Development, the “Storm Water Facilities”).

D. To protect future lot owners in the Development, as well as owners of neighboring property, the City requires Owner to enter into this Agreement as a condition to the City’s approval of construction plans, building permit(s), if applicable, and the final plat, if applicable, for the Development.

E. The Storm Water Facilities enable development of property while mitigating the adverse impacts of additional surface water and pollutants associated with storm water runoff prior to discharge from the property to the public storm water system. The consideration for this Agreement is connection to the City's storm water system.

F. The Storm Water Facilities are designed by a registered professional engineer to accommodate the anticipated volume of runoff and to detain and treat runoff in accordance with the City's regulations, engineering standards, administrative rules, and amendments.

G. Failure to inspect and maintain the Storm Water Facilities can result in an unacceptable impact to the public storm water system.

AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the City and Owner agree as follows:

1. Covenant to Maintain and Repair

Owner shall, at its sole expense, itself or through qualified independent contractors, at all times maintain the Storm Water Facilities in good working order, condition and repair, clear of all debris, and in compliance with all applicable state and local rules, regulations, and guidelines (including those adopted from time to time by the City and including the City's engineering standards).

2. Covenant to Inspect

The Owner shall perform annual inspections of all Storm Water Facilities covered by this agreement annually. Any work necessary to repair or maintain the facilities in good working order that is discovered during the annual inspection shall be completed by the Owner within a reasonable period of time after the annual inspection. Owner shall apply for renewed coverage under the City storm water permit as required by City Code.

3. Easement

Owner hereby grants the City, its employees, independent contractors, and designees, a nonexclusive easement for ingress and egress over, across, and under the Development from time to time at the City's sole discretion to inspect, sample, and monitor components of the Storm Water Facilities and discharges therefrom, as well as allow the City to take the actions described in Sections 4 and 5 of the Agreement. Owner understands and agrees that this easement limits the ability of Owner, its successors, and assigns from constructing any permanent buildings, structures, landscaping, or other improvements that would interfere with the functioning of the Storm Water Facilities or the City's access to perform the inspection and maintenance required under this Agreement.

4. Failure to Perform Covenant

If the City, in its sole discretion, determines that the Owner is not in compliance with the covenant described in Sections 1 and 2, except in the case of an emergency, the City or its designee shall give the Owner written notice to perform the maintenance and/or repair work specified in the notice. If such work is not performed to the City's satisfaction within twenty (20) days after the date of such notice, or such other time as the City may, in its sole discretion, determine, the City, its employees, independent contractors, and designees may exercise their right under the Easement described in Section 3 of this Agreement to enter the Development to perform any and all work required bringing the Storm Water Facilities into compliance with this Agreement.

5. Emergency

If the City, in its sole discretion, determines that there exists or will likely exist an emergency on or about the Development with respect to the Storm Water Facilities, the City, its employees, independent contractors, and designees may immediately exercise their rights under the Easement described in Section 3 of this Agreement to immediately enter the Development to perform any and all work required to bring the Storm Water Facilities into compliance with the Agreement, and in such case the City shall use reasonable efforts to notify the Owner prior to entering the Development. Notwithstanding the above, the work performed may consist only of avoiding or mitigating the emergency and/or cleaning and repairing the Storm Water Facilities to their original condition and standards.

6. City Under No Obligation

Owner, for itself or its successors and assigns (including all owners of lots in the Development), agrees that the City, as well as its department, employees, independent contractors, and/or designees shall have no obligation to exercise its rights under this Agreement, including the right under Sections 4 and 5 of this Agreement to perform the work required of the Owner, or to perform any other maintenance or repair of the Storm Water Facilities. Owner also agrees that none of the City, as well as its departments, employees, independent contractors, and/or designees shall have any liability to Owner or any of Owner's successors or assigns (including owners of lots in the Development) in connection with the exercise or non-exercise of such rights, the maintenance or repair of the Storm Water Facilities, or the failure to perform the same.

7. Owner Obligation

In addition to the covenants and easement described above, Owner agrees to the following additional obligation:

a. Owner shall construct the Storm Water Facilities as shown on City-approved construction plans.

b. Prior to the sale of any portion of the Development, Owner shall provide to the City's Development Services Department, a copy of the Operations and Maintenance Manual for the Storm Water Facilities, which shall include detailed diagrams and descriptions identifying the components and operations of the Storm Water Facilities.

c. Prior to final approval of the Development, Owner shall record this document in the deed records of Missoula County and provide a copy of the recorded documents to the City.

d. Owner shall notify the City's Public Works Director in writing of the person responsible for compliance with Owner's obligations under this covenant ("Owner Designee"), and of any change in the Owner Designee. Owner expressly agrees that the Owner Designee shall have the authority to bind Owner, its successors, and assigns with respect to the matters described in this Agreement.

e. Upon sale or transfer of the Development, or any portion thereof, including any lots in a subdivision, the Owner shall inform the purchaser of the obligations required under this Agreement.

8. Reimbursement

If the City exercises its right to enter the Development pursuant to the Easement described in Section 3 of this Agreement, Owner shall reimburse the City for all of its costs and expenses incurred in connection with any work performed pursuant to Section 4 or 5 of this Agreement within thirty (30) days after receipt of an invoice. If Owner fails to pay the invoiced amount within such period, such amount shall thereafter accrue interest at the statutory rate. The City may pursue any available means to collect such amount, together with interest, including placing a lien on the Development (and each of the lots contained therein). If the Development is owned by more than one person (i.e., multiple lot owners), each such owner shall be jointly and severally liable for payment of the amounts provided for in this Section.

9. Indemnification

Owner agrees to indemnify, defend (with legal counsel acceptable to the City), and hold harmless the City, its employees, independent contractors, and designees from and against any liability, losses, costs, expenses (including reasonable attorney fees), claims, or suits arising from: (1) Owner's failure to perform its obligations under this Agreement, including among other things its obligation to properly design, construct, operate, and maintain the Storm Water Facilities, and (2) the exercise of the City's rights under this Agreement.

10. Run with the Land

The parties' rights and obligations contained herein touch and concern the land, and shall run with the land and be binding upon Owner and its successors and assigns (including, without limitation, subsequent owners of lots in the Development and any homeowner's association owning common areas in the Development). Those rights and obligations shall inure to the benefit of the City, as well as its successors and assigns.

11. Assignment

The obligations of Owner (and subsequent owners of lots in the Development) under this Agreement may not be assigned except (a) in connection with the sale of the property owned by such person (in which case the transferee will be deemed to assume such obligations), or (b) with the prior written consent of the City, to a homeowner's association that owns and maintains the common areas of the Development.

12. Authority

If Owner is an entity, the individual executing this Agreement on behalf of Owner represents and warrants to the City that he or she has the full powers and authority to do so and that the Owner has full right and authority to enter into this Agreement and perform its obligations under this Agreement.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement as of the date below.

By: ___________________________________
Owner

____
Title

STATE OF MONTANA)
) ss.
County of ______________________)

This instrument was acknowledged before me on ______________________________, 20_____ ,
by ___________________________________, as ______________________________ of
______________________________________, an_______________________________.

____
Notary Public—State of Montana
My commission expires: _________________

APPROVED:

By:________________________________
Jeremy Keene, PE, Public Works Director

CITY OF MISSOULA, MONTANA:

By: _________________________________
John Engen, Mayor

ATTEST:

By: _________________________________
Marty Rehbein, City Clerk

Operation and Maintenance Requirements

The Operation and Maintenance (O&M) Manual summarizes the tasks required for perpetual maintenance to ensure the proper operation of storm water facilities. The following is the minimum requirements for an O&M Manual:

1. Contact Information for the party responsible for O&M
2. Description of the maintenance tasks to be performed and their frequency
3. Inspection checklist to be used for annual maintenance
4. List of the expected design life and replacement schedule of each component
5. Site plan showing the overall layout of the development
6. Copy of recorded HOA Agreement, if applicable
7. Other information as necessary

The O&M Manual shall first be submitted to the City Utility Engineering Department for review and comment. A final copy shall be submitted to the City for their records prior to final closeout.

Test Pit Infiltration Test Method

The following infiltration test method is modified version of the percolation test procedure in Appendix A of DEQ Circular-4 which better simulates the higher head seen in typical underground storm water infiltration facilities in Missoula.

1. Dig or bore holes a minimum of 6-inch in diameter with vertical sides. Abide by all OSHA regulations for open trenches. The depth of the test holes must coincide with the elevation of the infiltrative surface for the proposed infiltration facility (10 feet from finished grade to bottom of drain rock for a standard dry well). Place 4-inches of clean 3/4” gravel in the bottom of the hole for splash protection and install a 4 to 8-inch diameter pipe. If using an open pit without pipe, ensure bottom of pit is scarified and splash protection is provided. If pipe is perforated then backfill void space between the pipe and the walls with the clean gravel or drain rock.
2. Presoak the hole by maintaining at least 1-foot depth of water in the pipe for a minimum of 60 minutes. Alternatively, add the expected volume of water from the 2-year, 24-hour storm for the largest drainage area the test results will be used for. Provide the calculations used to determine this volume with the test results.
3. Immediately after presoaking begin the infiltration test by filling the pipe to the top of the operational height of the proposed infiltration facility. Water depth should not exceed the design head for the facility. For a standard 8-ft dry well, water should be kept between 5 to 7 feet from the bottom of the pipe, or as close to 6-feet as possible. A head depth of 6-feet coincides with the top of the slotted barrel. The water level shall be allowed to drop for one hour or until 2 feet of headloss occurs. Record the time required for the 2-foot headloss. Use of a water level meter tape is recommended.
    a. If it takes longer than one hour for the water level to drop 2 feet, the test shall be repeated until two consecutive readings do not vary by more than 10%. The final reading shall be used as the infiltration rate.
    b. If it takes less than one hour for the water level to drop 2 feet, the test shall be repeated until four consecutive readings do not vary by more than 10%. An average of the four readings will be used as the infiltration rate.
4. Variations in the test procedure may be allowed upon prior approval by the City of Missoula.

Missoula City Public Works
Standards and Specifications Manual

CHAPTER 8 – EROSION CONTROL

November 18, 2020

CHAPTER 8 – EROSION CONTROL

Table of Contents

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CHAPTER 8 - EROSION CONTROL

8.1 Introduction

8.1.1 References

A. *Montana Public Works Standard Specifications* (MPWSS), latest edition – by purchase only

B. Montana Department of Environmental Quality (DEQ) MS4 General Permit

C. DEQ General Permit for Construction Discharges

D. Montana DEQ *Storm Water Management During Construction Field Guide for Best Management Practices*

E. Montana Department of Transportation - *Erosion and Sediment Control Best Management Practices Manual*

F. *Missoula Parks and Recreation Design Manual* – Appendix E

G. Missoula County Noxious Weed Management Plan – Appendix B

8.1.2 Appendices

A. Appendix 8-A – City Storm Water Compliance Permits Flow Chart

B. Appendix 8-B – Storm Water Permit

C. Appendix 8-C – Erosion Control Site Plan Review Checklist

D. Appendix 8-D – Storm Water Site Evaluation Form

E. Appendix 8-E – Construction Site Inspection Form

8.1.3 Standard Modifications to MPWSS

Specifications not specifically contained herein related to transportation improvements shall be in conformance with the *Montana Public Works Standard Specifications* (MPWSS), latest edition, and the following City of Missoula Modifications to the MPWSS.

8.1.4 Standard Drawings

Standard drawings related to erosion control shall be in conformance with the MPWSS, 6th Edition, 2010 Standard Drawings; the Montana DEQ Storm Water Management, Construction Field Guide for Best Management Practices; the MDT Erosion and Sediment Control BMP Manual Standard Drawings; and the 800-series of the City of Missoula Standard Drawings on the *Missoula City Public Works Standards and Specifications Manual* web page.

8.2 General Requirements

8.2.1 Design Standards

A. The best management practices (BMPs) described in this chapter apply to the management of storm water, erosion, and sediment during construction. Post-construction storm water management controls are addressed in Chapter 6 of this Manual.

B. A disturbance area greater than or equal to 2,500 square feet requires a City Storm Water Permit (Appendix 8-A and Appendix 8-B) and includes the following:

1. Any ground disturbance by digging, excavating, grading, or any other work, operation or activity that moves or relocates earth (e.g., dirt, gravel, rock, and soil).
2. Utility installation and maintenance work activities, including boring operations.
3. Land disturbance activities related to agricultural practices or improvements are exempt from this requirement.
4. Emergency repairs by a public utility or any other governmental agency are exempt from this requirement.

C. A disturbance area greater than or equal to 1 acre requires a City Storm Water Permit. In addition, a Montana Pollutant Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Construction Activity shall be obtained per the eligibility requirements defined in the General Permit.

D. Storm Water Permit applicants 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 application.

1. The applicant shall use the Erosion Control Site Plan Review Checklist (Appendix 8-C) to ensure their plan meets City requirements.
2. The applicant shall complete the Storm Water Site Evaluation Form (Appendix 8-D) to identify the priority ranking of the project.
    a. The priority ranking determines the construction inspection frequency and whether a Storm Water Management Site Plan is required for post-construction storm water management controls.
3. For projects that are required to obtain coverage under an MPDES General Permit for Storm Water Discharges Associated with Construction Activity, the City requires the following be submitted to them before a City permit will be issued: Storm Water Pollution Prevention Plan, Notice of Intent, and DEQ confirmation letter.
    a. Specific requirements for this plan and MPDES General Permit can be found on the Montana DEQ website.
4. The City requires notification that permit coverage should be terminated.
    a. Once permanent erosion control has been established on 70% or greater of the remaining unimproved areas, the permittee shall complete a permit-specific Notice of Termination (NOT).

b. 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.
c. For post-construction storm water management (Chapter 6 of this Manual), the Storm Water NOT shall include a recorded covenant for maintenance, a utility easement, and an accurate post-construction (as-built) plan of the system, signed and sealed by a Montana-licensed professional engineer.
d. 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 for Stormwater Construction (NOT-SWC) is required by MDEQ for activities covered under the General Permit, and a copy shall be submitted to the City along with the Storm Water-NOT.

8.2.2 Plan Requirements

A. **Erosion Control Site Plan**. For any site disturbance greater than or equal to 2,500 square feet, an Erosion Control Site Plan shall be submitted with the Storm Water Permit application. The plan shall show which BMPs are proposed to be used—when and where, specific to the project scope—along with the total disturbance area and installation details and notes for the proposed BMPs. Measures include those necessary to delineate areas of work, prevent erosion of unstable or bare soil, plan for construction staging and storage logistics, construction of stabilized access points, and proper containment measures for construction materials and waste. An Erosion Control Site Plan Review Checklist is provided in Appendix 8-C.

B. The following minimum requirements apply to the Erosion Control Site Plan:
1. Include an anticipated construction schedule and construction duration (in weeks or months);
2. Point of contact. Include name and contact information for the person responsible for maintaining erosion prevention and sediment control measures;
3. Boundary lines of the site;
4. Vicinity map of the site, showing relation to the surrounding adjacent area;
5. North arrow and legend;
6. Sufficient scale and size to clearly display site conditions;
7. Outfall location(s);
8. Locations and details of all BMPs;
9. State waters and other water bodies;
    a. Width, direction of flow, and approximate location of top and toe of banks of water bodies, if applicable;
10. 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;
11. All existing buildings, structures, public easements, or underground utilities;

12. Existing vegetation, location and type. 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;
13. Revegetation plan;
14. Existing drainage patterns and direction of flow;
15. Limits of disturbed areas;
16. Areas not to be disturbed and off-limits to construction activity;
17. Location of proposed vegetative erosion control measures (e.g., seeding and landscaping), including type, quantity, planting schedule, and irrigation;
18. 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.

8.3 Design Requirements

8.3.1 Best Management Practices

A. BMPs are used to minimize or eliminate the potential for pollutants to reach state waters in storm water runoff. Construction-related pollutants include, but are not limited to, trash, paint, masonry, drywall, and dust. Emphasis is placed on managing erosion through preventative practices and control measures, including planning, project phasing, minimizing disturbance, vegetative cover, and grading controls. Sediment control BMPs are designed to prevent soil particles already being carried in storm water and discharging from the construction site. Sediment control BMPs are not as effective as erosion prevention BMPs and are typically considered secondary practices, installed after all opportunities for erosion prevention have been implemented. Examples of sediment control BMPs include inlet protection, silt fence, rock wattles, sediment traps, and other perimeter control devices.

B. The BMPs described in *Storm Water Management During Construction, Field Guide for Best Management Practices* published by MDEQ, *Erosion and Sediment Control Best Management Practices Manual* published by the Montana Department of Transportation, City standard drawings (Appendix 2-B) shall be used for compliance with the City Storm Water Permit.

C. All BMPs require regular maintenance to function properly. The construction inspection frequency is determined per the Storm Water Site Evaluation Form that is filled out by the applicant for City approval with the Storm Water Permit application. The City will inspect the site per the site priority. Project erosion and sediment control measures shall be maintained as necessary—throughout the duration of the permit—to be effective.

8.3.2 Erosion Prevention BMPs

A. Conserving the existing natural vegetation is the most important erosion prevention BMP, thus it is a critical consideration in project planning and phasing. Once these conservation areas have been identified, geotextile mats, surface roughening, drainage structures, check dams, and temporary slope drains are some examples of BMPs that can be implemented to prevent erosion. It is not practicable to provide an exhaustive list in this chapter, so the City suggests also consulting the BMP information found in the References section of this chapter.

Temporary construction BMPs shall be properly installed, regularly maintained, and removed after construction is complete.

1. **Natural Vegetation**. The identification and planned protection of existing natural vegetation (e.g., trees, shrubs, grasses, and forbs) within the construction area is the most effective and least expensive BMP for soil stabilization. Its purpose is to minimize the amount of bare soil exposed to erosive factors; reduce the velocity of storm water runoff; reduce erosion, sediment transport, and tracking; provide an area for runoff to permeate the soil; provide buffers, screens, and aesthetic value; provide bio filtration (capture/process of pollutants); and provide habitat for wildlife. Thus, natural vegetation and vegetated buffers should be conserved to the maximum extent practicable.
2. **Geotextile Mats**. Geotextile mats, or other rolled erosion prevention materials, are used when disturbed soils are difficult to stabilize. They reduce rainfall impact and improve infiltration; provide a microclimate to promote seed establishment; reduce erosion caused by concentrated flows; and hold mulch, seed, fertilizer, and topsoil in place. A wide range of materials and combination of materials are used to produce geotextile mats, including straw, jute, wood fiber, and coir (coconut fiber). Correct installation is critical, as good ground contact prevents runoff concentrating under the mat, causing significant unplanned erosion.
3. **Surface Roughening**. Surface roughening creates a series of ridges and depressions that run horizontal across the slope and parallel to the contour. Notably, it is important not to create vertical ridges down the slope, as this facilitates channeling and erosion. Surface roughening increases infiltration, reduces erosion, and traps sediment.
4. **Drainage Structures**. A drainage structure is a ridge of compacted soil or a lined swale with vegetative lining located at the top, base, or somewhere along a sloping disturbed area. The dike or swale intercepts and conveys smaller flows along low-gradient drainage ways to larger conveyances, such as piped slope drains, or to a stabilized outlet. Dikes and swales may be used singly or in combination with each other.
5. **Check Dams**. Check dams are small dams (6 to 12 inches high) constructed across a swale or ditch to reduce velocities of concentrated flows, thereby reducing erosion in the swale or ditch. Check dams not only prevent gully erosion from occurring before vegetation is established, but also allow a significant amount of suspended sediment to settle out. Steep slopes may also be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.
6. **Temporary Slope Drains.** A temporary pipe or lined chute may be used to intercept run-on/runoff and carry concentrated flows from the top of a slope into a stabilized swale, sediment trapping device, or large stabilized area at the toe of the slope. Slope drains are often used with dikes and lined ditches to intercept and direct surface flow. Their primary purpose is to prevent run-on/runoff from flowing over slopes that are at high risk of erosion or slope failure. Velocity dissipation is an important component of temporary slope drains. These temporary devices are placed at conveyance outlets to

prevent scour and reduce the velocity and/or energy of storm water flows and discharges. This BMP is temporary and shall not be confused with permanent outlet protection and velocity dissipation devices.

8.3.3 Sediment Control BMPs

A. The purpose of sediment control BMPs is to ensure that sediments or other contaminants do not leave the construction site. Some common sediment control measures include BMPs related to the construction entrance, inlet protection, sediment fencing, concrete washout, and portable toilets. Like the erosion prevention BMPs, it is not practicable to provide an exhaustive list in this chapter. The City suggests consulting the additional information provided in the References section of this chapter during the site planning and design phase of a project. Temporary construction BMPs shall be properly installed, regularly maintained, and removed after construction is complete.

1. **Construction Entrance/Exit**. Sediment tracking from vehicular traffic on construction sites can be a major challenge, as well as an early BMP failure and violation, for contractors. A defined point of entrance/exit to a construction site should be stabilized to reduce the tracking of mud and dirt onto public streets by construction vehicles. Once sediment is tracked onto impervious surfaces, it is extremely difficult to manage and is readily transported with runoff. Evaluating soil conditions, site access, traffic patterns, seasonal weather, and appropriate BMP alternatives will all factor into implementing an environmentally responsible construction entrance. An effective construction entrance/exit will include numerous administrative and structural BMPs to minimize and control sediment tracking. These other BMPs may include limiting site access, stabilized parking areas, project scheduling changes, halting work, wheel wash stations, subcontractor training, and vehicle track pads.
2. **Inlet Protection**. Inlet protection is installed to prevent sediment-laden runoff from entering a storm drain inlet; this is the last line of defense and the final opportunity to prevent illicit discharge. It is used at storm drain dry wells and inlets that are subject to runoff from construction activities. The purpose is to detain runoff and allow sediment to settle/filter out prior to discharging into the storm drain system or waterbodies. These are most effective when the appropriate material and method are chosen for the location based on the anticipated flow velocity. These BMPs are least effective when they are not regularly maintained. Thus, regular maintenance is critical to their success. Landscape fabric shall not be used for inlet protection.
3. **Sediment Fencing**. A sediment fence is a temporary linear sediment barrier of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow runoff. Silt fences allow sediment to settle from runoff before water leaves the construction site. Silt fences should be used between the edge of construction disturbance and a critical resource or right of way line that is adjacent to the construction activity. These BMPs are not effective unless they are trenched and keyed in, and they must be regularly maintained.
4. **Compacted Earthen Berms**. Temporary earthen berms can be implemented in coordination with grading. Compaction is important for these BMPs to function as

designed, to prevent seepage and by-pass. Berms are usually located along a contour with a relatively gentle slope. They may serve various functions, such as creating a barrier, retaining flow, infiltration, or directing flow. Compacted earthen berms must be vegetated with an approved seed mix, if in place for more than 14 calendar days.

5. **Concrete Washout**. Liquid and solid waste from concrete operations is a significant pollutant source due to its high pH and chemical constituents. Thus, concrete washout and slurry must be properly contained. A designated concrete washout area needs to be large enough to completely contain all liquid wastes generated from concrete operations. Procedures and practices shall be implemented to prevent pollutants from concrete waste materials from entering the storm drain system.
    a. Secondary containment is required for certain quantities of regulated substances and must comply with the Missoula Valley Water Quality Ordinance. Please contact the Missoula Valley Water Quality District for more information.

8.3.4 Vegetation Management BMPs

A. To the maximum extent practicable, existing native vegetation should be conserved and protected from disturbance. This has been shown to be the most effective and least expensive BMP. Disturbed areas are especially susceptible to invasion by noxious weeds, which are a major threat to Montana's economy and environment. During the past century, weeds have expanded to infest over 8.2 million acres, degrading ecosystem productivity and diversity. Further, the County Weed Management Act (MCA §7-22-2102 to 2104) states that it is unlawful to permit noxious weeds to propagate. When a property is offered for sale, the person who owns the property shall notify the owner's agent and the purchaser of: (a) the existence of noxious weed infestations on the property offered for sale; and (b) the existence of a noxious weed management program or a noxious weed management agreement. Please refer to current Montana Noxious Weed List to prioritize management.

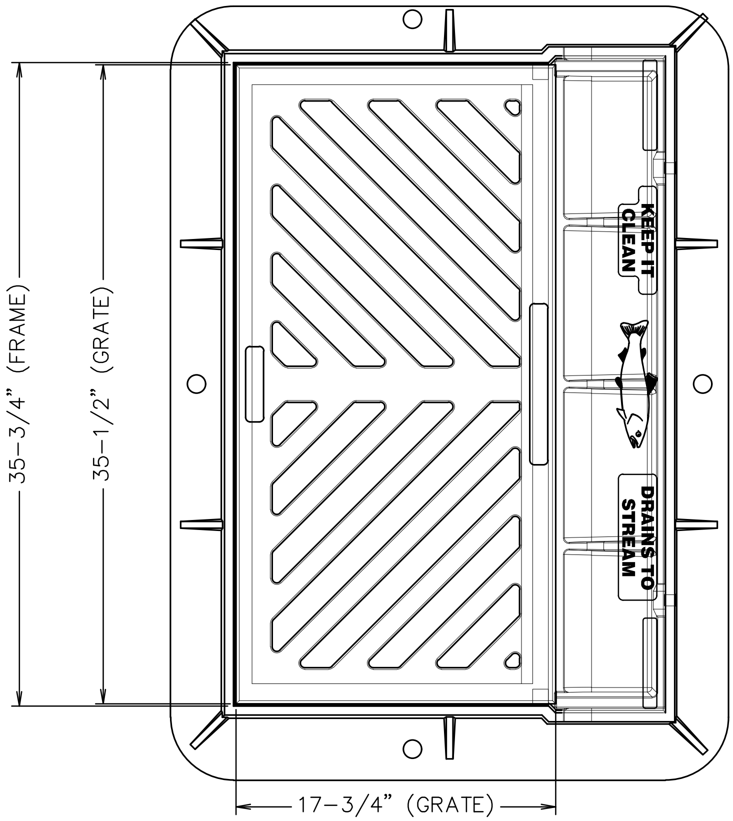
1. **Revegetation Plan.** Appendix E of the *Missoula Parks and Recreation Design Manual* provides revegetation guidelines that should be followed in the Erosion Control Site Plan. Further, Appendix B of the Missoula County Noxious Weed Management Plan provides methods to control weeds and revegetate disturbed areas. The City encourages owners or operators to consult with the Missoula County Weed District at any point, from initial planning to monitoring and evaluation. To prevent noxious weed establishment, the City requires the submittal of a revegetation plan with the Storm Water Permit application (Appendix 8-B). A revegetation plan shall describe the time and method of seeding/planting, fertilization, and watering practices; recommended native plant species; use of weed-free seed; weed management procedures; monitoring and evaluation guidelines; and the final objective. It should also note the size of the overall disturbed area, size of common areas and parks, who will be responsible for management, and the responsibilities of the owner/developer in managing non-native species.
2. **Long-term Success.** Revegetation is a long-term process. Maintaining stable, native plant communities on adjacent lands will help support revegetation efforts on disturbed areas

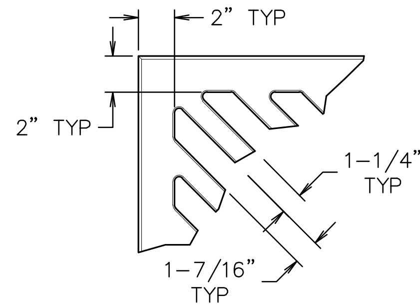
by providing a seed bank and supporting the appropriate pollinators. To ensure successful revegetation, an environmental scientist should perform long-term monitoring and evaluation. Some sites may take several years to become established enough to outcompete noxious weeds. Monitoring may cease once the final objective, per the revegetation plan, has been met.

Appendix F

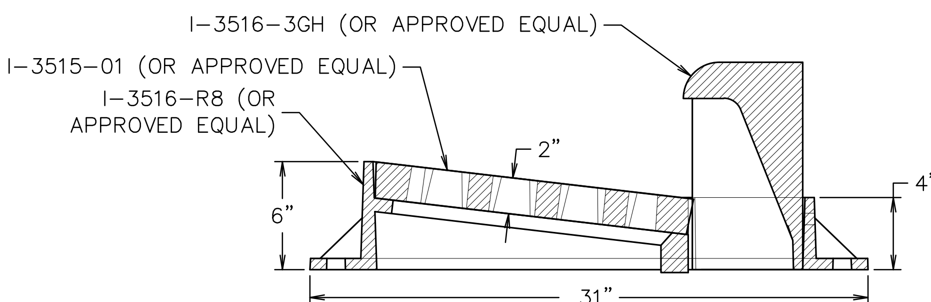
City of Missoula Standard Drawings

D&L 3516/EJIW 7030
OR APPROVED EQUIVALENT

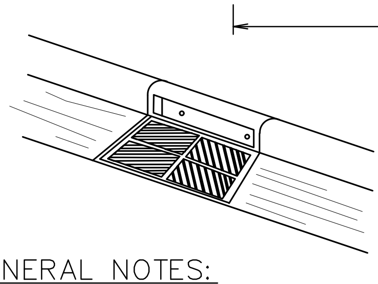




GRATE OPENING DETAIL



SECTION

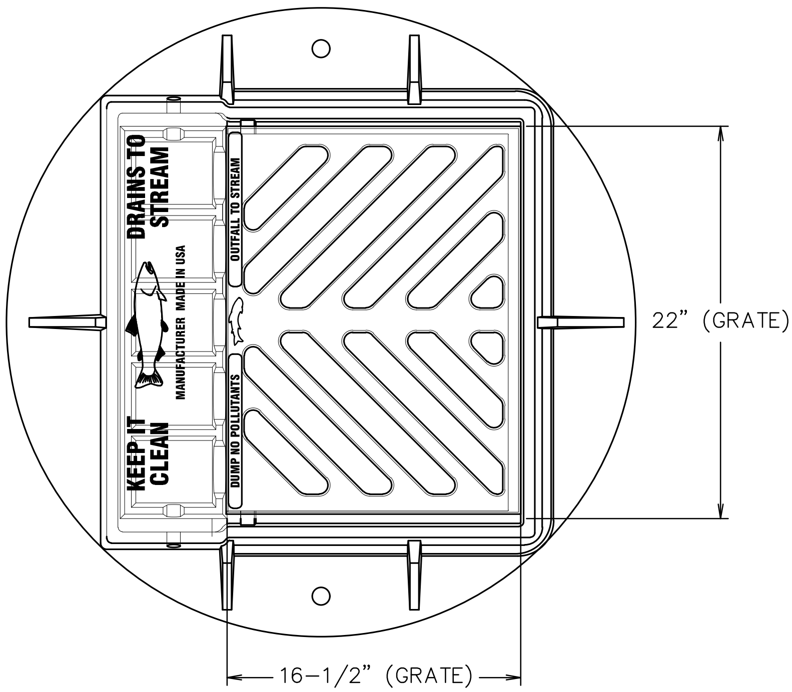


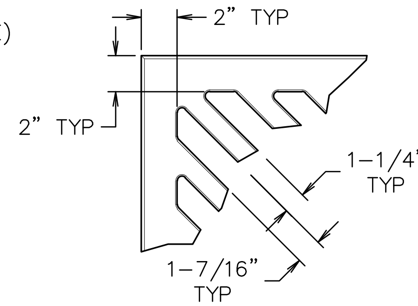
GENERAL NOTES:

1. COMBINATION CURB INLET FRAME AND GRATE SHALL BE USED WHERE INLET OR DRY WELL IS LOCATED IN TYPICAL "L" TYPE CURB & GUTTER (STD-740).
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. VANED GRATE (D&L I-3517-02 OR APPROVED EQUAL) SHALL BE USED WHEN SLOPE EXCEEDS 5%.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD.
5. GRATE SHALL MATCH RUNNING SLOPE OF STREET.
6. GROUT BOLT SLOTS LOCATED IN THE CURB LINE.

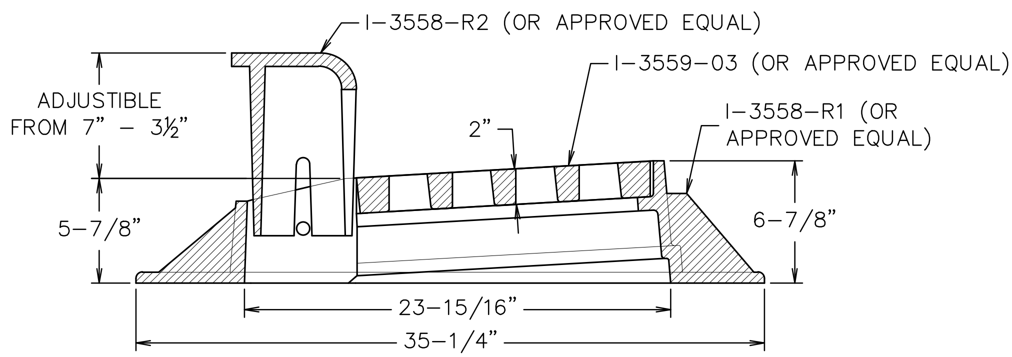
MISSOULA – THE GARDEN CITY – HUB OF FIVE VALLEYS Engineering Division	36" COMBINATION CURB INLET FRAME & GRATE		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 600

D&L 3558/EJIW 7222
OR APPROVED EQUIVALENT

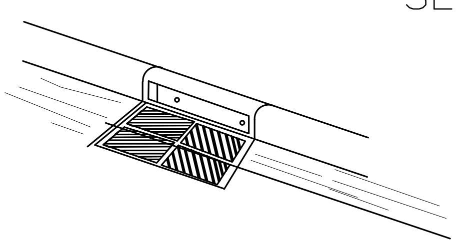




GRATE OPENING DETAIL



SECTION



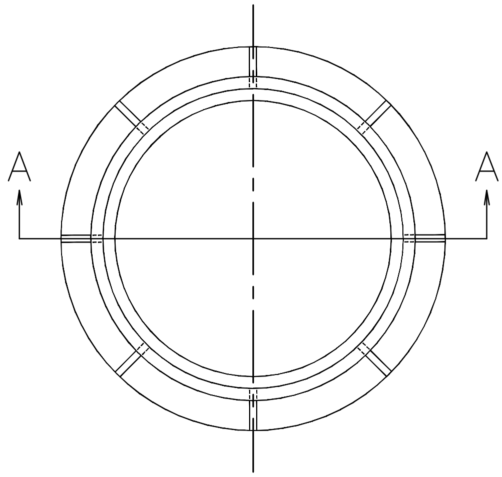
GENERAL NOTES:

1. COMBINATION CURB INLET FRAME AND GRATE SHALL BE USED WHERE INLET OR DRY WELL IS LOCATED IN TYPICAL "L" TYPE CURB & GUTTER (STD-740).
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. VANED GRATE (D&L I-3559-04 OR APPROVED EQUAL) SHALL BE USED WHEN SLOPE EXCEEDS 5%.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD.
5. GRATE SHALL MATCH RUNNING SLOPE OF STREET.
6. GROUT BOLT SLOTS LOCATED IN THE CURB LINE.

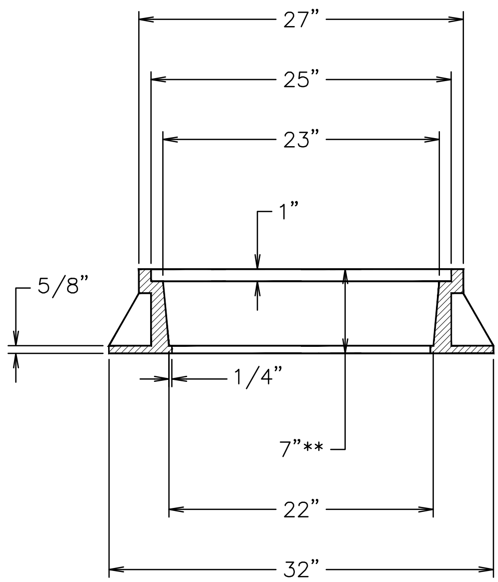
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	24" COMBINATION CURB INLET FRAME & GRATE		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 601

EJIW / 3777
OR APPROVED EQUIVALENT

MANHOLE RING



TOP VIEW



SECTION A–A

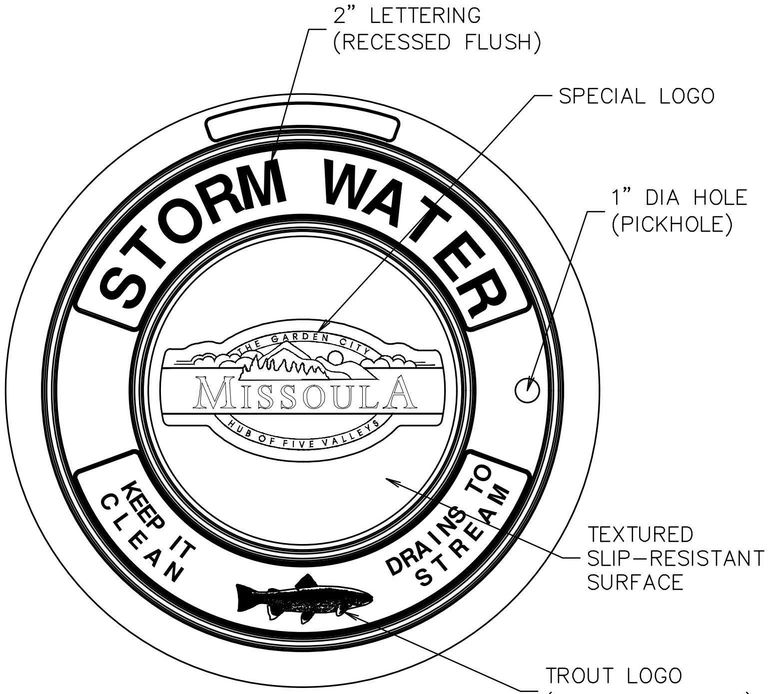
GENERAL NOTES:

1. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
2. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
5. 4–INCH MANHOLE RING MAY BE USED IN LIEU OF A 7" RING ONLY WITH PRIOR APPROVAL FROM CITY ENGINEERING.

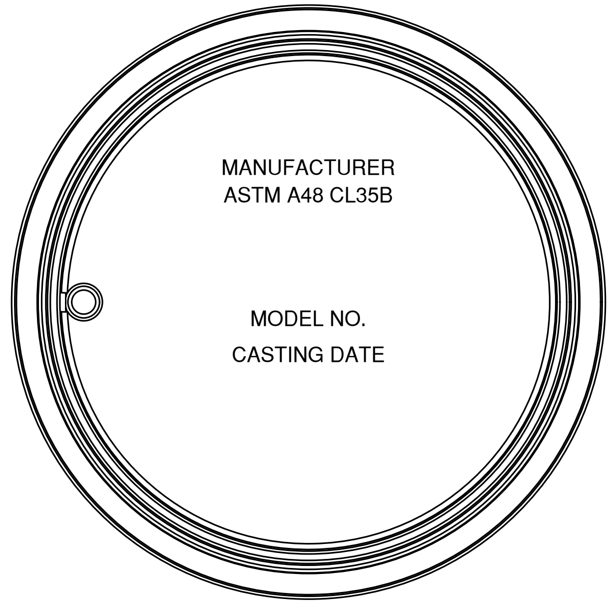
USE ONLY APPROVED COVERS:
STD–604B STORM WATER SOLID LID MANHOLE COVER
STD–604C AREA DRAIN GRATE
STD–604D ADA AREA DRAIN GRATE

MISSOULA Engineering Division	Storm Water Ring		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 604A

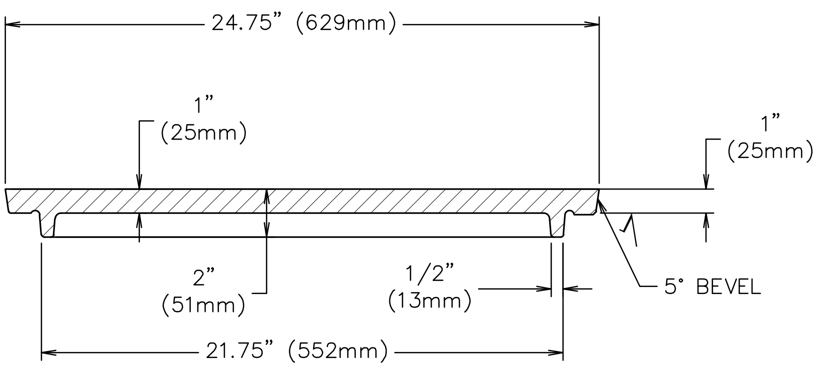
EJIW 3777-M / D&L A-1171
OR APPROVED EQUIVALENT



TOP VIEW



BOTTOM VIEW



√ MACHINED SURFACE

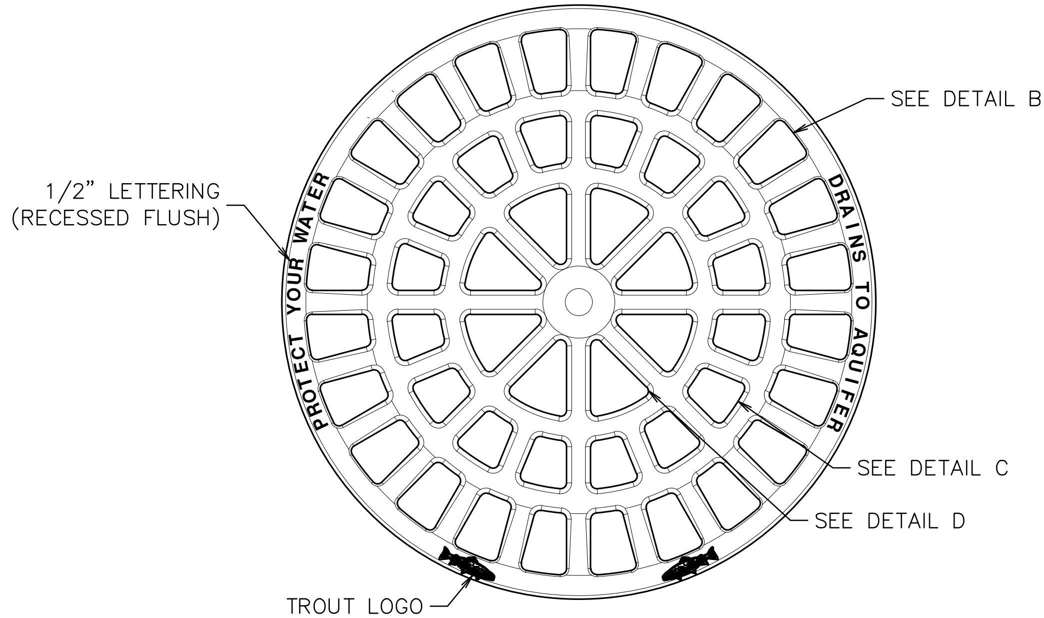
SECTION

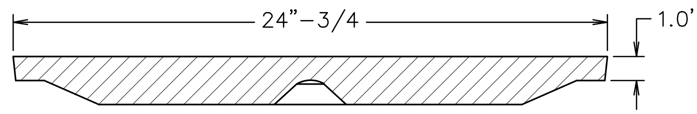
GENERAL NOTES:

1. FOR CITY-OWNED INFRASTRUCTURE ONLY. FOR PRIVATE STRUCTURES WITHIN THE RIGHT-OF-WAY PROVIDE A TEXTURED SLIP RESISTANT LID WITHOUT CITY LOGO - MUST HAVE "STORM WATER" ON LID.
2. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD
5. SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.
6. WHEN LOCATED WHERE MANHOLE MAY BECOME PRESSURIZED USE STD-605, "STORM WATER LOCKABLE LID AND FRAME".

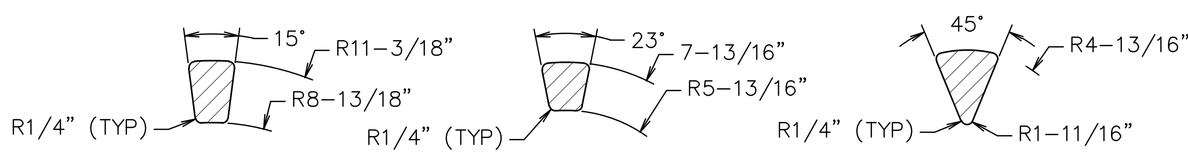
THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Storm Water Solid Lid		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 604B

D&L C-1171-03
OR APPROVED EQUIVALENT





SECTION



DETAIL B
x24

DETAIL C
x16

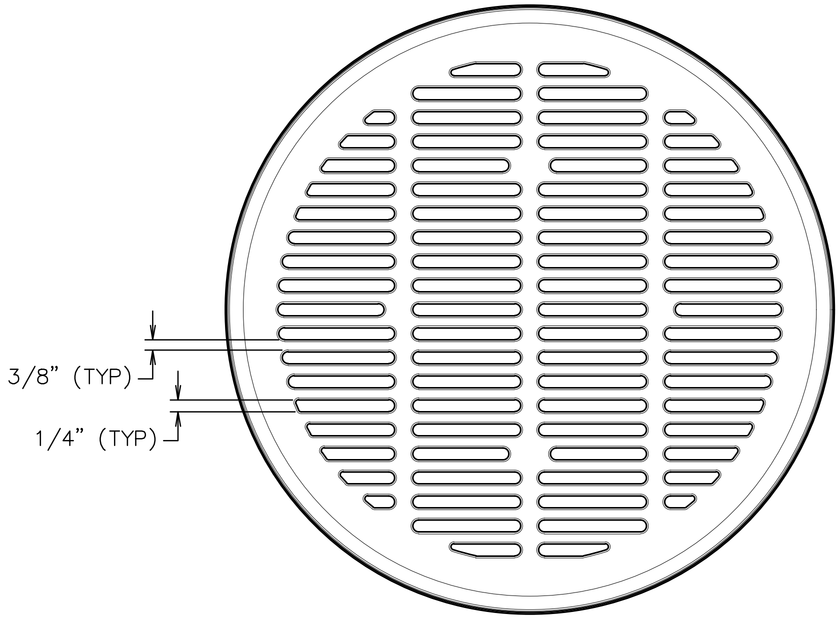
DETAIL D
x8

GENERAL NOTES:

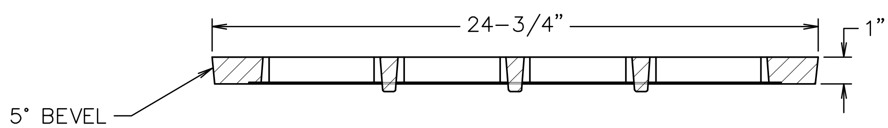
1. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD
5. SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Area Drain Grate		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 604C

D&L C-2670
OR APPROVED EQUIVALENT



TOP VIEW



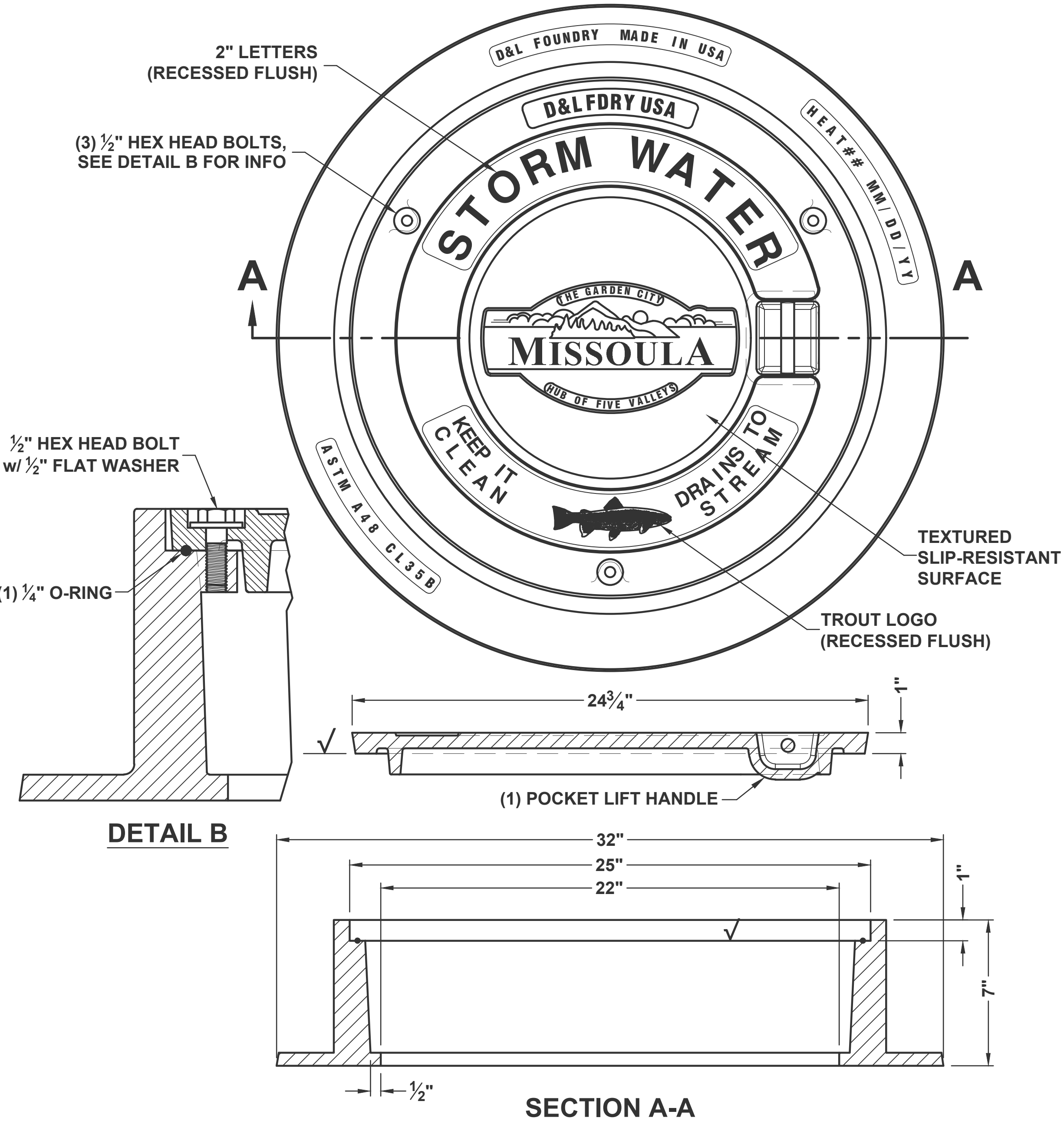
SECTION

GENERAL NOTES:

1. DUE TO PROVISIONS IN THE INTERMODAL SURFACE TRANSPORTATION ACT, VENDORS MUST AUTHENTICATE U.S. ORIGIN OF CASTINGS FOR FEDERALLY FUNDED PROJECTS.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 H20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD
5. SEE STD-604A FOR STANDARD MANHOLE RING SPECIFICATIONS.
6. GRATE SHALL BE USED WHEN GRATE IS LOCATED IN ADA TRAVEL PATH. GRATE MAY BE USED ONLY WITH PRIOR CITY ENGINEER APPROVAL

Engineering Division	ADA Area Drain Grate		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 604D

D&L A–1171 LOCKABLE
OR APPROVED EQUIVALENT



PRODUCT NUMBER:	MATERIAL TYPE:
COVER: A-1171	GRAY IRON: ASTM A-48 CL 35B
RING: A-1171-R1	GRAY IRON: ASTM A-48 CL 35B

GENERAL NOTES:

1. FOR USE WHEN THE MANHOLE CAN BECOME PRESSURIZED.
2. FOR CITY–OWNED INFRASTRUCTURE ONLY. FOR PRIVATE STRUCTURES WITHIN THE RIGHT–OF–WAY PROVIDE A TEXTURED SLIP RESISTANT LID WITHOUT CITY LOGO – MUST HAVE "STORM WATER" ON LID.
3. PROVIDE LIDS AND RINGS THAT MEET AASHTO 306 HS20 LOADING RATING OR HIGHER.
4. ANGLED GRADE RINGS SHALL BE USED TO MATCH LID TO CROSS SLOPE AND RUNNING SLOPE OF THE ROAD
5. 4–INCH MANHOLE RING MAY BE USED IN LIEU OF A 7" RING ONLY WITH PRIOR APPROVAL FROM CITY ENGINEERING.

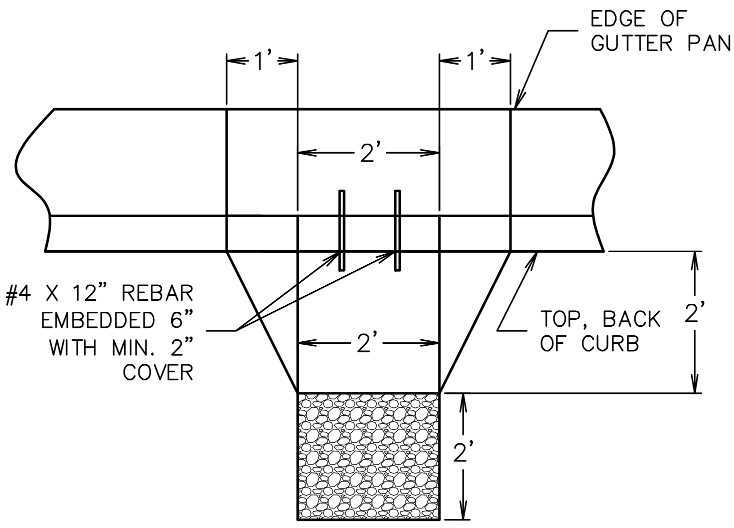
MISSOULA
Engineering Division

Storm Water Lockable Lid and Frame

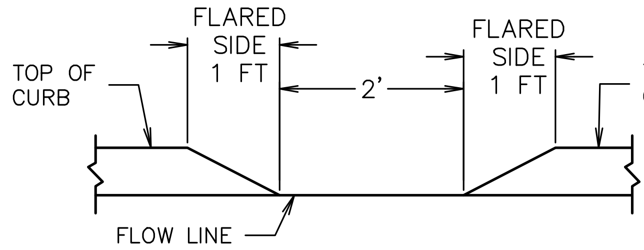
Approved By
Utility Engineer
Andy Schultz, PE

Revised: 09/28/2020

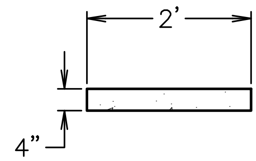
STD - 605



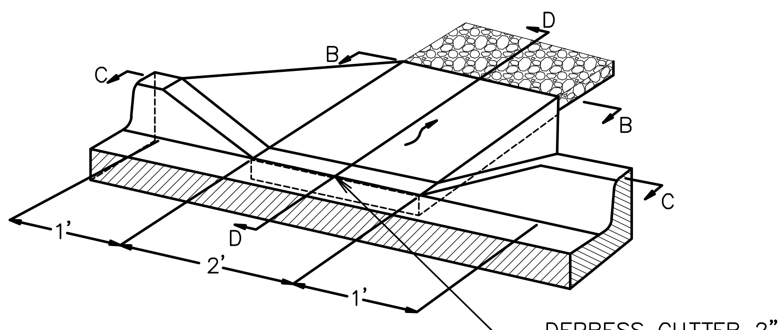
PLAN VIEW



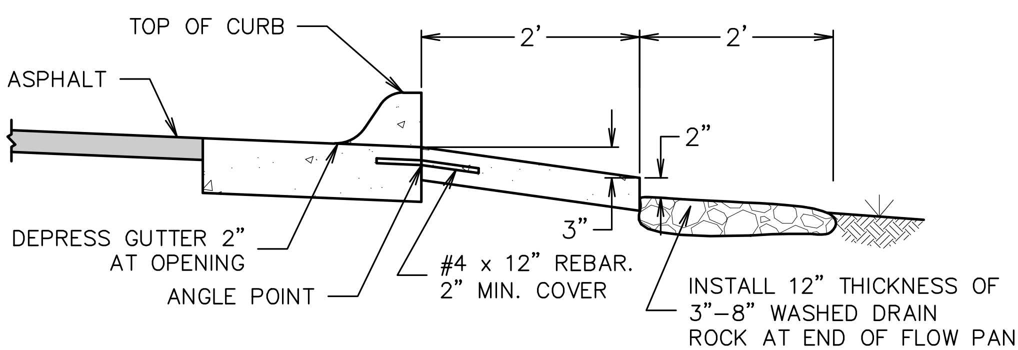
SECTION C–C



SECTION B–B



ISOMETRIC VIEW



SECTION D–D

GENERAL NOTES:

1. POUR ENTIRE CURB OPENING SECTION AS MONOLITHIC SLAB
2. PROVIDE FLOW CHANNEL FOR ALL OPENINGS ON GRADE
3. SEE STANDARD DRAWING STD–740 'TYPICAL "L" CURB/GUTTER SECTION' FOR CURB/GUTTER SPECIFICATIONS

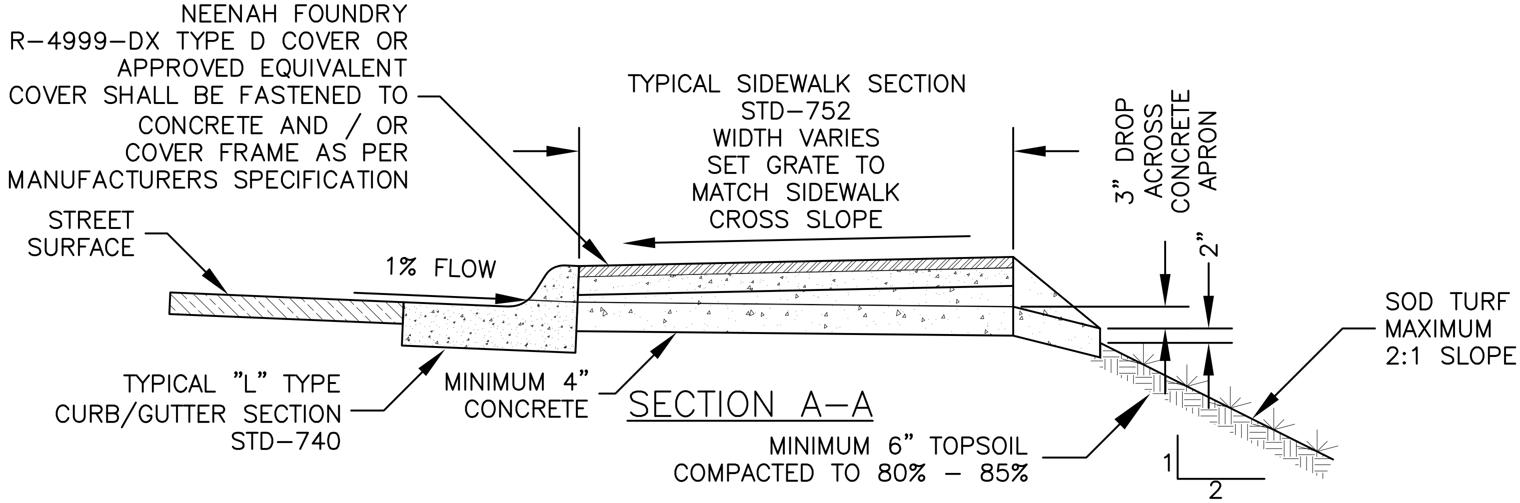
MISSOULA
Engineering Division

Curb Opening

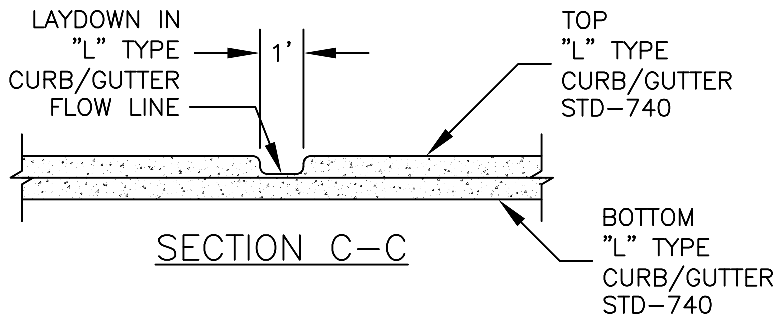
Approved By
Utility Engineer
Andy Schultz, PE

Revised: 09/28/2020

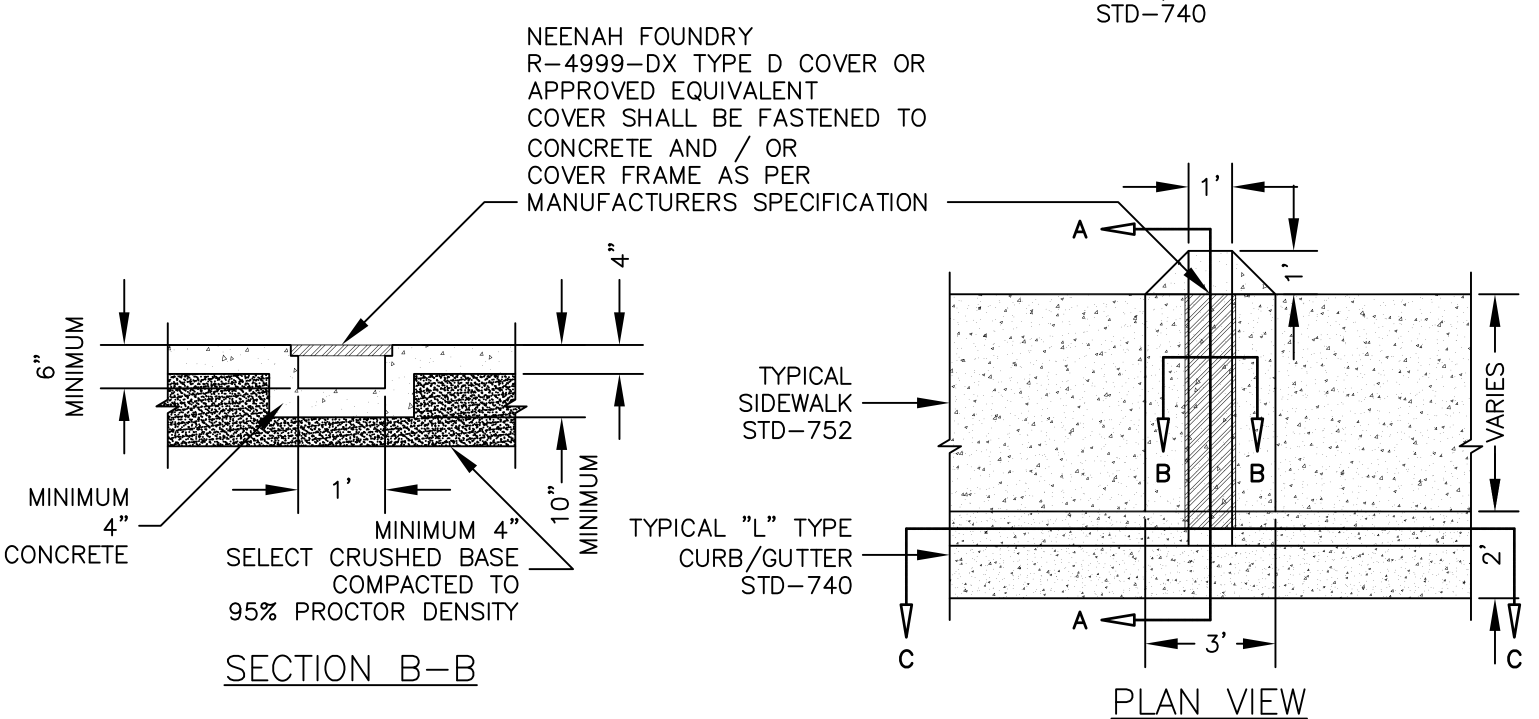
STD - 607



SECTION A-A



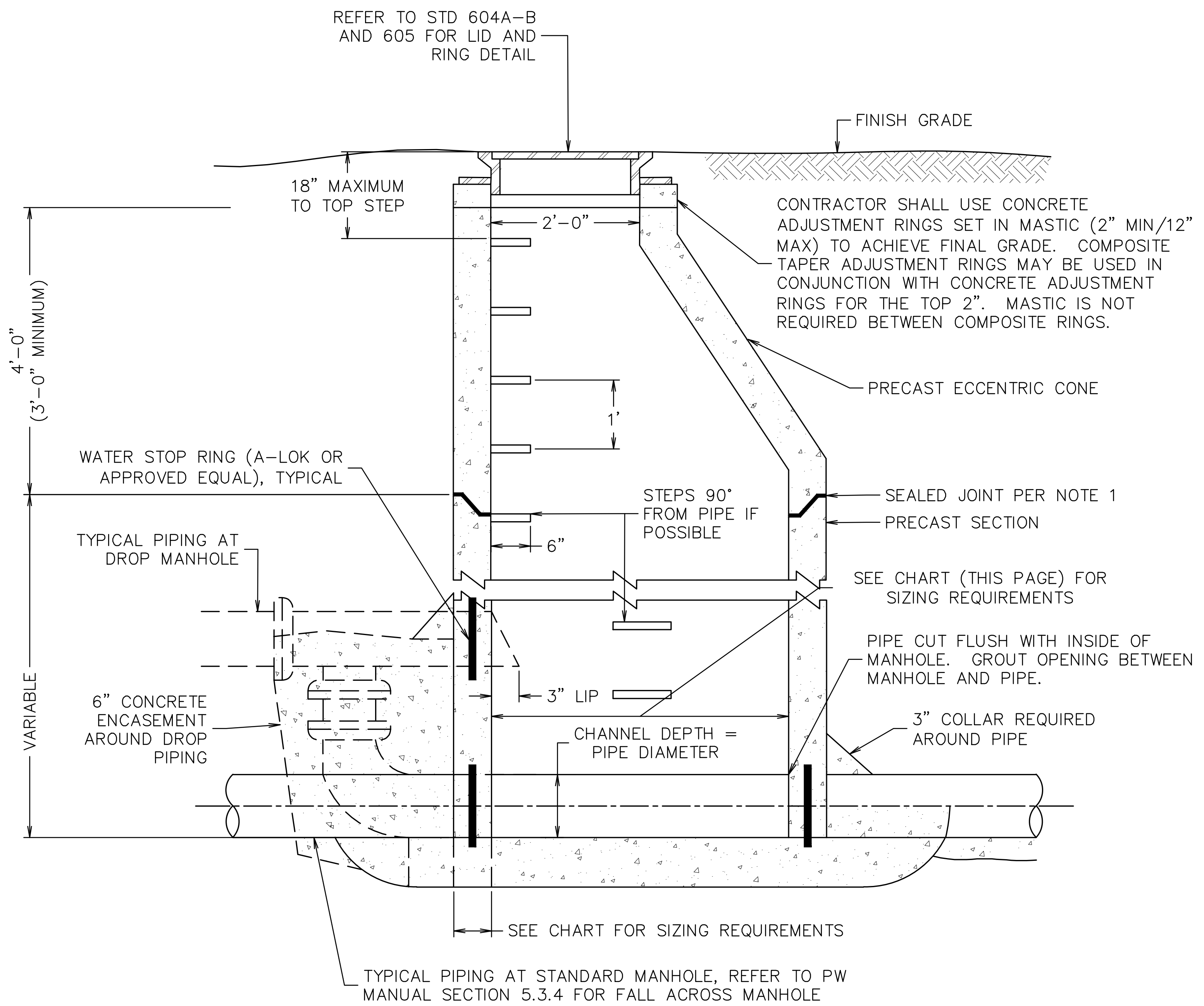
SECTION C-C



GENERAL NOTES:

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

Engineering Division	Curb Opening Through Sidewalk Section to Landscape		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 608



GENERAL NOTES:

1. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, MANHOLE RING AND TOP SECTION, SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM–NEK®" OR EQUAL.
2. CONCRETE FOR DROP STRUCTURES SHALL BE FORMED.

MANHOLE–TO–PIPE DATA TABLE			
MANHOLE DIA.	WALL THICKNESS	PIPE DIA >	PIPE DIA ≤
4'–0"	0'–5"	---	18"
5'–0"	0'–6"	18"	24"
6'–0"	0'–7"	24"	54"
JUNCTION BOX	---	54"	---

*MINIMUM PIPE DIAMETER FOR PUBLIC MAINS/LATERALS = 12 INCHES

MISSOULA
Engineering Division

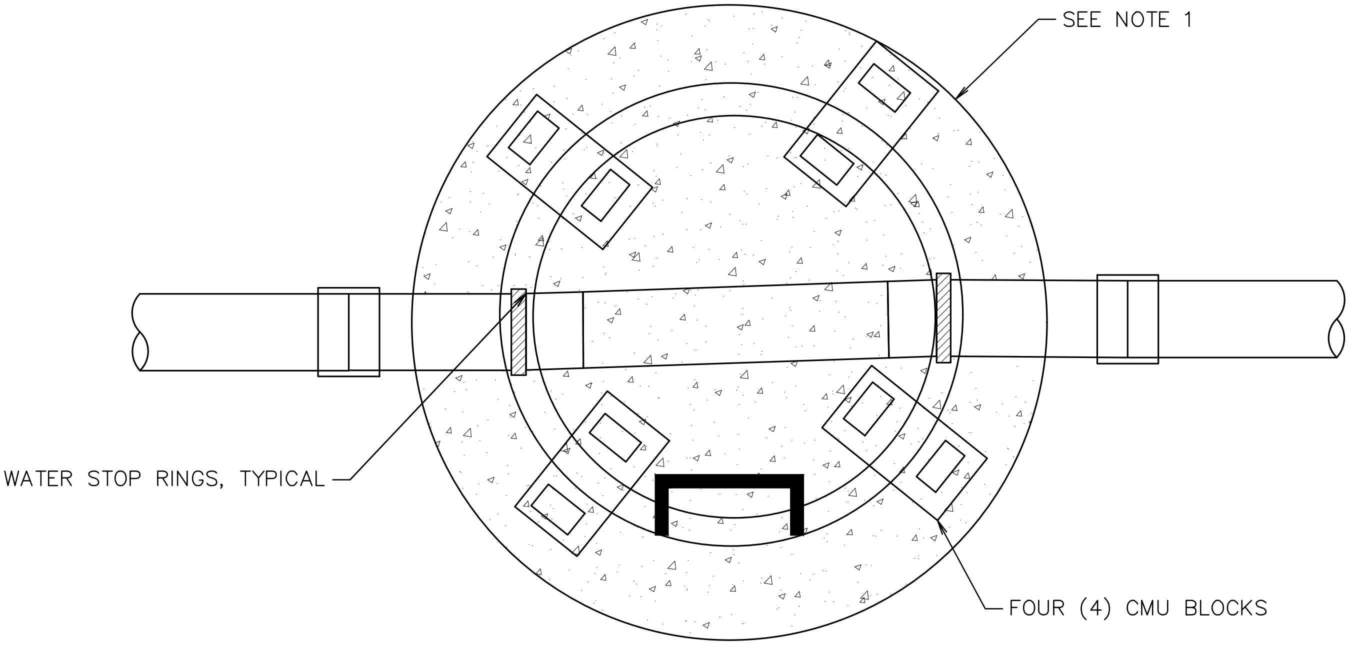
Storm Water Manhole (Sheet 1 of 3)

Approved By
Utility Engineer
Andy Schultz, PE

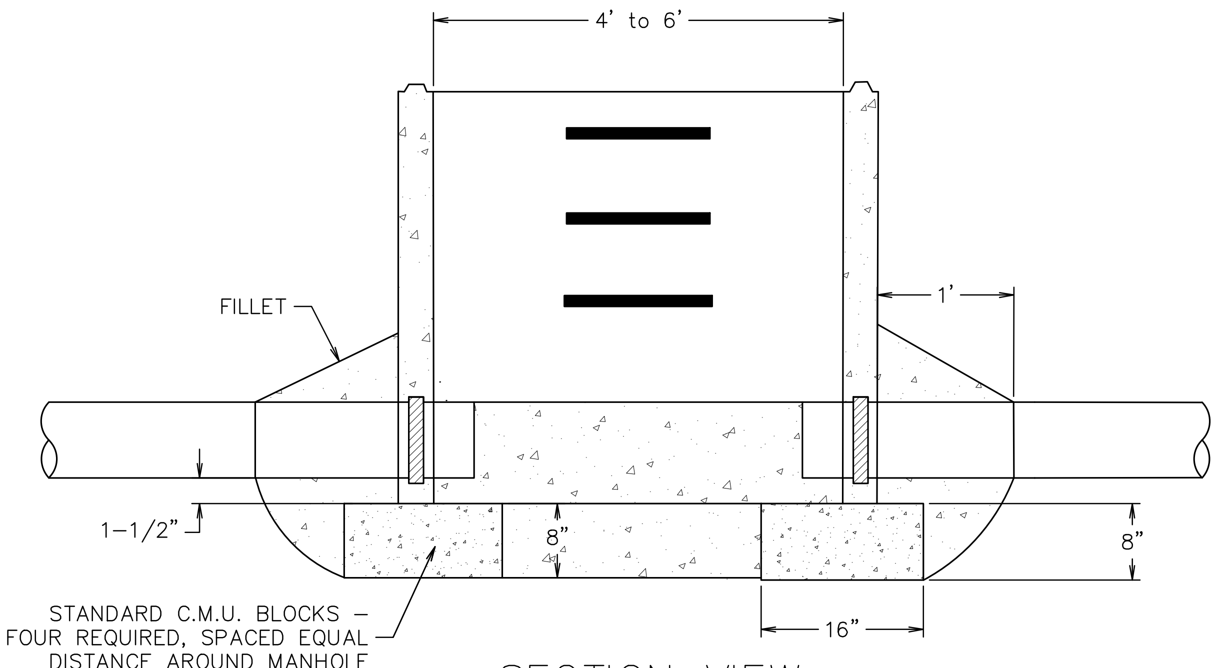
Revised: 09/28/2020

STD - 612-1

POURED IN PLACE (DOG-HOUSE) MANHOLE BASE



PLAN VIEW



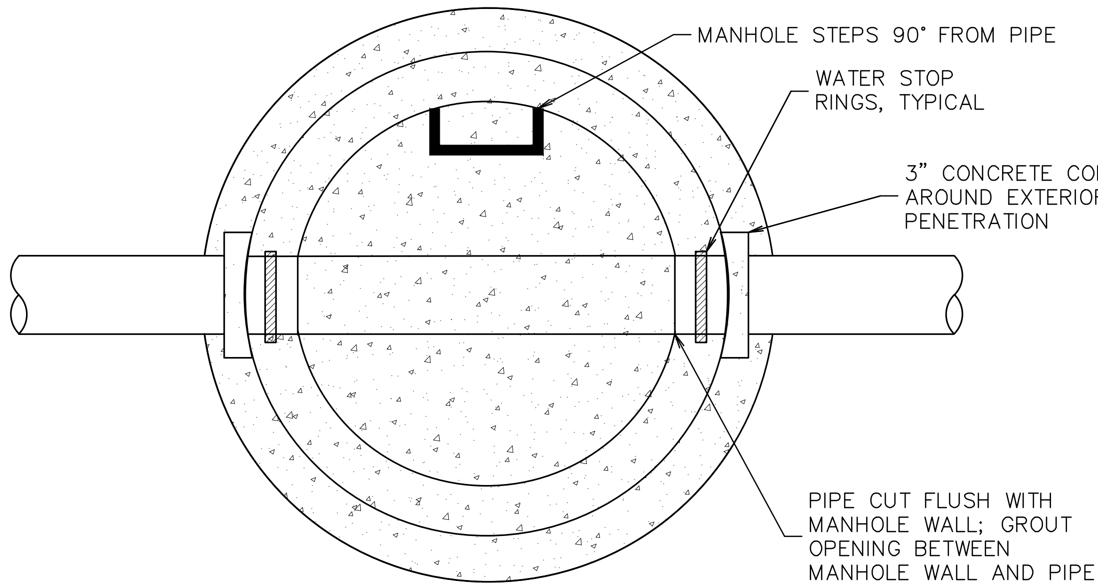
SECTION VIEW

NOTES

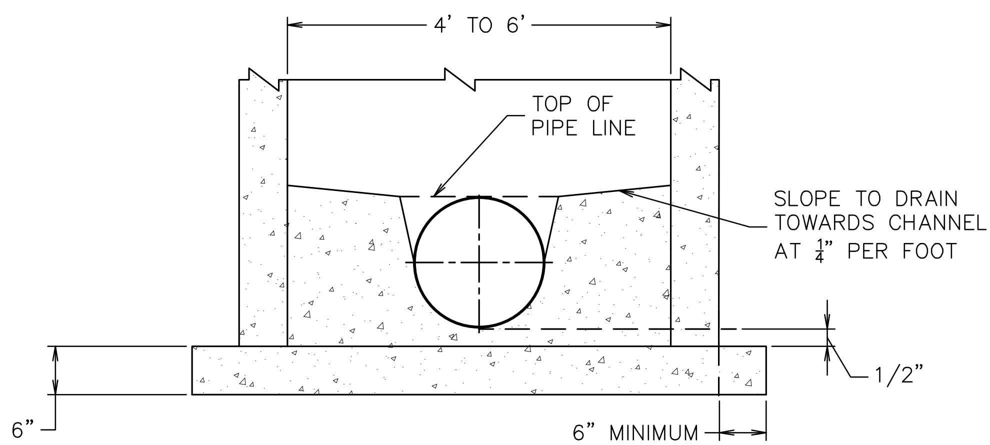
1. BASE AND FILL CONCRETE MAY BE POURED MONOLITHICALLY.
2. ONE-HALF (1/2") INCH SPACING MAY BE OMITTED WHEN BASE AND FILL CONCRETE ARE POURED MONOLITHICALLY.

MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS Engineering Division	Storm Water Manhole - Dog House Base (Sheet 2 of 3)		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 612-2

PRECAST MANHOLE BASE

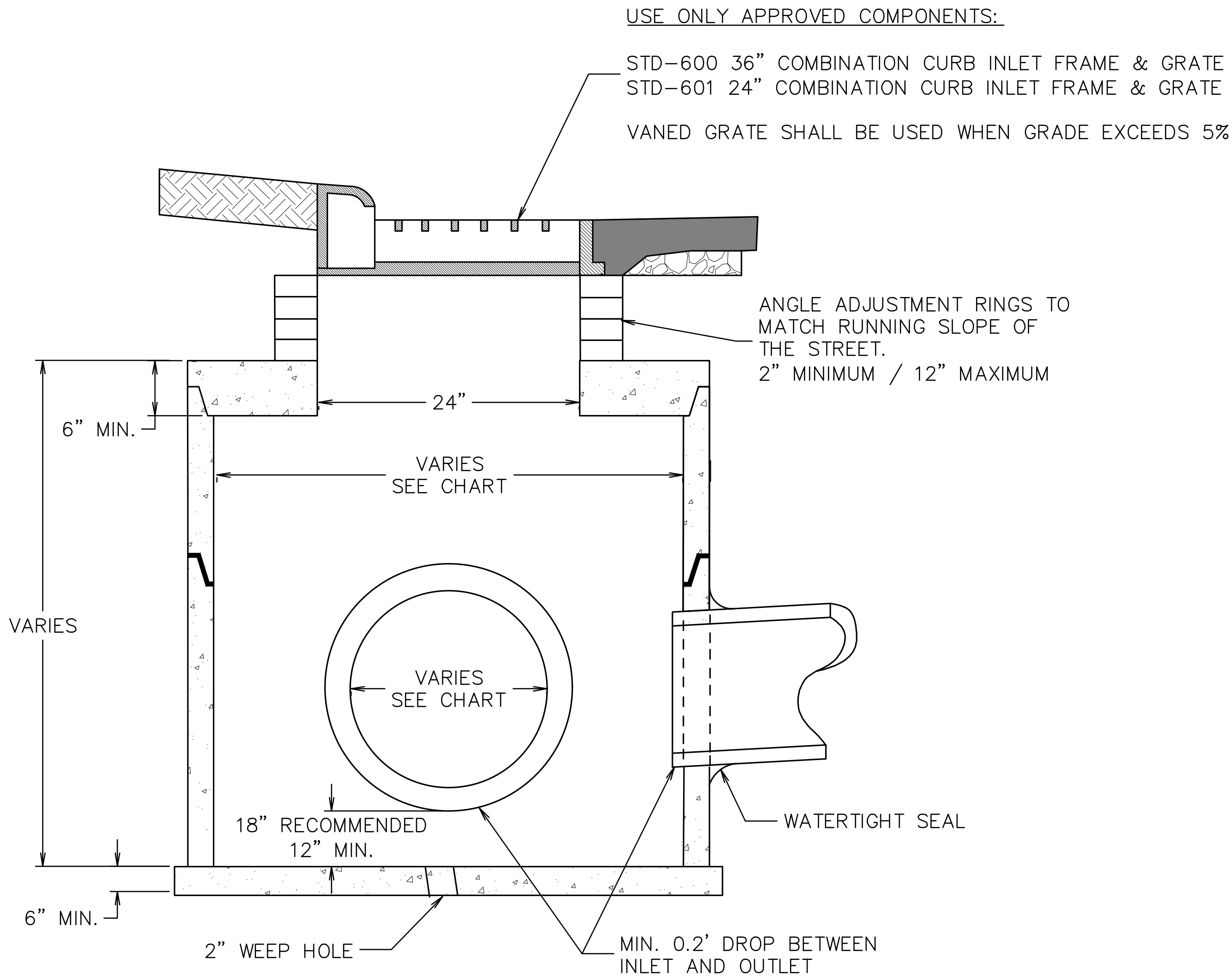


PLAN VIEW



SECTION VIEW

MISSOULA Engineering Division	Storm Water Manhole - Precast Base (Sheet 3 of 3)	
Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 612-3



MANHOLE-TO-PIPE DATA TABLE			
MANHOLE DIA.	WALL THICKNESS	PIPE DIA >	PIPE DIA ≤
2'-6"	0'-3 1/2"	---	12"*
4'-0"	0'-5"	---	18"
5'-0"	0'-6"	18"	24"
6'-0"	0'-7"	24"	54"
JUNCTION BOX	---	54"	---

*SINGLE PIPE ONLY. MAXIMUM DEPTH 6 FT.
MINIMUM PIPE SIZE FOR PUBLIC MAINS/LATERALS = 12"

GENERAL NOTES:

1. CATCH BASINS PIPED TO DRY WELLS (STD-616) ARE ENCOURAGED AS A PRE-TREATMENT METHOD OR TO AVOID UTILITY CONFLICTS.

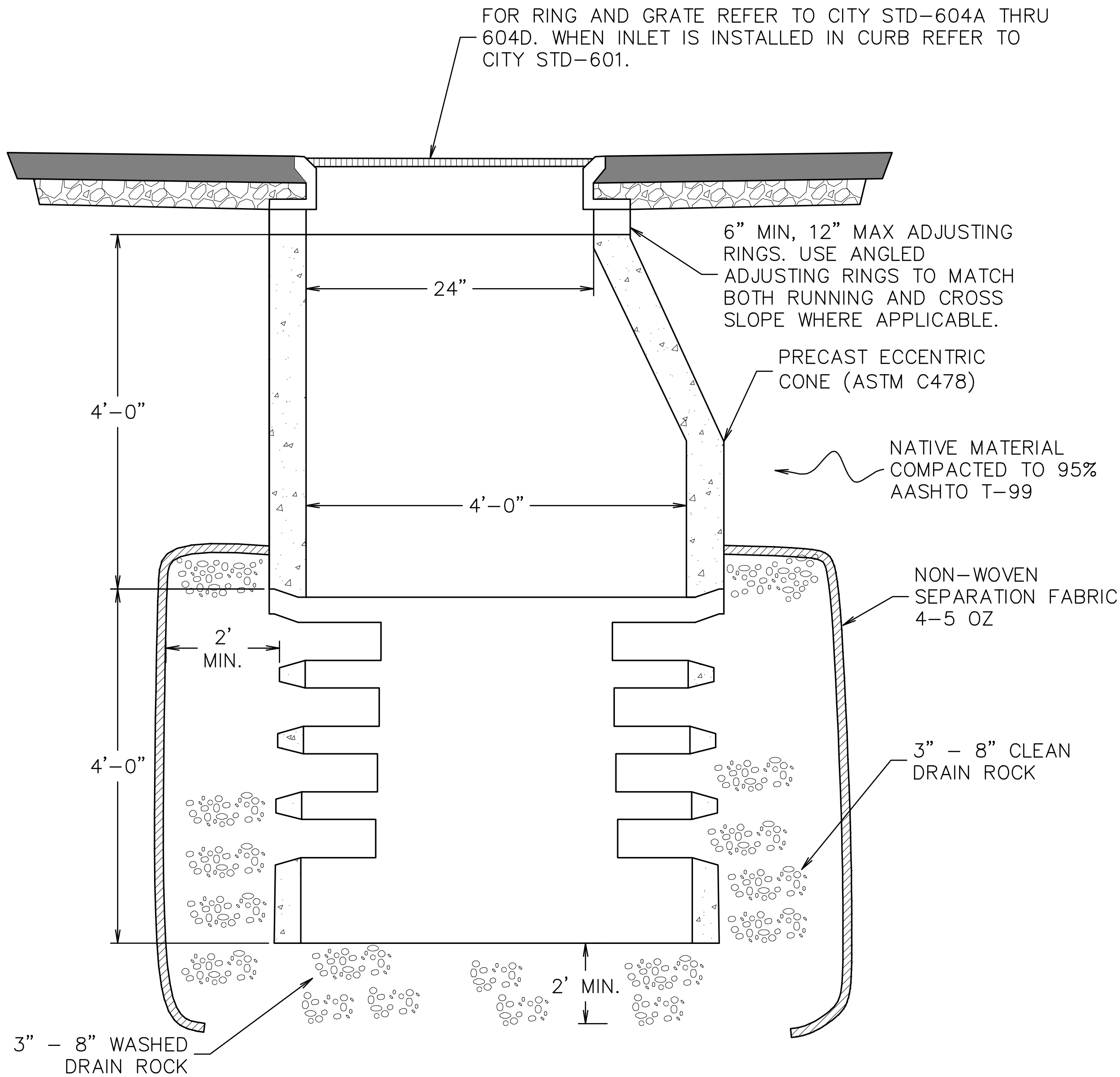
MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS
Engineering Division

Standard Catch Basin

Approved By
Utility Engineer
Andy Schultz, PE

Revised: 09/28/2020

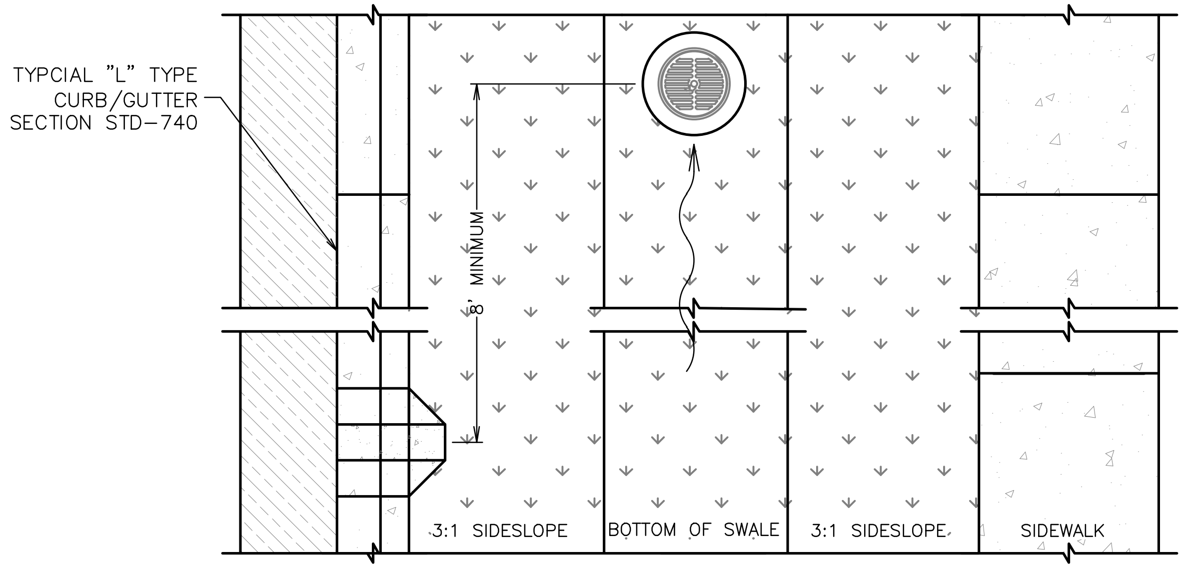
STD - 614

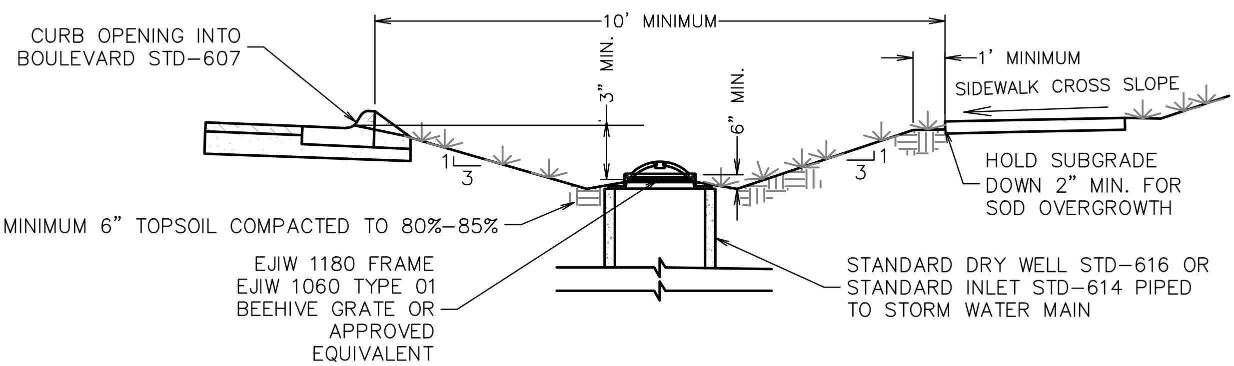


GENERAL NOTES:

1. OVER-EXCAVATE WHERE REQUIRED TO ENSURE BOTTOM OF EXCAVATION IS A MIN. 2-FT INTO GRAVELLY SOIL.
2. CATCH BASINS (STD-614) PIPED TO DRY WELLS ARE ENCOURAGED AS A PRE-TREATMENT METHOD OR TO AVOID UTILITY CONFLICTS.
3. NO GRADE RING TO BE OFFSET MORE THAN 2" AND TOTAL OFFSET NOT TO EXCEED WALL THICKNESS OF CONE.
4. GRADE RINGS SHALL BE 2" THICKNESS MINIMUM.
5. NO WEDGES ALLOWED BETWEEN GRADE RINGS AND FRAME MUST BE SET FLUSH WITH TOP GRADE RING.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Standard 8' Precast Dry Well		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 616

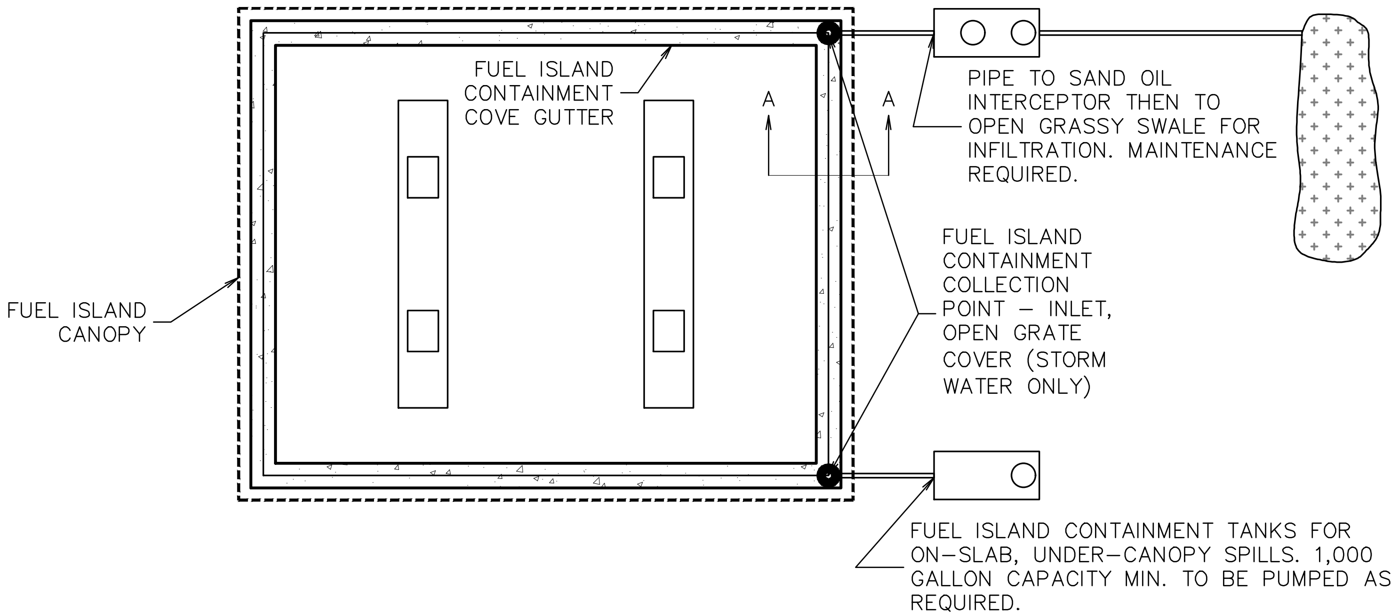


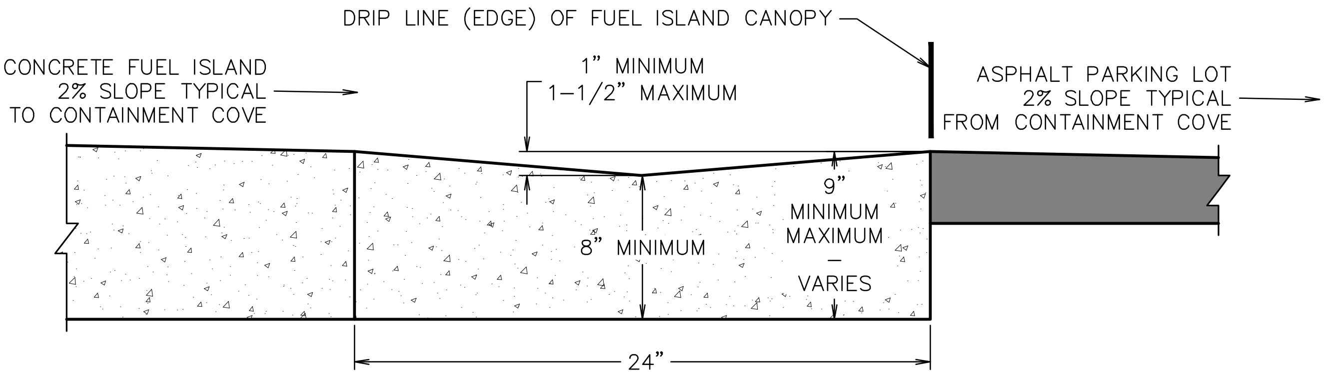


GENERAL NOTES:

1. SWALE DESIGN WIDTH AND DEPTH WILL VARY AS REQUIRED TO PROVIDE ADEQUATE TREATMENT STORAGE FOR THE GIVEN STORM VOLUME.
2. DRY WELL/INLET SHALL BE INSTALLED A MINIMUM OF 8 FT FROM THE NEAREST INLET TO PREVENT DIRECT INFLOW INTO THE OVERFLOW GRATE. PROVIDE A MINIMUM OF 3" FREEBOARD BETWEEN THE LOWEST SWALE INLET AND THE BASE OF THE TOP OF THE BEEHIVE GRATE.
3. SWALES WITH LONGITUDINAL SLOPE STEEPER THAN 2% SHALL HAVE CHECK DAMS INSTALLED.
4. PROVIDE A MINIMUM 1 FT FLAT AREA ADJACENT TO SIDEWALK WHEN USING A SIDE-SLOPE NO STEEPER THAN 3:1. IF FLAT AREA IS NOT PROVIDED ADJACENT TO SIDEWALK, THEN USE A SIDE-SLOPE NO STEEPER THAN 4:1.
5. NO COMPACTION IN SWALE BOTTOM.
6. SWALES SHALL BE GRASSED OR THE CITY OF MISSOULA STORM WATER DEPARTMENT CONSULTED FOR PROPER PLANT SELECTION IN SWALE.

Missoula Engineering Division	Bioswale		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 620



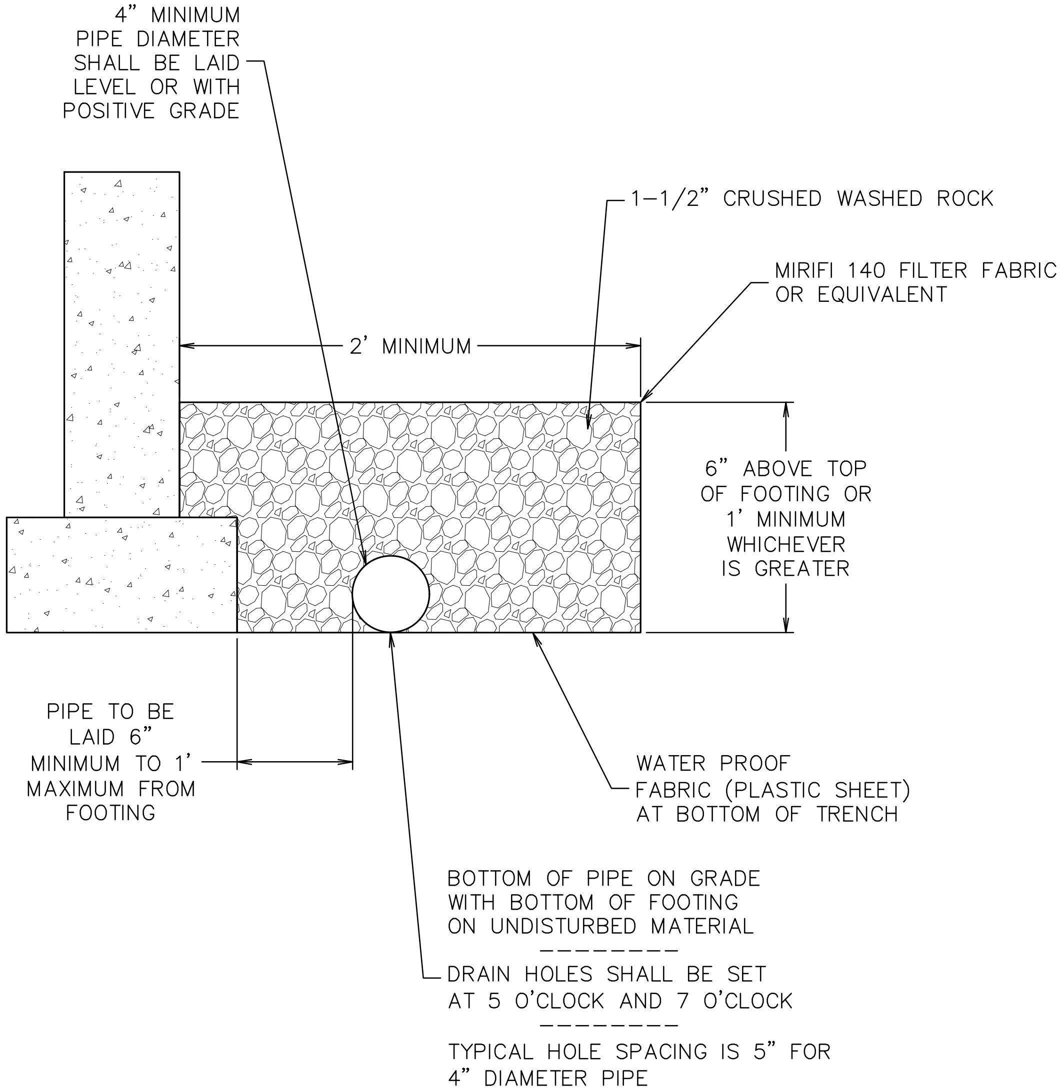


SECTION A–A

GENERAL NOTES:

1. TWENTY–FOUR (24") INCH WIDTH CONCRETE CONTAINMENT COVE GUTTER.
2. EIGHT (8") INCH MINIMUM THICKNESS CONCRETE CONTAINMENT COVE GUTTER.
3. ONE (1") INCH TO ONE AND ONE–HALF (1–1/2") INCH DEPRESSION THROUGH CENTER OF CONCRETE CONTAINMENT COVE GUTTER AROUND ENTIRE FUEL ISLAND PERIMETER.
4. CONCRETE CONTAINMENT COVE GUTTER AND OIL AND SAND INTERCEPTOR MUST BE ENGINEERED BY A CERTIFIED LICENSED ENGINEER.
5. CANOPY AND CONCRETE CONTAINMENT COVE GUTTER SHALL BE SIZED SO AS TO COMPLETELY CONTAIN FUELING VEHICLES AT ANY/ALL FUEL PUMP(S).
6. CONCRETE CONTAINMENT COVE GUTTER SHALL BE LOCATED UNDER FUEL ISLAND CANOPY NOT TO EXCEED COVER OF THE FUEL ISLAND CANOPY. RAINWATER CANNOT DIRECTLY FALL WITHIN AND/OR UPON THE CONTAINMENT COVE GUTTER.
7. CONCRETE CONTAINMENT COVE GUTTER SHALL COLLECT AND DEPOSIT ANY AND ALL LIQUIDS FROM THE FUEL ISLAND, THROUGH AN APPROVED PIPE FOR FUEL/PETROLEUM PRODUCTS, TO FUEL SPILL CONTAINMENT TANK OR AN OIL AND SAND INTERCEPTOR AND GRASSY SWALE AS PER SPECIFICATIONS AND APPROVAL OF UTILITY ENGINEER.
8. CANOPY RAIN WATER COLLECTION CAN NOT BE DEPOSITED INTO FUEL ISLAND CONTAINMENT COLLECTION SYSTEM. CANOPY RAIN WATER COLLECTION MAY BE DEPOSITED INTO PARKING LOT STORM WATER COLLECTION SYSTEM.
9. REFER TO MISSOULA MUNICIPAL CODE (MMC) 13.26 – 'MISSOULA VALLEY WATER QUALITY ORDINANCE' FOR ADDITIONAL INFORMATION, SPECIFICATIONS AND REQUIREMENTS.

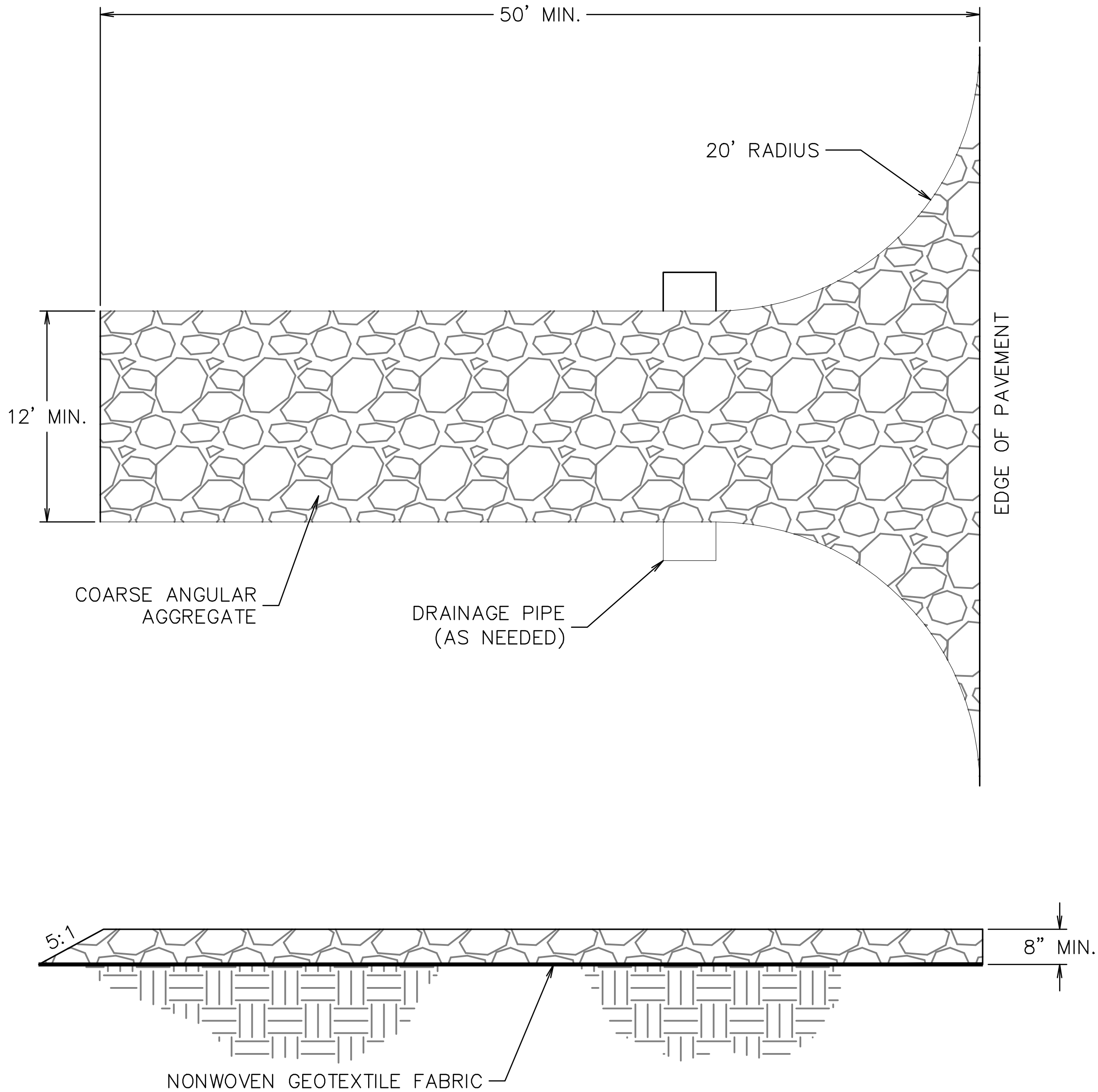
MISSOULA Engineering Division	Typical Fuel Island Canopy and Containment Cove Gutter Approved By Utility Engineer Andy Schultz, PE — Revised: 09/28/2020	STD - 630



GENERAL NOTES:

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

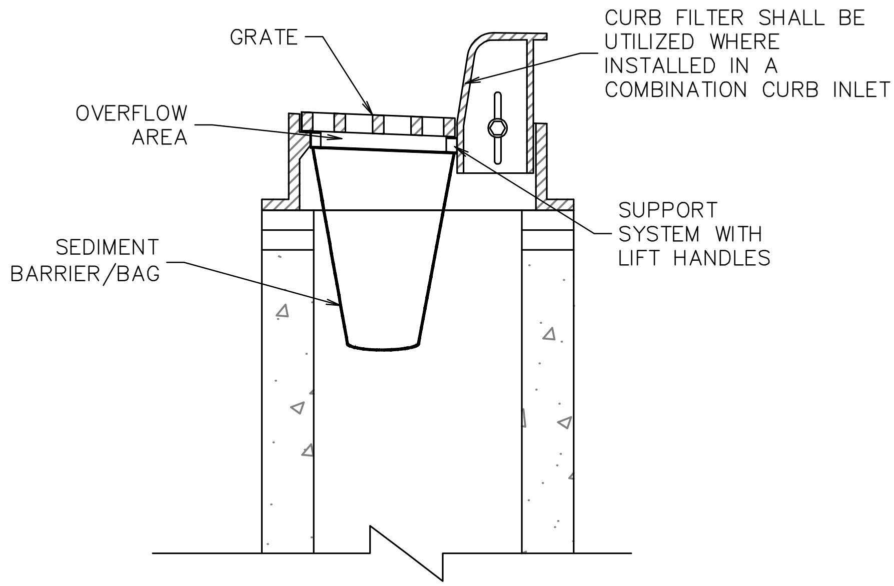
MISSOULA Engineering Division	Footing Drain System		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 632



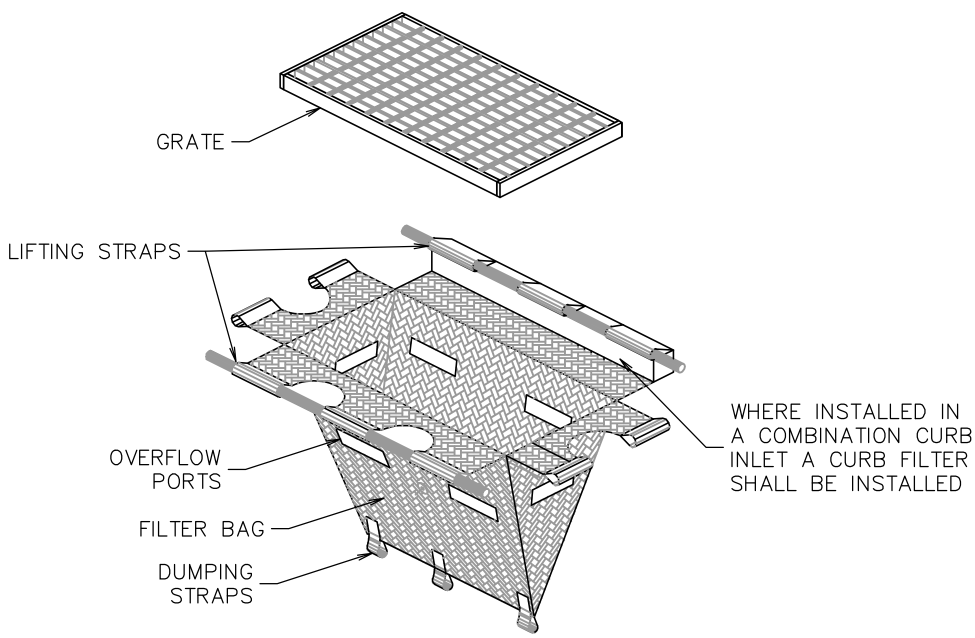
GENERAL NOTES:

1. A TEMPORARY GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT POINTS OF VEHICULAR EGRESS ON A CONSTRUCTION SITE TO LIMIT THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PUBLIC ROADS BY VEHICLES.
2. REMOVE AND REPLACE AGGREGATE WHEN VOIDS BECOME FILLED.
3. SWEEP AND REMOVE SEDIMENT TRACKED ONTO PAVED SURFACES.
4. PROPERLY GRADE INGRESS/EGRESS POINTS TO PREVENT RUNOFF FROM LEAVING THE SITE.
5. CONSIDER THE USE OF RUMBLE PADS, FODs, OR CATTLE GUARDS IN COMBINATION WITH THE GRAVEL CONSTRUCTION ENTRANCE TO IMPROVE EFFECTIVENESS

Engineering Division	Temporary Gravel Construction Entrance		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 650



SECTION

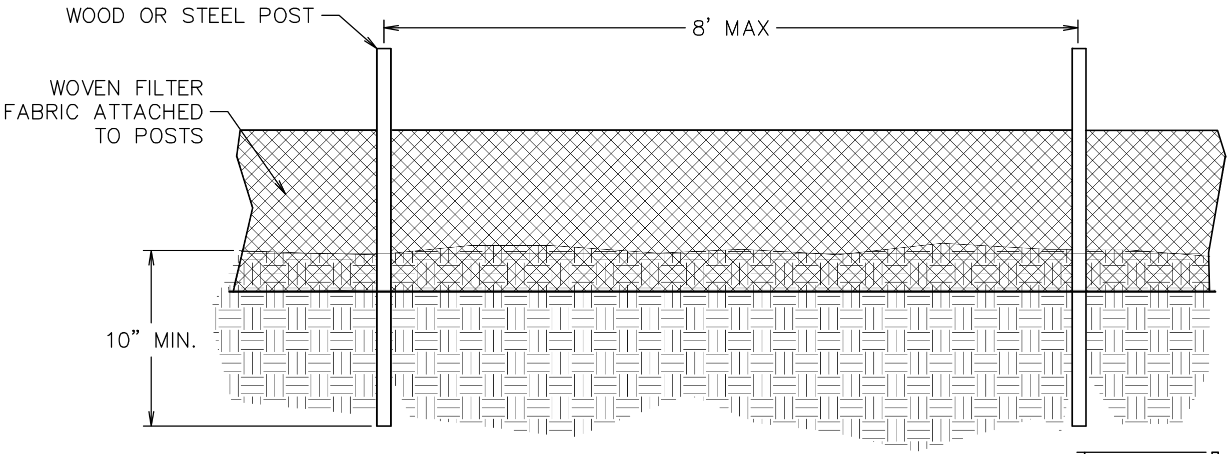


INSTALLATION

GENERAL NOTES:

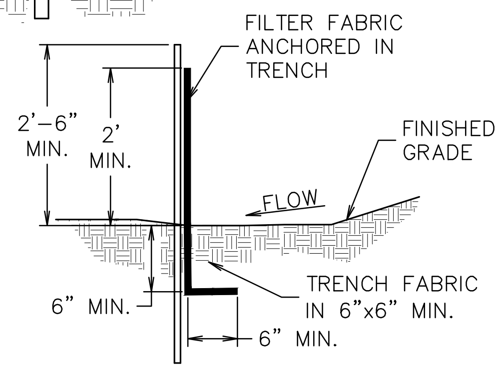
1. INLET PROTECTION SHALL BE USED AS A "LAST RESORT" BMP. CARE SHALL BE TAKEN TO MINIMIZE SEDIMENT LADEN STORM WATER FROM REACHING INLETS/DRY WELLS
2. INLET PROTECTION SHALL BE INSPECTED REGULARLY AND AFTER STORM EVENTS. IF UNIT IS MORE THAN 1/3 FULL OF ACCUMULATED SEDIMENT, THE UNIT MUST BE EMPTIED.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

Engineering Division	Inlet Protection		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 651



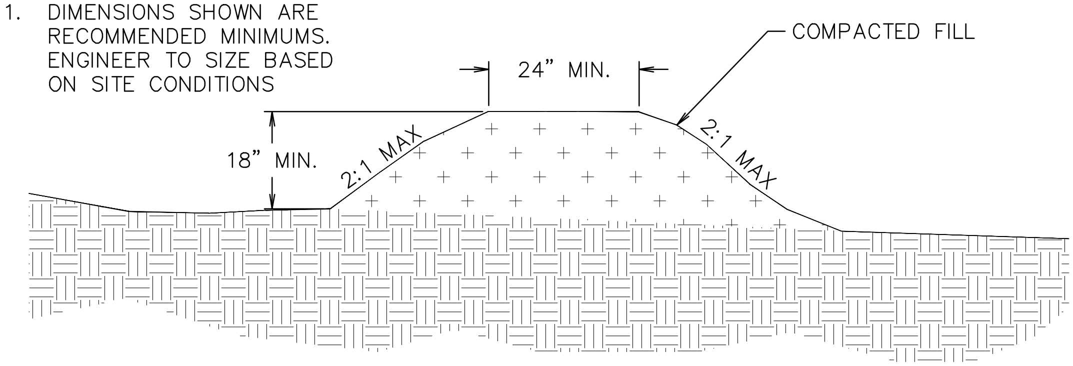
NOTES:
1. TURN SILT FENCE UP HILL AT ENDS
2. USE SILT FENCE ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND NEVER IN AREAS OF CONCENTRATED FLOW

SILT FENCE

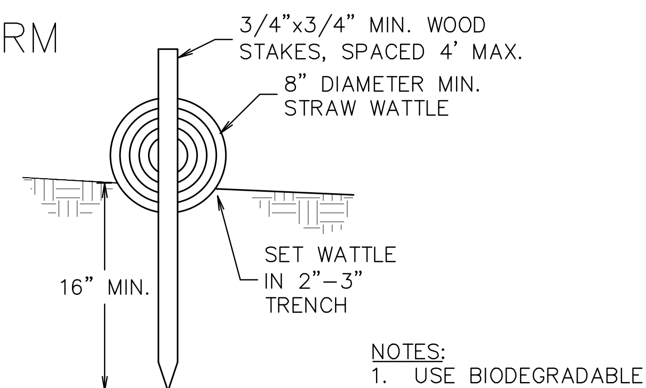


DETAIL

NOTES:
1. DIMENSIONS SHOWN ARE RECOMMENDED MINIMUMS. ENGINEER TO SIZE BASED ON SITE CONDITIONS



COMPACTED EARTHEN BERM



STRAW WATTLE

NOTES:
1. USE BIODEGRADABLE WRAP ON STRAW WATTLES IF THEY ARE TO BE LEFT IN PLACE.

GENERAL NOTES:

1. PRESERVING EXISTING VEGETATION SHALL BE USED AS THE PRIMARY PERIMETER CONTROL.
2. PERIMETER CONTROL BMPs SHALL BE INSTALLED BEFORE ANY EARTH REMOVAL OR EXCAVATION TAKES PLACE.
3. INSTALL PERIMETER CONTROL BMPs PARALLEL TO CONTOUR LINES.
4. FOLLOW MANUFACTURER'S INSTRUCTIONS TO OVERLAP THE SILT FENCE AND WATTLES AT JUNCTIONS.
5. ALL TEMPORARY BMP'S TO BE REMOVED AT FINAL STABILIZATION.

THE GARDEN CITY MISSOULA HUB OF FIVE VALLEYS Engineering Division	Perimeter Control		
	Approved By Utility Engineer Andy Schultz, PE	Revised: 09/28/2020	STD - 652

Appendix G
Chapter 13.27, Missoula Municipal Code

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:

_________________________________ _______________________________

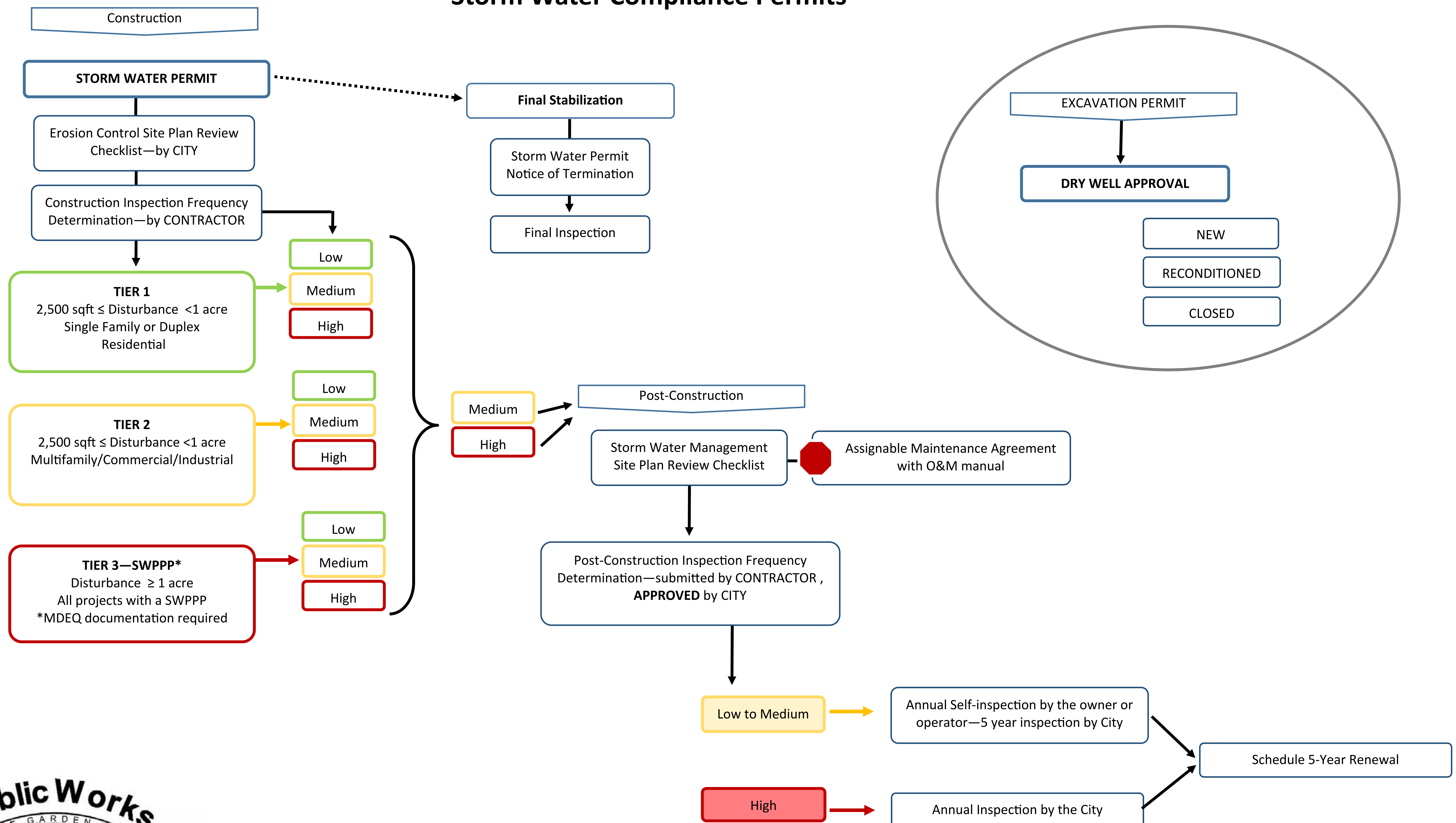
Martha L. Rehbein, CMC
City Clerk

John Engen
Mayor

Appendix H

City Storm Water Permit

Storm Water Compliance Permits



Storm Water Utility

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

Storm Water Permit Fact Sheet

The City of Missoula is required to comply with the conditions of our General Permit for Storm Water Discharges associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit). To ensure compliance with federal and state environmental regulations, the City has implemented a Storm Water Permit. This Fact Sheet explains what is needed for your project (Table 1). Disturbance area is any area that is subject to clearing, excavating, grading, and/or placement/removal of earth materials.

1. Does your project disturb more than 2,500 ft^2 of land or change the grade of the lot by three feet or more?
   Yes……………………………Storm Water Permit Application required, Go to 2
   No……………………………No Storm Water Permit required, other City permits may apply

2. Using the Site Evaluation Form, submit documentation per your site priority:
   Low…………………………..Erosion Control Site Plan;
   Erosion Control Site Plan Review Checklist; and
   Site Evaluation Form
   Medium or High……….All of the above, in addition to:
   Post-Construction Inspection Frequency Determination
   Storm Water Management Site Plan
   Maintenance Agreement (template provided by City)*
   Operation and Maintenance Manual*
   Storm Drainage Report
   Geotechnical Report (for infiltration)

Table 1. Storm Water Permit Submittals

Site Priority per the Site Evaluation Form	
Low	Medium and High
• Erosion Control Site Plan • Erosion Control Site Plan Review Checklist • Site Evaluation Form	• Erosion Control Site Plan • Erosion Control Site Plan Review Checklist • Site Evaluation Form • Post-Construction Inspection Frequency Determination • Storm Water Management Site Plan • Maintenance Agreement* • Operation and Maintenance Manual* • Storm Drainage Report • Geotechnical Report (for infiltration)

*Projects that propose to infiltrate, evapotranspire, and/or capture for reuse all post-development storm water on-site—without the use of piped conveyance—do not require a Maintenance Agreement or O&M Manual.

Storm Water Permit (SWP)

Site Plan	Description	Fee
SWP - Erosion Control Site Plan (Construction)	2,500 square feet ≤ Disturbance Area* < 1 acre Single Family Residential	**$209**
	2,500 square feet ≤ Disturbance Area* < 1 acre Multifamily/Commercial/Industrial	**$258**
	Disturbance Area* ≥ 1 acre All projects with a SWPPP	**$516**
SWP - Storm Water Management Site Plan (Post-Construction)	Low and Medium Priority** Sites	**$258**
	High Priority** Sites	**$387**

*Disturbance Area is any area that is subject to clearing, excavating, grading, and/or placement/removal of earth materials.

**Priority per the Post-Construction Site Inspection Frequency Determination

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

rev. Dec. 2, 2020

Construction Site Inspection Form

☐ Pass ☐ Fail

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

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Jan. 28, 2021

Storm Water Site Evaluation Form

This form is used for the Construction Site Inspection Frequency Determination and is completed by the applicant/owner.

Date:___________________

Project Name:____**Permit No.:**___________________

Address:____**Zip Code:**____________________

Project Area (acres):_________________________**Disturbance Area (acres):**__________________________

Applicant/Owner Representative:_________________________**Phone number:**______________________

Owner Name:____**Phone Number:** 406 552-6364

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—the City of Missoula must inspect construction sites based upon their priority ranking.

Site Priority Determination

Check the appropriate Project Priority box based on the worksheet total on page 2.

Score	Priority	Inspection Frequency	Project Priority
6 to 11	Low	1. Once at commencement of construction after BMPs have been implemented	
12 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 67	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	

rev. Jan. 28, 2021

Site Priority Ranking Worksheet

Criteria	Rating System	Rating Value	Site Rating
Project type	Subdivision with 5 or more units	7	
	TED with 5 or more units	7	
	Commercial site ≥ 0.5 acres	7	
	None of the above	0	
Proximity to waterbody (surface or dry well/groundwater)	≥ 1,500 feet	1	
	200 to 1,499 feet	5	
	< 200 feet	7	
	Discharge to waterbody	10	
Depth to groundwater	> 15 feet	1	
	≤ 15 feet	10	
Discharge to an impaired waterbody	No (dry well/groundwater, 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 non-compliance (applicant and/or owner)	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 Score	
6 to 11 = Low	12 to 30 = Medium	31 to 67 = 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 stop work order; fine(s); and/or suspension/revocation of City Business License.

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Feb. 4, 2021

Erosion Control Site Plan Checklist

(to be completed by the applicant/owner)

Date: ________________________

Project Name: ____

Address: ____**Zip Code:**____________________

Project Area (square feet): ______________________ **Disturbance Area (square feet):**___________

Applicant/Owner Name: _____________________________ **Phone Number:** 406 552-6364

Applicant/Owner Address: ____

****Disturbance Area is any area that is subject to clearing, excavating, grading, and/or placement/removal of earth materials.****

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.

An Erosion Control Site Plan may include the following, *as applicable* to the site and project. This checklist is intended to inform your decisions regarding applicable best management practices (BMPs) for your site. BMPs are structural, vegetative, or managerial practices used to treat, prevent, or reduce water pollution. Help us protect our waterways and sole-source aquifer with BMPs. For guidance, please refer to the Public Works Manual Chapter 8, MDT BMP Manual, and/or MDEQ Construction Field Guide.

	Applicant	NA	**Delineation of Work Area**
			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 relative to surrounding areas. Use appropriate scale to show adequate level of detail and show north arrow.
			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.

			Delineation of Work Area (continued)
	Applicant	NA	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., temporary and final 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. 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.
			Provide designated area(s) for parking of construction vehicles, using aggregate over geo-textile fabric.

			Construction Access Routes (continued)
	Applicant	**NA**	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)
	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.

Notes

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Dec. 1, 2020

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:** 406 552-6364

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.

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

rev. Dec. 1, 2020

____
DATE RECEIVED

POST-CONSTRUCTION STORM WATER MANAGEMENT SITE 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	☐	☐	☐

After recording, return to:
City Clerk, City of Missoula
435 Ryman
Missoula, MT 59802

Private Storm Water Facility Maintenance Covenant and Access Easement

This Maintenance Covenant and Access Easement ("Agreement") is made this [INSERT DAY] day of [INSERT MONTH], [INSERT YEAR], between [INSERT OWNER NAME HER] ("Owner") whose address is [INSERT OWNER ADDRESS HERE] and the City of Missoula, 435 Ryman, Missoula, Montana 59802, a municipal corporation under the laws of the state of Montana (the "City").

RECITALS

A. Owner is the owner and developer of certain real property located in the City of Missoula, Missoula County, Montana, legally described as follows, and commonly known as (the "Development"):

B. Owner has developed or will develop at the Development, private storm water management facilities as further described below:

   List the type, quantity, and location of all private storm water facilities proposed and constructed within the development.

   ____
   ____
   ____
   ____
   ____
   ____

   The above described facilities shall be known as the "Private Storm Water Facilities", and are intended to include all storm water management infrastructure in the Development that is outside the public right-of-way, as well as any additional infrastructure in the public right-of-way identified above.

C. The City has approved construction plans submitted by Owner for the Development, including the Private Storm Water Facilities (together with any other storm water facilities that may hereafter be constructed on the Development outside the public right-of-way).

D. To protect future lot owners in the Development, as well as owners of neighboring property, the City requires Owner to enter into this Agreement as a condition to the City's approval of construction plans, building permit(s), if applicable, and the final plat, if applicable, for the Development.

E. The Private Storm Water Facilities enable development of property while mitigating the adverse impacts of additional surface water and pollutants associated with storm water runoff prior to discharge from the property to the public storm water system. The consideration for this Agreement is connection to the City's storm water system.

F. The Private Storm Water Facilities are designed by a registered professional engineer to accommodate the anticipated volume of runoff and to detain and treat runoff in accordance with the City's regulations, engineering standards, administrative rules, and amendments.

G. Failure to inspect and maintain the Private Storm Water Facilities can result in an unacceptable impact to the public storm water system.

AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the City and Owner agree as follows:

1. Covenant to Maintain and Repair

Owner shall, at its sole expense, itself or through qualified independent contractors, at all times maintain the Private Storm Water Facilities in good working order, condition and repair, clear of all debris, and in compliance with all applicable state and local rules, regulations, and guidelines (including those adopted from time to time by the City and including the City's engineering standards).

2. Covenant to Inspect

The Owner shall perform annual inspections of all Private Storm Water Facilities covered by this agreement annually. Any work necessary to repair or maintain the facilities in good working order that is discovered during the annual inspection shall be completed by the Owner within a reasonable period of time after the annual inspection. Owner shall apply for renewed coverage under the City storm water permit as required by City Code.

3. Easement

Owner hereby grants the City, its employees, independent contractors, and designees, a nonexclusive easement for ingress and egress over, across, and under the Development from time to time at the City's sole discretion to inspect, sample, and monitor components of the Private Storm Water Facilities and discharges therefrom, as well as allow the City to take the actions described in Sections 4 and 5 of the Agreement. Owner understands and agrees that this easement limits the ability of Owner, its successors, and assigns from constructing any permanent buildings, structures, landscaping, or other improvements that would interfere with the functioning of the Private Storm Water Facilities or the City's access to perform the inspection and maintenance under this Agreement.

4. Failure to Perform Covenant

If the City, in its sole discretion, determines that the Owner is not in compliance with the covenant described in Sections 1 and 2, except in the case of an emergency, the City or its designee shall give the Owner written notice to perform the maintenance and/or repair work specified in the notice. If such work is not performed to the City's satisfaction within twenty (20) days after the date of such notice, or such other time as the City may, in its sole discretion, determine, the City, its employees, independent contractors, and designees may exercise their right under the Easement described in Section 3 of this Agreement to enter the Development to perform any and all work required bringing the Private Storm Water Facilities into compliance with this Agreement.

5. Emergency

If the City, in its sole discretion, determines that there exists or will likely exist an emergency on or about the Development with respect to the Private Storm Water Facilities, the City, its employees, independent contractors, and designees may immediately exercise their rights under the Easement described in Section 3 of this Agreement to immediately enter the Development to perform any and all work required to bring the Private Storm Water Facilities into compliance with the Agreement, and in such case the City shall use reasonable efforts to notify the Owner prior to entering the Development. Notwithstanding the above, the work performed may consist only of avoiding or mitigating the emergency and/or cleaning and repairing the Private Storm Water Facilities to their original condition and standards.

6. City Under No Obligation

Owner, for itself or its successors and assigns (including all owners of lots in the Development), agrees that the City, as well as its department, employees, independent contractors, and/or designees shall have no obligation to exercise its rights under this Agreement, including the right under Sections 4 and 5 of this Agreement to perform the work required of the Owner, or to perform any other maintenance or repair of the Private Storm Water Facilities. Owner also agrees that none of the City, as well as its departments, employees, independent contractors, and/or designees shall have any liability to Owner or any of Owner's successors or assigns (including owners of lots in the Development) in connection with the exercise or non-exercise of such rights, the maintenance or repair of the Private Storm Water Facilities, or the failure to perform the same.

7. Owner Obligation

In addition to the covenants and easement described above, Owner agrees to the following additional obligation:

a. Owner shall construct the Private Storm Water Facilities as shown on City-approved construction plans.

b. Prior to the sale of any portion of the Development, Owner shall provide to the City's Development Services Department, a copy of the Operations and Maintenance Manual for the Private Storm Water Facilities, which shall include detailed diagrams and descriptions identifying the components and operations of the Private Storm Water Facilities.

c. Prior to final approval of the Development, Owner shall record this document in the deed records of Missoula County and provide a copy of the recorded documents to the City.

d. Owner shall notify the City's Public Works Director in writing of the person responsible for compliance with Owner's obligations under this covenant ("Owner Designee"), and of any change in the Owner Designee. Owner expressly agrees that the Owner Designee shall have the authority to bind Owner, its successors, and assigns with respect to the matters described in this Agreement.

e. Upon sale or transfer of any land in the Development containing Private Storm Water Facilities, the Owner shall inform the transferee of the obligations required under this Agreement.

8. Reimbursement

If the City exercises its right to enter the Development pursuant to the Easement described in Section 3 of this Agreement, Owner shall reimburse the City for all of its costs and expenses incurred in connection with any work performed pursuant to Section 4 or 5 of this Agreement within thirty (30) days after receipt of an invoice. If Owner fails to pay the invoiced amount within such period, such amount shall thereafter accrue interest at the statutory rate. The City may pursue any available means to collect such amount, together with interest, including placing a lien on the Development (and each of the lots contained therein). If the Development is owned by more than one person (i.e., multiple lot owners), each such owner shall be jointly and severally liable for payment of the amounts provided for in this Section.

9. Indemnification

Owner agrees to indemnify, defend (with legal counsel acceptable to the City), and hold harmless the City, its employees, independent contractors, and designees from and against any liability, losses, costs, expenses (including reasonable attorney fees), claims, or suits arising from: (1) Owner's failure to perform its obligations under this Agreement, including among other things its obligation to properly design, construct, operate, and maintain the Private Storm Water Facilities, and (2) the exercise of the City's rights under this Agreement.

10. Run with the Land

The parties' rights and obligations contained herein touch and concern the land, and shall run with the land and be binding upon Owner and its successors and assigns (including, without limitation, subsequent owners of any land in the Development containing any Private Storm Water Infrastructure and any homeowner's association owning common areas in the Development). The City's rights and obligations shall inure to the benefit of the City, as well as its successors and assigns.

11. Assignment

The obligations of Owner under this Agreement may not be assigned except (a) in connection with the sale of the property owned by such person (in which case the transferee will be deemed to assume such obligations), or (b) with the prior written consent of the City, to a homeowner's association that owns and maintains the common areas of the Development.

12. Authority

If Owner is an entity, the individual executing this Agreement on behalf of Owner represents and warrants to the City that he or she has the full powers and authority to do so and that the Owner has full right and authority to enter into this Agreement and perform its obligations under this Agreement.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement as of the date below.

By: ___________________________________
Owner

____
Title

STATE OF MONTANA)
) ss.
County of ______________________)

This instrument was acknowledged before me on ______________________________, 20_____ ,
by ___________________________________, as ______________________________ of
_______________________________________, an_______________________________.

____
Notary Public—State of Montana
My commission expires: ________________

APPROVED:

By:_______________________________
Jeremy Keene, PE, Public Works Director

CITY OF MISSOULA, MONTANA:

By: ________________________________
John Engen, Mayor

ATTEST:

By: ________________________________
Marty Rehbein, City Clerk

Appendix I
Water Sampling Plan

Water Sampling Plan

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

City of Missoula
Public Works and Mobility Department
Storm Water Utility Division
1345 West Broadway
Missoula, Montana 59802

February 2021

Contents

TABLES

FIGURES

GRAPHS

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 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 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, in conjunction with the TMDL section of the SWMP will 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.

In addition to the self-monitoring and TMDL parameters, collected samples of storm water, from two Clark Fork outfalls, are tested for *Escherichia coli* and total *coliform*. While these parameters are not required per the MS4 Permit, the City Parks and Recreation Department has identified them as a concern.

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, the implemented plan will track and evaluate the effectiveness of best management practices (BMPs) selected for reducing MS4 loading to impaired waterbodies.
- In accordance with the MS4 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 Permit). The TMDL-related monitoring locations identified in this plan will fulfill the self-monitoring requirements.
- This document, when implemented, will fulfill the requirements of Part III.B of the MS4 Permit for completing a sampling plan for TMDL-related monitoring.
- Due to increased recreational activity in the Clark Fork River, *E. coli* and total coliform have been added as sampling parameters to two outfalls.

2 MS4 Outfalls

The City is within the Middle Clark Fork and Bitterroot Sub-basins, with eight sub-watersheds intersecting the City limits (Table 1). Four of these sub-watersheds have MS4 outfalls to a surface water. Within these four sub-watersheds, 42 outfalls discharge storm water to one of nine waterbodies: five streams, three irrigation ditches, and one unnamed drainage. 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	2
		Grant Creek[IMP]	5
	La Valle Creek (170102040202)	La Valle Creek	0
	Lower Rattlesnake Creek (170102040102)	Rattlesnake Creek	5
	Marshall Creek-Clark Fork (170102040104)	Clark Fork River[IMP]	13
		Orchard Homes Ditch Company	6
		Missoula Irrigation District	2
	Martin Gulch-Clark Fork (170102040205)	Clark Fork River[IMP]	0
Bitterroot (17010205)	Hayes Creek-Bitterroot River (170102051603)	Bitterroot River[IMP]	1
		Pattee Creek	6
		Unnamed drainage	2
	Miller Creek (170102051601)	Miller Creek[IMP]	0
		Total	**42**

[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 waste-load 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). Figure 1 provides map of the sub-watersheds that intersect the City's boundary.

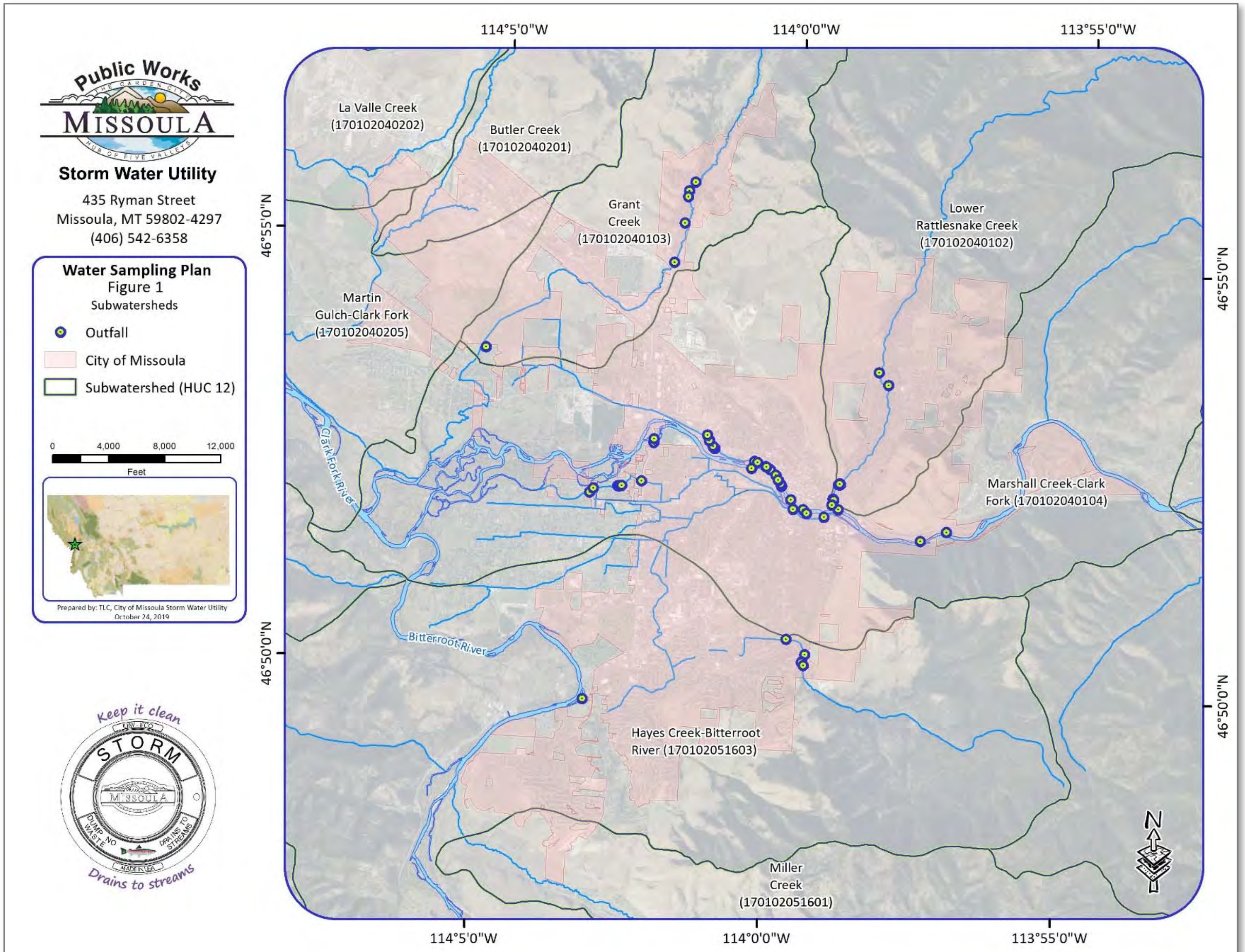


Figure 1. Sub-watersheds that intersect the City of Missoula

Table 2. Waste-load 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 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.

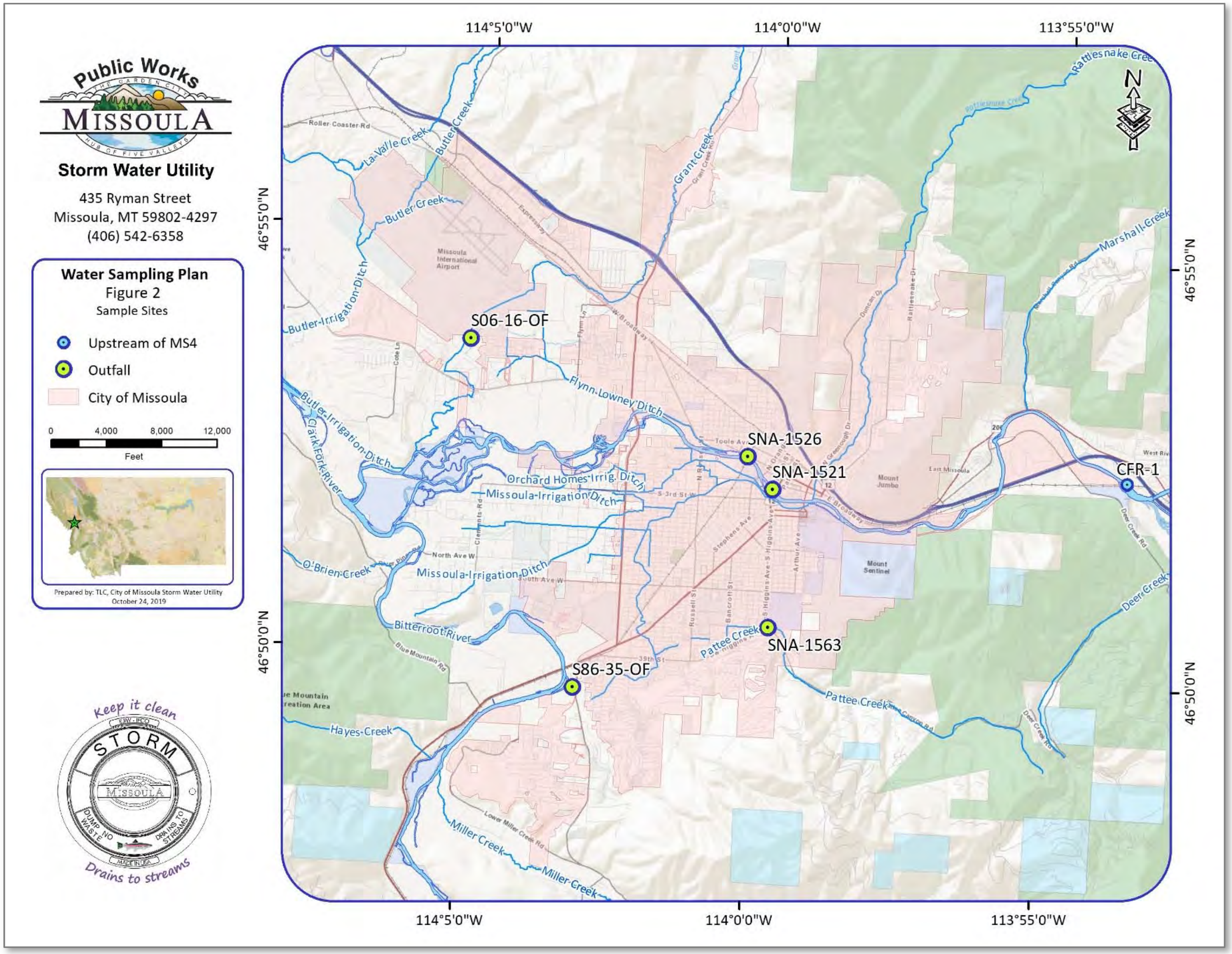


Figure 2. City of Missoula storm water monitoring sites

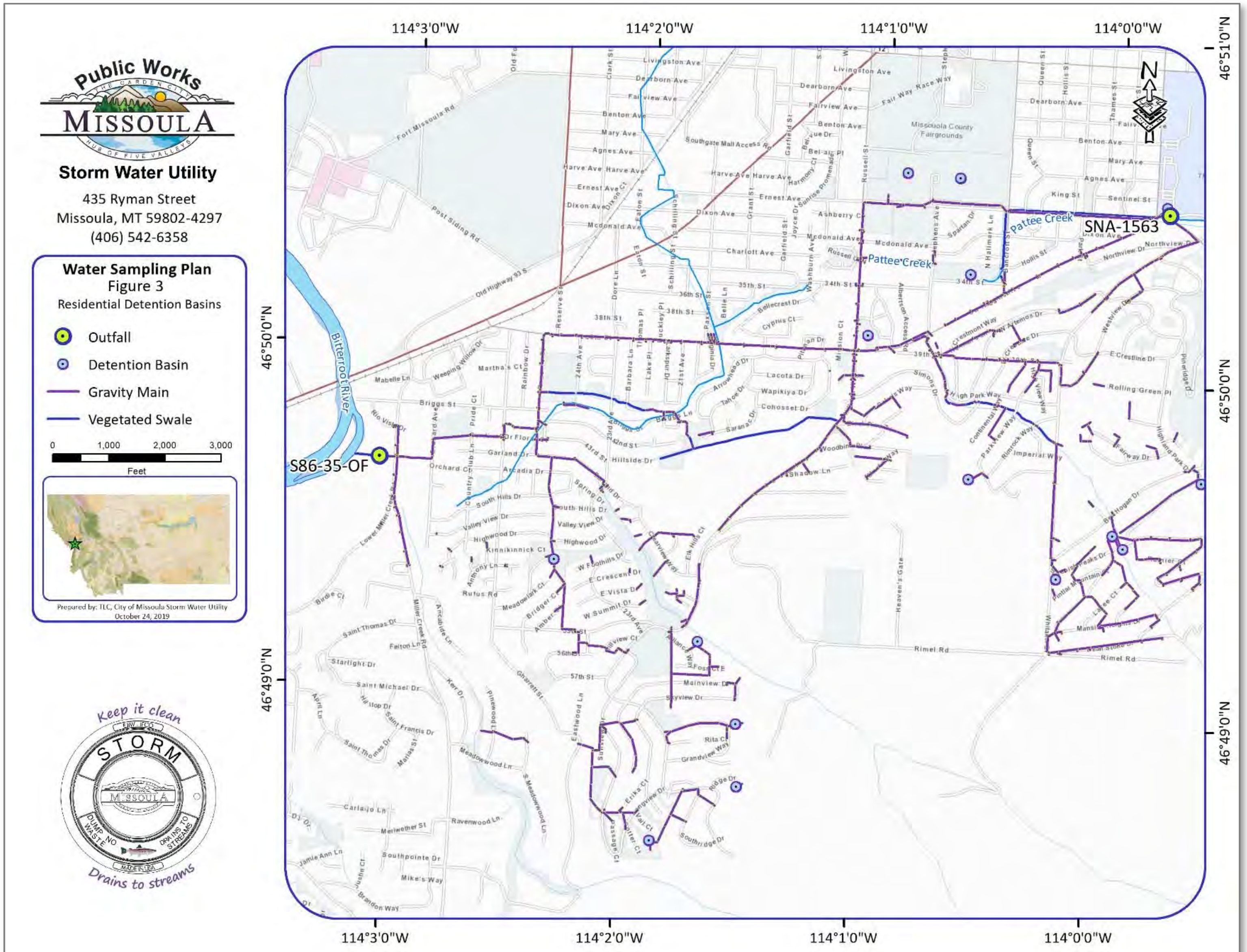


Figure 3. Sample sites for evaluating detention basin performance in a residential area

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 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.

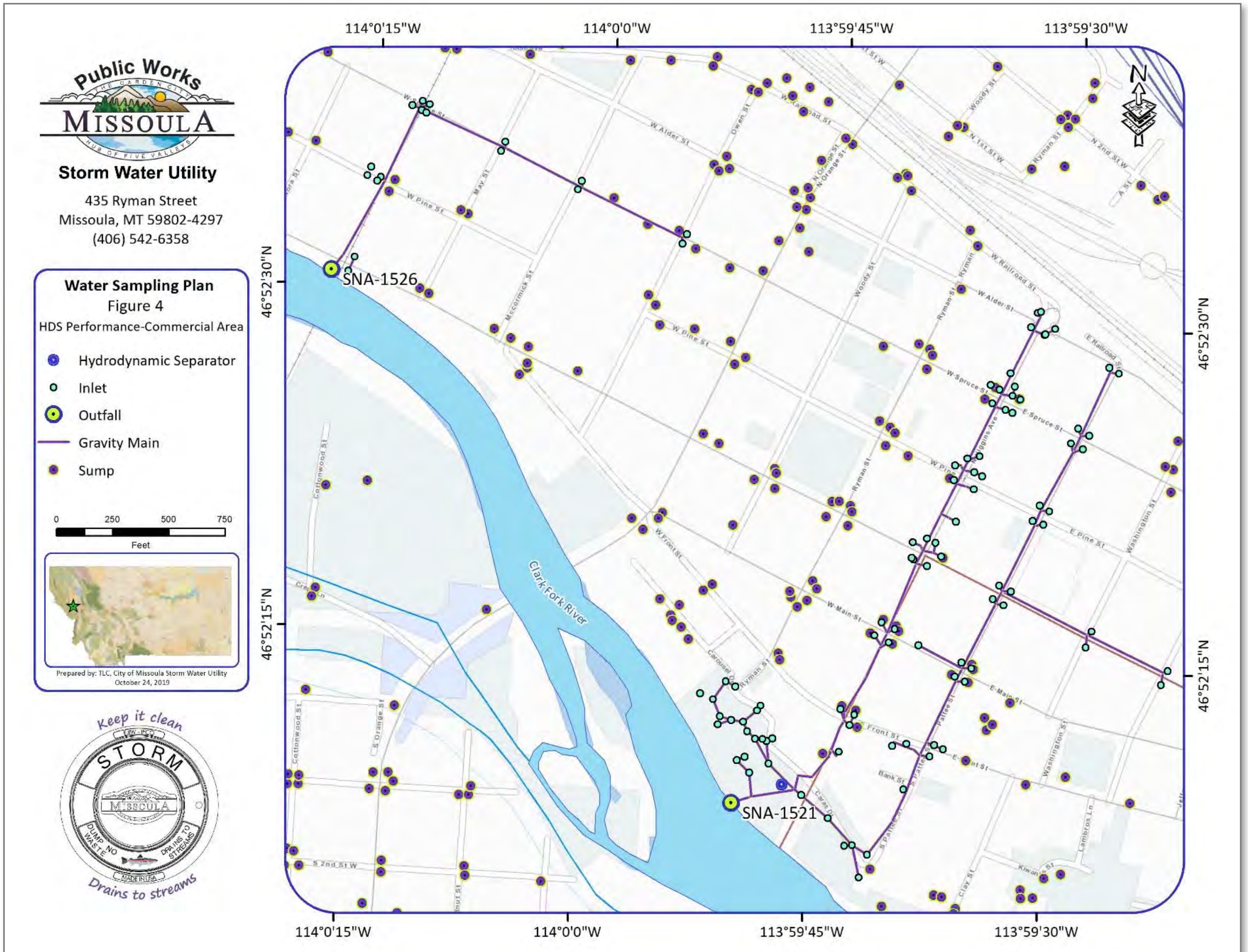


Figure 4. Sample sites for evaluating hydrodynamic separator performance in a commercial area

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 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 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

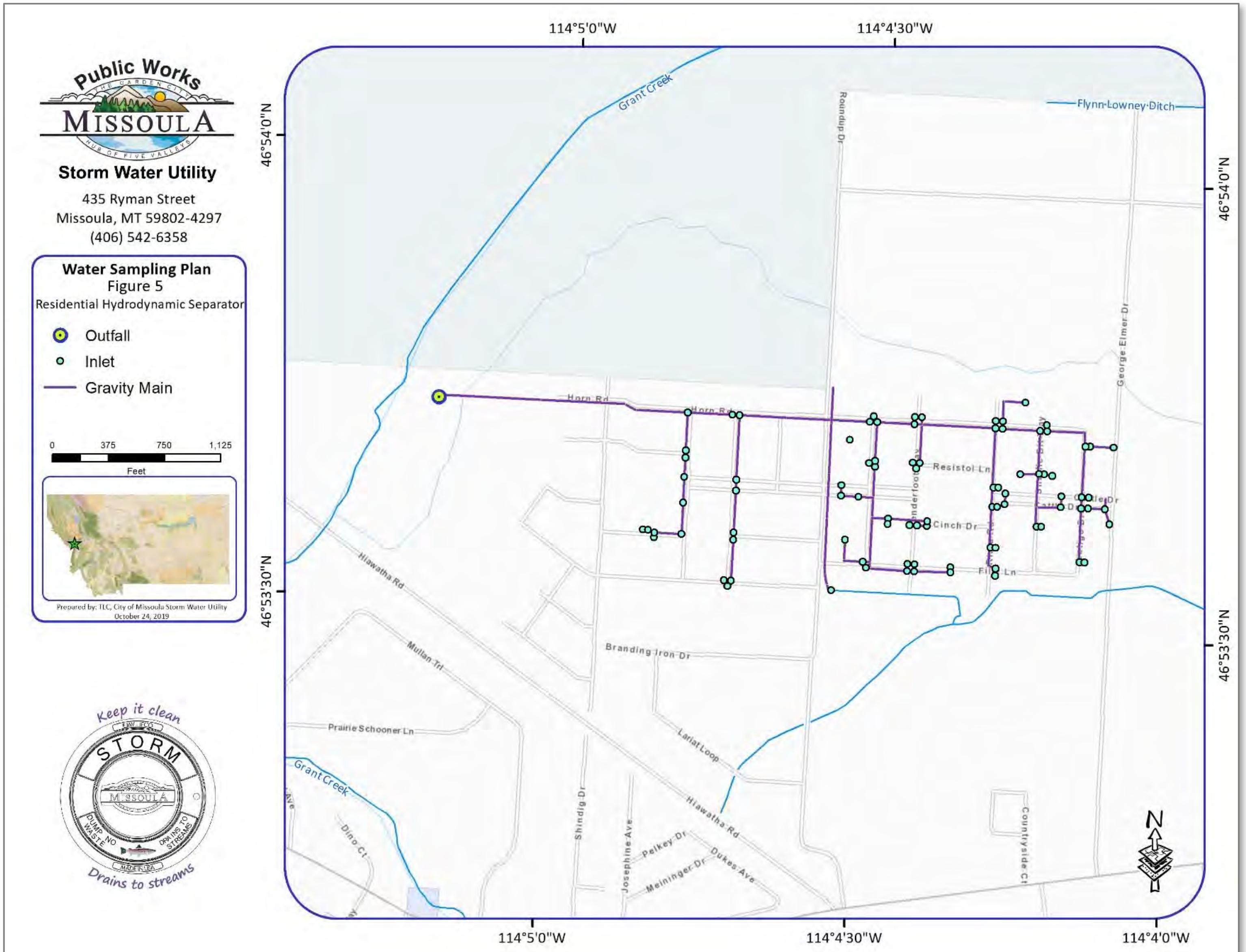


Figure 5. Sample site for evaluating hydrodynamic separator performance in a residential area

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 Permit. This site fulfills the self-monitoring requirements of the MS4 Permit. The purpose of these samples is to evaluate water quality entering the City.

3.5 Green Infrastructure Performance

Green infrastructure is a storm water management method that uses natural processes to improve water quality. The City has constructed various detention basins and vegetated swales as part of the South Hills Storm Drain System, described in Section 3.1. These systems are designed to remove sediment and promote nutrient uptake, using vegetation and soils. As the City works to promote green infrastructure, it is important to assess how well these facilities are performing. Further, the data will inform our decisions regarding implementation of similar facilities, based on the efficacy of these existing systems.

To analyze the performance of two basins and a swale, we will sample upstream and downstream of these facilities, at least twice annually during wet or dry weather. Six sites have been selected: Grit Chamber, Bancroft Ponds, and Bitterroot Swale (Figure 6). The samples will be collected on the same day and brought to the City Wastewater Treatment Plant Laboratory (WWTP Lab) for analysis: total suspended solids, total persulfate nitrogen, and total phosphorus.

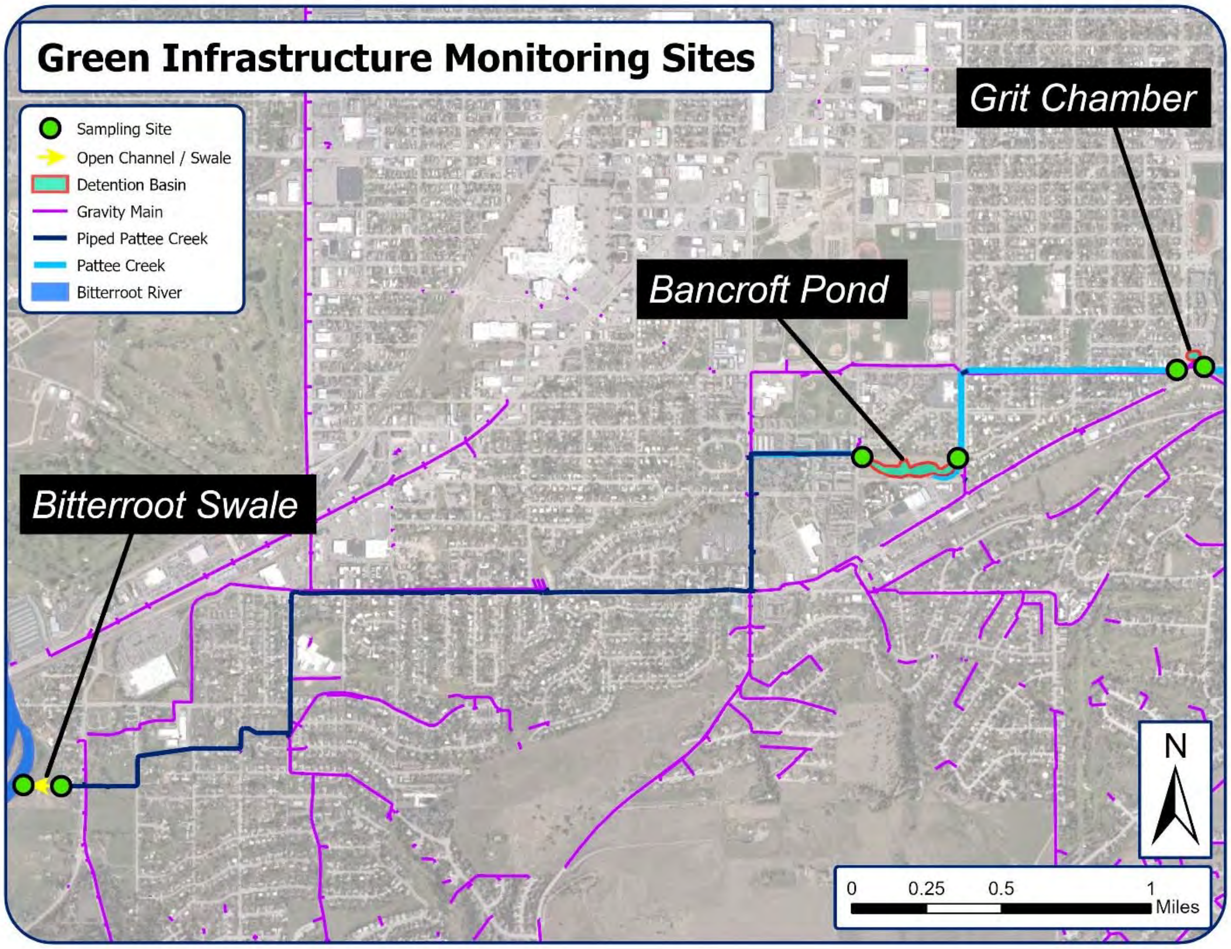


Figure 6. Green infrastructure monitoring sampling locations

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.

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) or the Wastewater Treatment Plant Laboratory (Missoula, 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 Sampling Equipment Decontamination

Decontaminated sample collection bottles and lids will be provided by Energy Laboratories or the WWTP Laboratory.

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 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 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 SNA-1563 (inflow)

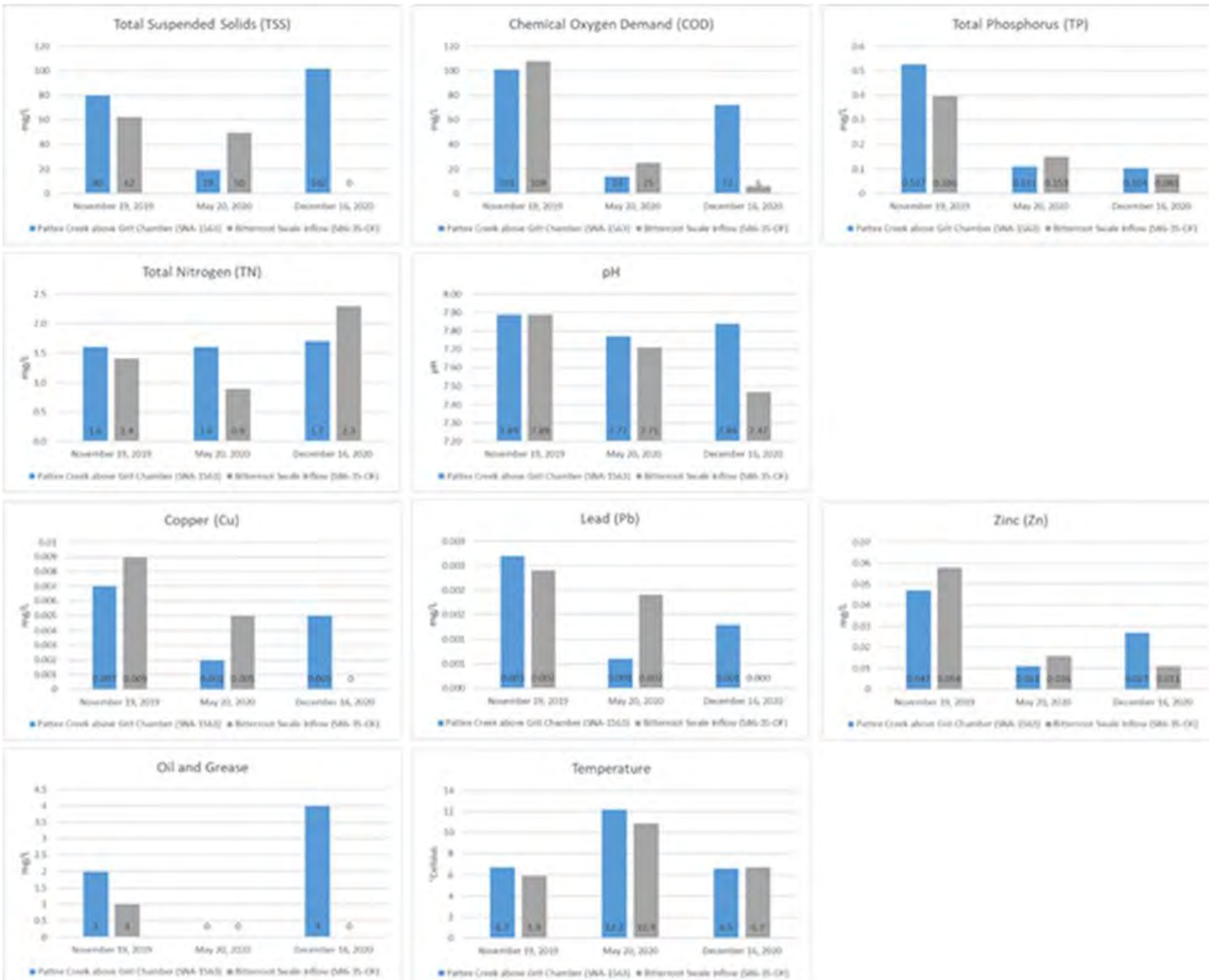
β = pollutant-specific concentration (mg/L) at S86-35-OF (outflow)

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. A positive percent change indicates that BMPs implemented upstream are effective, while a negative percent change indicates that they are not effective at reducing pollutants. A separate analysis of each parameter can be used to help understand the effectiveness of BMPs for a variety of parameters considered.

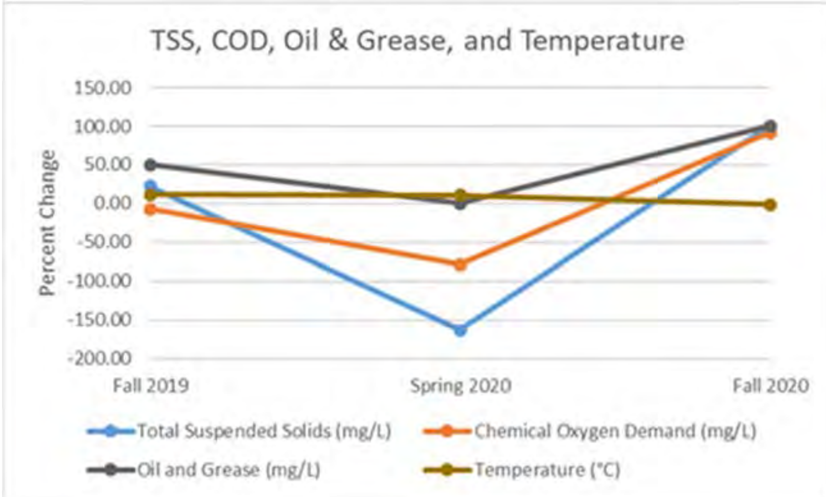
For the other samples (CFR-1 and S06-16-OF), graphs will be generated showing sample date and pollutant-specific concentration for each parameter. These graphics will show the trend in water quality data over time.

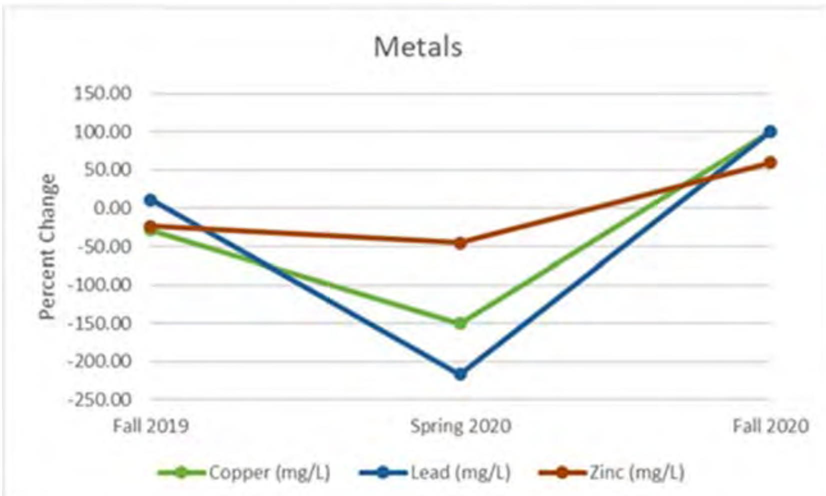
4.5.1 Detention Basin Performance in a Residential Area

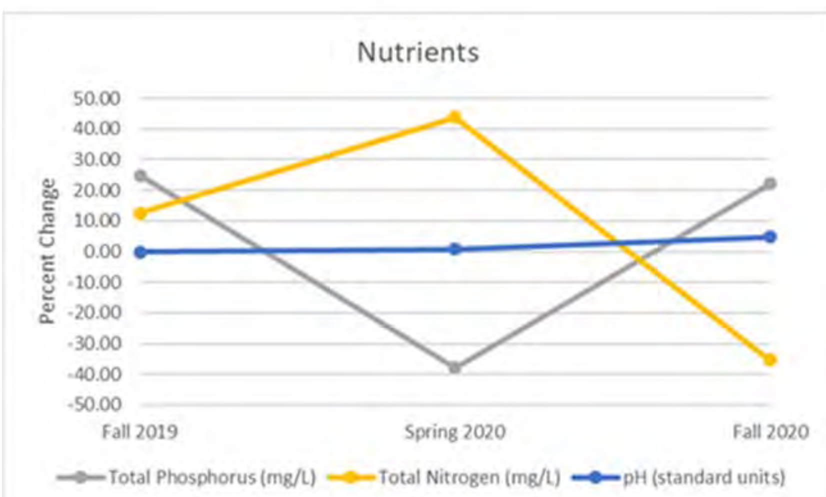
Samples were collected in fall 2019, spring 2020, and fall 2020 (Graph 1). Generally, the study parameters showed less effectiveness of the basins to treat pollutants in spring 2020 and greater effectiveness in fall 2020 (Graph 2). For example, in spring 2020, total nitrogen was significantly less at the Bitterroot outfall compared to SNA-1563, but it was significantly greater in fall 2020. We may need to add a sample site that better represents water quality as it flows across the valley from Pattee Canyon and the South Hills, to the Bitterroot River.



Graph 1. Water quality sampling results - SNA-1563 and S86-35-OF



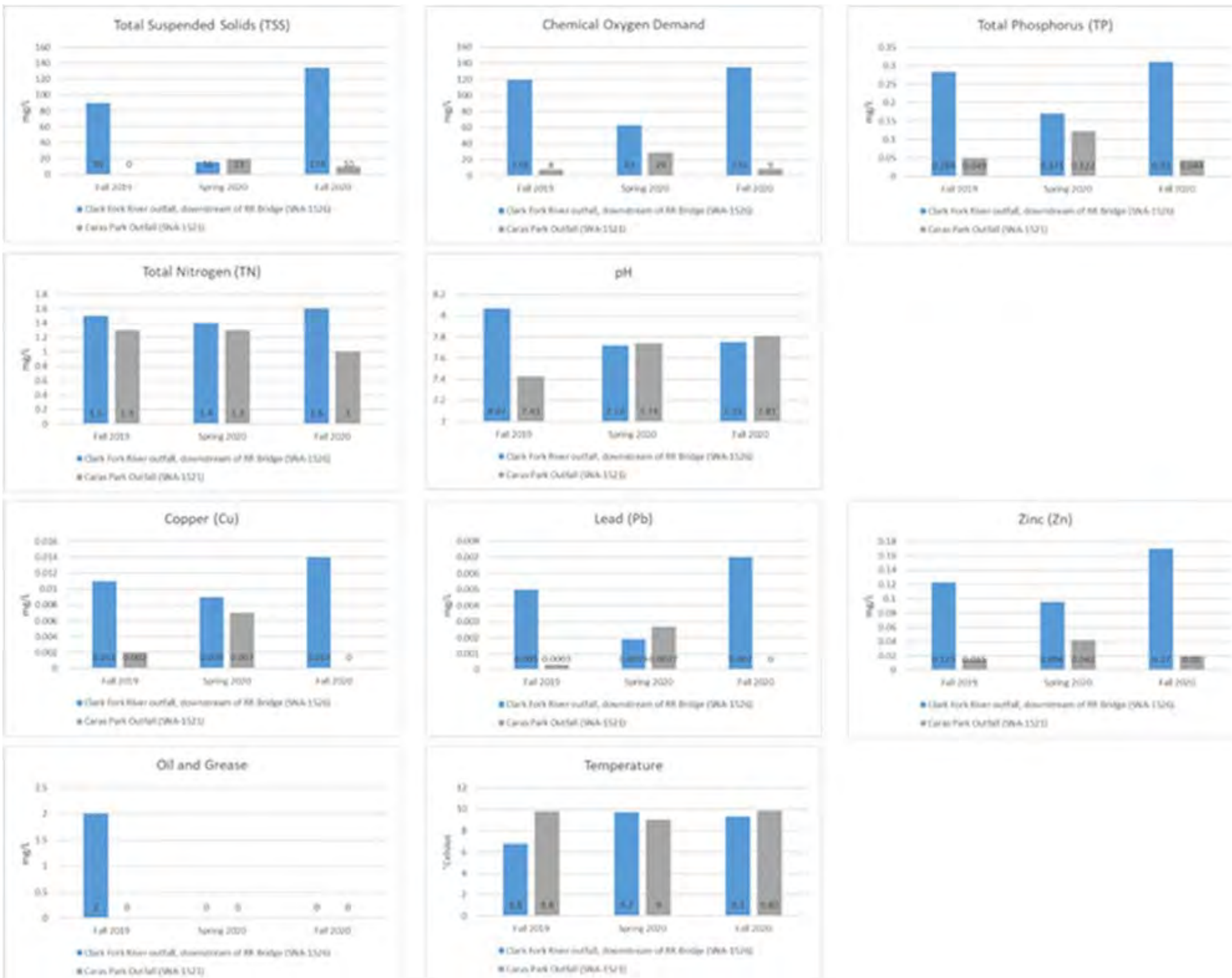




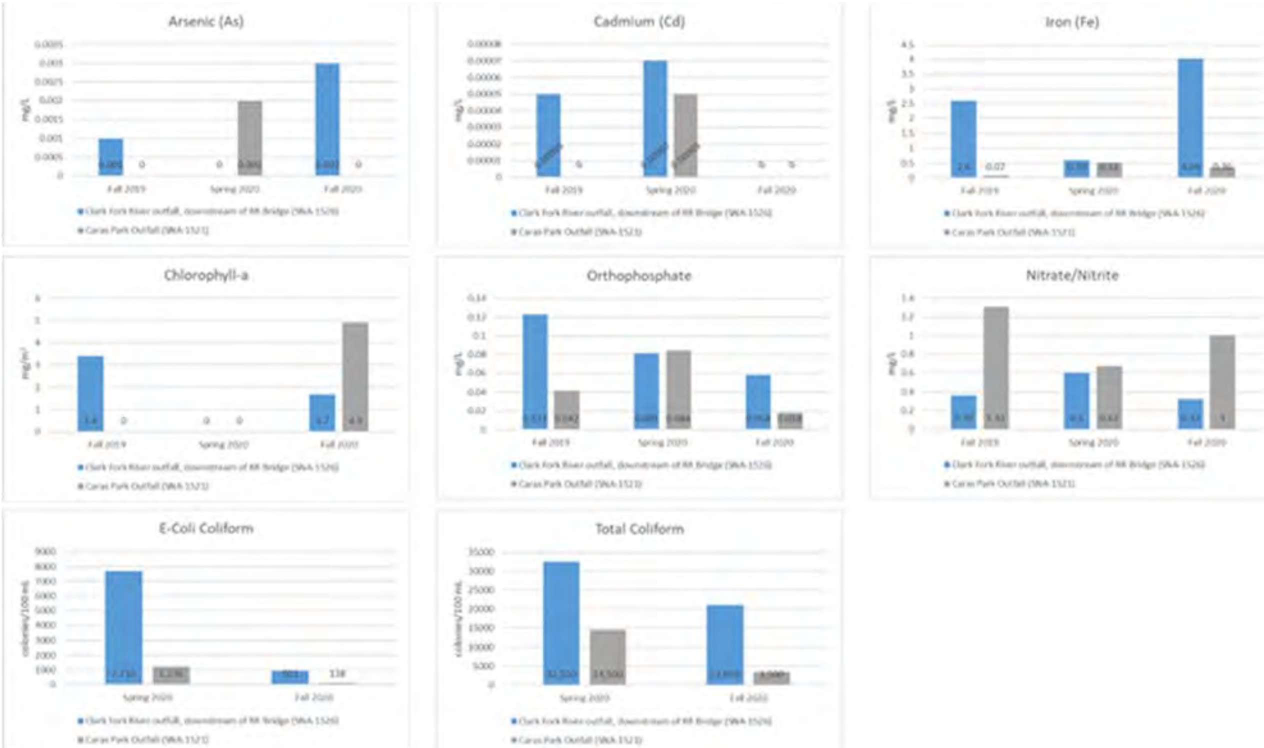
Graph 2. Percent change in detention basin performance from SNA-1563 to S86-35-OF

4.5.2 Hydrodynamic Separator Performance in a Commercial Area

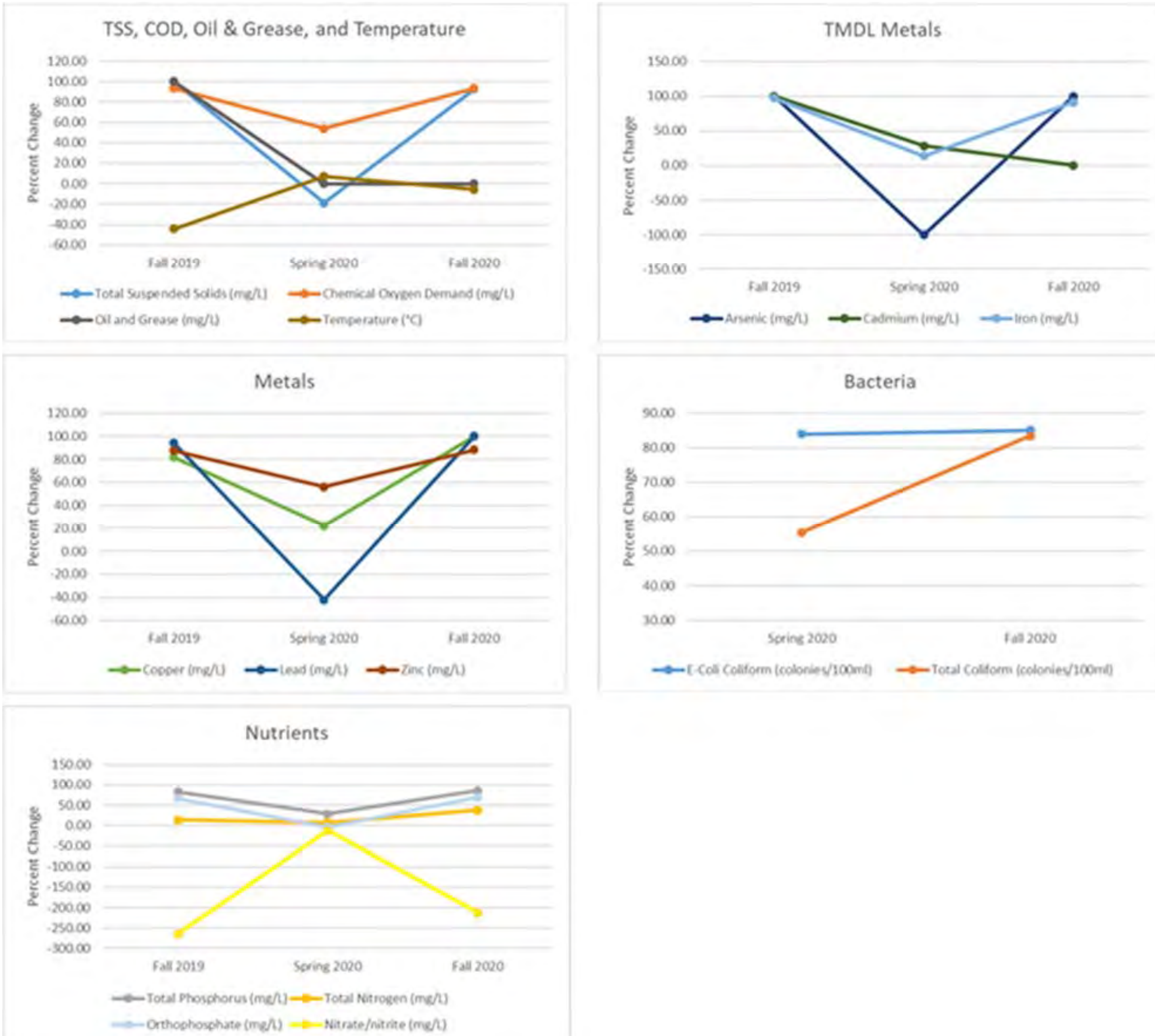
Samples were collected in fall 2019, spring 2020, and fall 2020 (Graph 3 and Graph 4). The results show that the HDS at Caras Park (SNA-1521) results in significantly improved quality of storm water discharge, compared to the outfall (SNA-1526) without an HDS (Graph 5).



Graph 3. Water quality sampling results - SNA-1526 and SNA-1521



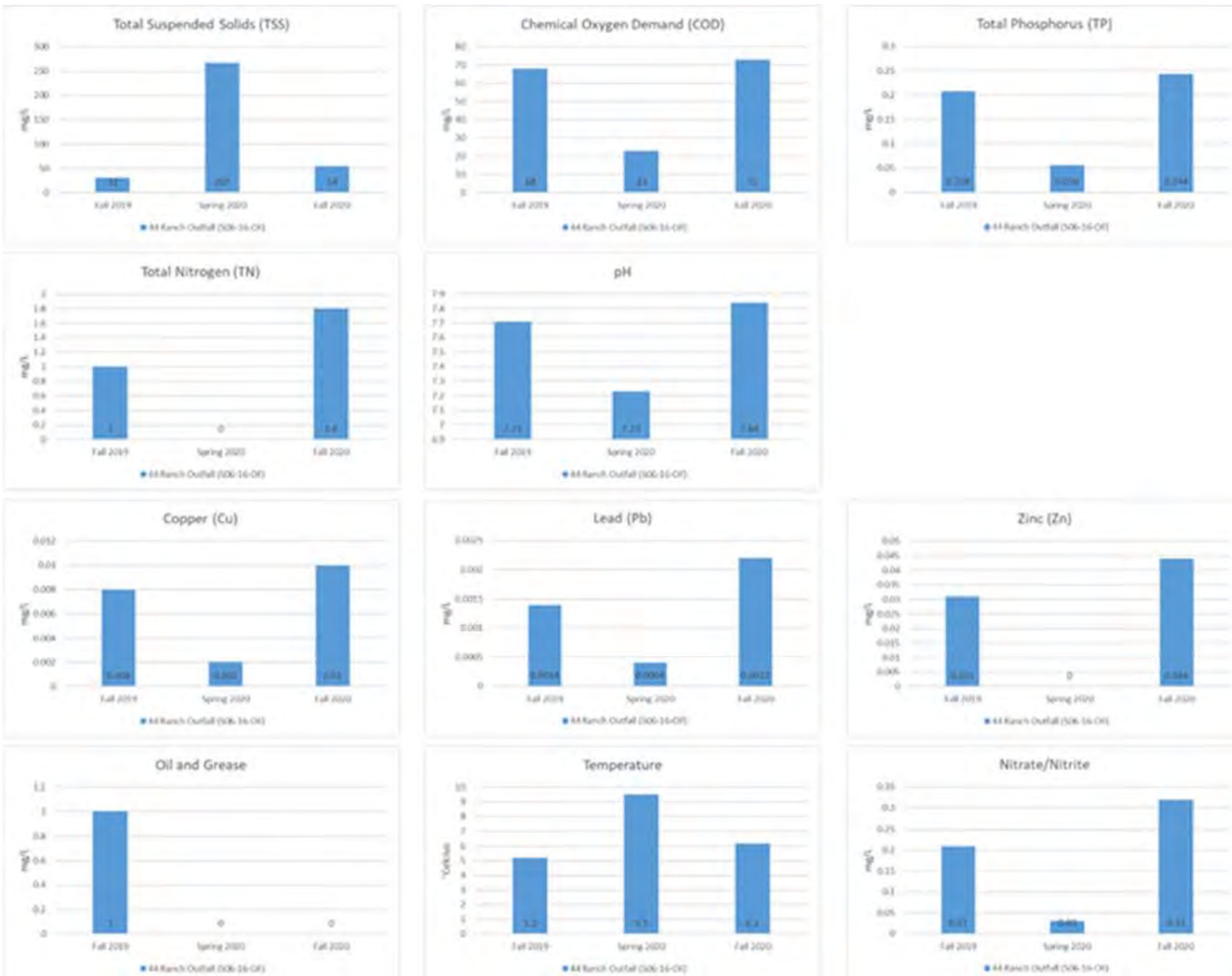
Graph 4. Total maximum daily load (TMDL) monitoring results - SNA-1526 and SNA-1521



Graph 5. Percent change in hydrodynamic separator performance - SNA-1521 and SNA-1526

4.5.3 Hydrodynamic Separator Performance in a Residential Area

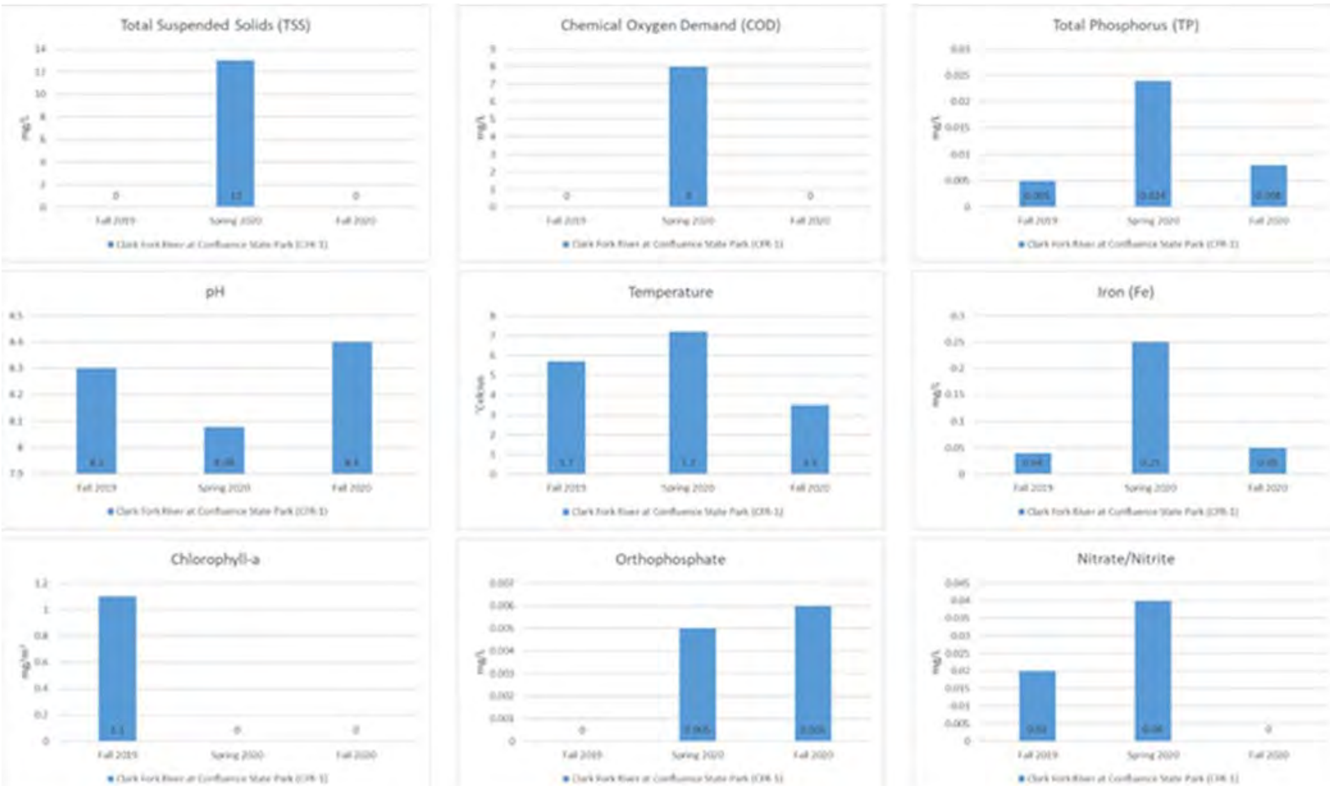
Samples were collected in fall 2019, spring 2020, and fall 2020 (Graph 6).



Graph 6. Water quality sampling results for S06-16-OF

4.5.4 Water Quality Upstream of the City of Missoula

Samples were collected in fall 2019, spring 2020, and fall 2020 (Graph 7). If no graph is depicted, it is because each sampling event resulted in a non-detect limit for that parameter.



Graph 7. Water quality sampling results - Clark Fork River at Confluence State Park

4.5.5 Green Infrastructure Performance

Each of the sites was sampled twice: end of June 2020 and end of August 2020. Except for temperature, the results showed a general trend towards improved water quality downstream of the green infrastructure facilities: total suspended solids, total nitrogen, total phosphorus, and pH (Graph 8). Notably, nutrients were significantly reduced downstream at all sites. Temperature was significantly increased downstream of Bancroft Ponds, and remained at approximately the same (elevated) level all the way to the Bitterroot River.

Graph 8. Water quality sampling results for measuring the effectiveness of green infrastructure as a best management practice

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

Montana Department of Environmental Quality. (2014a). Final Central Clark Fork Basin Tributaries TMDL and Water Quality Improvement Plan. Helena, MT. http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/COL-TMDL-01a.pdf

Montana Department of Environmental Quality. (2014b). Final Central Clark Fork Basin Tributaries TMDL and Water Quality Improvement Plan. TMDL Summary Table. Helena, MT. https://deq.mt.gov/Portals/112/Water/WQPB/TMDL/Approval%20Letters/COL-TMDL-01a_EPA.pdf

Montana Department of Environmental Quality. (2014c). Final–Silver Bow Creek and Clark Fork River Metals TMDLs. Helena, MT. http://deq.mt.gov/Portals/112/Water/WQPB/TMDL/PDF/SilverBowCFRMetals/C01-TMDL-05a.pdf

Montana Department of Environmental Quality. (2018a). Final 2018 Water Quality Integrated Report. http://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/Reports/IRs/2018/2018_IR_Final.pdf

Montana Department of Environmental Quality. (2018b). Final 2018 Water Quality Integrated Report. Appendix A–Impaired Waters. http://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/Reports/IRs/2018/Appendix_A.pdf

Montana Department of Environmental Quality and U.S. Environmental Protection Agency Region 8. (2014). Bitterroot Watershed Total Maximum Daily Loads and Water Quality Improvement Plan. Helena, MT. http://deq.mt.gov/Portals/112/water/wqpb/CWAIC/TMDL/C05-TMDL-04a.pdf

Tri-State Implementation Council. (1998). Clark Fork River Voluntary Nutrient Reduction Program. https://clarkfork.org/wp-content/uploads/2016/03/VNRP-Agreement.pdf

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

ANALYTICAL SUMMARY REPORT

November 06, 2019

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B19102004

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 10/23/2019 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B19102004-001	SNA-1521	10/22/19 10:20	10/23/19	Waste Water	Metals by ICP/ICPMS, Tot. Rec. Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B19102004-002	CFR-1	10/22/19 9:31	10/23/19	Waste Water	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B19102004

Report Date: 11/06/19

CASE NARRATIVE

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/06/19
Project:	MS4 General Permit	**Collection Date:**	10/22/19 10:20
Lab ID:	B19102004-001	**DateReceived:**	10/23/19
Client Sample ID:	SNA-1521	**Matrix:**	Waste Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	10/23/19 14:57 / drm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	8	mg/L		5		E410.4	10/25/19 13:45 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.31	mg/L		0.01		E353.2	10/23/19 14:39 / srh
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	10/29/19 14:35 / zas
Nitrogen, Total	1.3	mg/L		0.5		Calculation	10/30/19 11:28 / bas
Phosphorus, Orthophosphate as P	0.042	mg/L		0.005		E365.1	10/23/19 17:49 / zas
Phosphorus, Total as P	0.049	mg/L		0.005		E365.1	10/28/19 13:10 / zas
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	10/25/19 02:48 / pap
Cadmium	ND	mg/L		0.00003		E200.8	10/25/19 02:48 / pap
Copper	0.002	mg/L		0.002		E200.8	10/25/19 02:48 / pap
Iron	0.07	mg/L		0.02		E200.8	10/25/19 02:48 / pap
Lead	0.0003	mg/L		0.0003		E200.8	10/25/19 02:48 / pap
Zinc	0.015	mg/L		0.008		E200.8	10/25/19 02:48 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	10/28/19 09:11 / eli-g
BIOLOGICAL							
Chlorophyll a	ND	mg/cu. m	D	1.1		A10200 H	10/31/19 13:37 / eli-h

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	11/06/19
Project:	MS4 General Permit	**Collection Date:**	10/22/19 09:31
Lab ID:	B19102004-002	**DateReceived:**	10/23/19
Client Sample ID:	CFR-1	**Matrix:**	Waste Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	10/23/19 14:57 / drm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		5		E410.4	10/25/19 13:45 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.02	mg/L		0.01		E353.2	10/23/19 14:41 / srh
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	10/29/19 14:39 / zas
Nitrogen, Total	ND	mg/L		0.5		Calculation	10/30/19 11:28 / bas
Phosphorus, Orthophosphate as P	ND	mg/L		0.005		E365.1	10/23/19 17:50 / zas
Phosphorus, Total as P	0.005	mg/L		0.005		E365.1	10/28/19 13:11 / zas
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	10/25/19 02:53 / pap
Cadmium	ND	mg/L		0.00003		E200.8	10/25/19 02:53 / pap
Copper	ND	mg/L		0.002		E200.8	10/25/19 02:53 / pap
Iron	0.04	mg/L		0.02		E200.8	10/25/19 02:53 / pap
Lead	ND	mg/L		0.0003		E200.8	10/25/19 02:53 / pap
Zinc	ND	mg/L		0.008		E200.8	10/25/19 02:53 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	10/28/19 09:11 / eli-g
BIOLOGICAL							
Chlorophyll a	1.1	mg/cu. m	D	1.0		A10200 H	10/31/19 14:05 / eli-h

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 10/29/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 191028A
Lab ID: MBLK1910280845	Method Blank				Run: BAL-ACCU-124_191028A				10/28/19 08:58
Oil & Grease (HEM)	ND	mg/L	0.7						
Lab ID: LCS1910280845	Laboratory Control Sample				Run: BAL-ACCU-124_191028A				10/28/19 08:58
Oil & Grease (HEM)	33	mg/L	5.0	83	78	114			
Lab ID: LCSD1910280845	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_191028A				10/28/19 08:59
Oil & Grease (HEM)	35	mg/L	5.0	87	78	114	4.4	18	
Lab ID: G19100472-002DMS	Sample Matrix Spike				Run: BAL-ACCU-124_191028A				10/28/19 09:01
Oil & Grease (HEM)	37	mg/L	5.0	37	78	114			S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/01/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A10200 H						Analytical Run: CHLOROPHYLL UV/VIS_191031A			
Lab ID: CCV_02r-W	Continuing Calibration Verification Standard								10/31/19 11:16
Chlorophyll a	2.8	mg/cu. m	0.1	113	85	115			
Method: A10200 H									Batch: 48687
Lab ID: MB-48687	Method Blank				Run: CHLOROPHYLL UV/VIS_191				10/31/19 12:13
Chlorophyll a	ND	mg/cu. m	0.02						
Lab ID: LCS-48687	Laboratory Control Sample				Run: CHLOROPHYLL UV/VIS_191				10/31/19 12:41
Chlorophyll a	2.6	mg/cu. m	0.1	105	80	120			
Lab ID: B19102004-002FMS	Sample Matrix Spike				Run: CHLOROPHYLL UV/VIS_191				10/31/19 14:33
Chlorophyll a	30	mg/cu. m	1.0	116	80	120			
Lab ID: B19102004-002FMSD	Sample Matrix Spike Duplicate				Run: CHLOROPHYLL UV/VIS_191				10/31/19 15:01
Chlorophyll a	30	mg/cu. m	1.0	114	80	120	1.7	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/06/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_191024A
Lab ID: QCS	6	Initial Calibration Verification Standard								10/24/19 23:41
Arsenic		0.0469	mg/L	0.0050	94	90	110			
Cadmium		0.0229	mg/L	0.0010	92	90	110			
Copper		0.0478	mg/L	0.010	96	90	110			
Iron		0.238	mg/L	0.020	95	90	110			
Lead		0.0463	mg/L	0.010	93	90	110			
Zinc		0.0467	mg/L	0.010	93	90	110			
Method: E200.8										Batch: 138483
Lab ID: MB-138483	6	Method Blank				Run: ICPMS208-B_191024A				10/25/19 01:51
Arsenic		ND	mg/L	0.0004						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		0.007	mg/L	0.002						
Lead		ND	mg/L	0.00009						
Zinc		ND	mg/L	0.005						
Lab ID: LCS4-138483	6	Laboratory Control Sample				Run: ICPMS208-B_191024A				10/25/19 01:55
Arsenic		0.0892	mg/L	0.0010	89	85	115			
Cadmium		0.0445	mg/L	0.0010	89	85	115			
Copper		0.0918	mg/L	0.0010	92	85	115			
Iron		0.502	mg/L	0.0030	100	85	115			
Lead		0.0897	mg/L	0.0010	90	85	115			
Zinc		0.0958	mg/L	0.0046	96	85	115			
Lab ID: B19101999-002EMS4	6	Sample Matrix Spike				Run: ICPMS208-B_191024A				10/25/19 02:13
Arsenic		0.0920	mg/L	0.0010	91	70	130			
Cadmium		0.0466	mg/L	0.0010	93	70	130			
Copper		0.0938	mg/L	0.0050	93	70	130			
Iron		0.724	mg/L	0.020	116	70	130			
Lead		0.0937	mg/L	0.0010	94	70	130			
Zinc		0.103	mg/L	0.010	103	70	130			
Lab ID: B19101999-002EMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_191024A				10/25/19 02:17
Arsenic		0.0910	mg/L	0.0010	90	70	130	1.1	20	
Cadmium		0.0467	mg/L	0.0010	93	70	130	0.3	20	
Copper		0.0960	mg/L	0.0050	95	70	130	2.2	20	
Iron		0.576	mg/L	0.020	87	70	130	23	20	R
Lead		0.0944	mg/L	0.0010	94	70	130	0.8	20	
Zinc		0.0962	mg/L	0.010	96	70	130	6.7	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

R - RPD exceeds advisory limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/05/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 138489	
Lab ID: MB-138489	Method Blank					Run: BAL #SD-15_191023B			10/23/19 14:57	
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-138489	Laboratory Control Sample					Run: BAL #SD-15_191023B			10/23/19 14:57	
Solids, Total Suspended TSS @ 105 C		104	mg/L	10	104	80	120			
Lab ID: B19102004-001BDUP	Sample Duplicate					Run: BAL #SD-15_191023B			10/23/19 14:57	
Solids, Total Suspended TSS @ 105 C		2.80	mg/L	10					5	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/05/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_191029A			
Lab ID: ICV		Initial Calibration Verification Standard							10/29/19 13:21	
Nitrogen, Kjeldahl, Total as N		9.59	mg/L	0.50	96	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							10/29/19 14:28	
Nitrogen, Kjeldahl, Total as N		9.26	mg/L	0.50	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							10/29/19 14:50	
Nitrogen, Kjeldahl, Total as N		9.31	mg/L	0.50	93	90	110			
Method: E351.2									Batch: 138608	
Lab ID: MB-138608		Method Blank				Run: FIA204-B_191029A			10/29/19 14:33	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.2						
Lab ID: LCS-138608		Laboratory Control Sample				Run: FIA204-B_191029A			10/29/19 14:34	
Nitrogen, Kjeldahl, Total as N		9.18	mg/L	0.50	92	90	110			
Lab ID: B19102004-001DMS		Sample Matrix Spike				Run: FIA204-B_191029A			10/29/19 14:37	
Nitrogen, Kjeldahl, Total as N		9.22	mg/L	0.50	92	90	110			
Lab ID: B19102004-001DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_191029A			10/29/19 14:38	
Nitrogen, Kjeldahl, Total as N		9.10	mg/L	0.50	91	90	110	1.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/05/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_191023B	
Lab ID: ICV		Initial Calibration Verification Standard							10/23/19 09:33	
Nitrogen, Nitrate+Nitrite as N		0.564	mg/L	0.010	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							10/23/19 14:26	
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							10/23/19 14:43	
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Method: E353.2									Batch: R329629	
Lab ID: MBLK		Method Blank				Run: FIA203-B_191023B			10/23/19 09:34	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.009						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_191023B			10/23/19 09:35	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: B19102006-001CMS		Sample Matrix Spike				Run: FIA203-B_191023B			10/23/19 14:45	
Nitrogen, Nitrate+Nitrite as N		1.12	mg/L	0.010	106	90	110			
Lab ID: B19102006-001CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_191023B			10/23/19 14:47	
Nitrogen, Nitrate+Nitrite as N		1.16	mg/L	0.010	110	90	110	3.5	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/05/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_191023B			
Lab ID: ICV	Initial Calibration Verification Standard								10/23/19 17:36	
Phosphorus, Orthophosphate as P		0.253	mg/L	0.0050	101	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard								10/23/19 17:51	
Phosphorus, Orthophosphate as P		0.496	mg/L	0.0050	99	90	110			
Method: E365.1									Batch: R329688	
Lab ID: ICB	Method Blank					Run: FIA202-B_191023B			10/23/19 17:37	
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB	Laboratory Fortified Blank					Run: FIA202-B_191023B			10/23/19 17:38	
Phosphorus, Orthophosphate as P		0.248	mg/L	0.0051	99	90	110			
Lab ID: B19101999-003CMS	Sample Matrix Spike					Run: FIA202-B_191023B			10/23/19 17:45	
Phosphorus, Orthophosphate as P		0.257	mg/L	0.0051	100	90	110			
Lab ID: B19101999-003CMSD	Sample Matrix Spike Duplicate					Run: FIA202-B_191023B			10/23/19 17:46	
Phosphorus, Orthophosphate as P		0.255	mg/L	0.0051	99	90	110	0.8	10	
Method: E365.1							Analytical Run: FIA202-B_191028B			
Lab ID: ICV	Initial Calibration Verification Standard								10/28/19 12:42	
Phosphorus, Total as P		0.519	mg/L	0.0050	104	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard								10/28/19 13:01	
Phosphorus, Total as P		0.514	mg/L	0.0050	103	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard								10/28/19 13:21	
Phosphorus, Total as P		0.509	mg/L	0.0050	102	90	110			
Method: E365.1									Batch: 138452	
Lab ID: MB-138452	Method Blank					Run: FIA202-B_191028B			10/28/19 12:45	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-138452	Laboratory Control Sample					Run: FIA202-B_191028B			10/28/19 12:46	
Phosphorus, Total as P		0.194	mg/L	0.0050	97	90	110			
Lab ID: B19101934-001CMS	Sample Matrix Spike					Run: FIA202-B_191028B			10/28/19 13:04	
Phosphorus, Total as P		0.203	mg/L	0.0050	97	90	110			
Lab ID: B19101934-001CMSD	Sample Matrix Spike Duplicate					Run: FIA202-B_191028B			10/28/19 13:05	
Phosphorus, Total as P		0.207	mg/L	0.0050	99	90	110	2.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19102004 **Report Date:** 11/05/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_191025A
Lab ID: CCV		Continuing Calibration Verification Standard								10/25/19 13:45
Oxygen Demand, Chemical (COD)		48.0	mg/L	5.0	96	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								10/25/19 13:45
Oxygen Demand, Chemical (COD)		50.1	mg/L	5.0	100	90	110			
Method: E410.4										Batch: 138562
Lab ID: MB-138562		Method Blank				Run: SPEC3_191025A				10/25/19 13:45
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-138562		Laboratory Control Sample				Run: SPEC3_191025A				10/25/19 13:45
Oxygen Demand, Chemical (COD)		23.9	mg/L	5.0	98	90	110			
Lab ID: B19101860-001BMS		Sample Matrix Spike				Run: SPEC3_191025A				10/25/19 13:45
Oxygen Demand, Chemical (COD)		86.8	mg/L	5.0	103	90	110			
Lab ID: B19101860-001BMSD		Sample Matrix Spike Duplicate				Run: SPEC3_191025A				10/25/19 13:45
Oxygen Demand, Chemical (COD)		86.8	mg/L	5.0	103	90	110	0.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

City of Missoula Storm Water Utility B19102004

Login completed by:	Richard L. Shular	Date Received:	10/23/2019
Reviewed by:	BL2000\gmccartney	Received by:	qej
Reviewed Date:	10/24/2019	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Storm Water Utility
Contact	Tracy Campbell
Phone	406-542-6364
Mailing Address	1345 W Broadway
City, State, Zip	Missoula, MT 59802
Email	Campbellt@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	136499

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 General Permit
Sampler Name	T. Campbell
Sampler Phone	406-542-6364
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	TSS	COD	Total P	TKN	Nitrate+Nitrite	Total N	oil+grease	Metals-Cu, Pb, Zn, As, Cd, Fe	Chlorophyll a	~~See Attached~~ Orthophosphate	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1521	10-22-19	10:20	8	W	X	X	X	X	X	X	X	X	X	X		B19102004-001
2	CFR-1	10-22-19	09:31	8	W	X	X	X	X	X	X	X	X	X	X		-002
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	10-22-19/11:17	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				Quincee Jones	10/23/19 09:30	[signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-12/16 v.1

BOTTLE ORDER 136499

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
435 Ryman St
Missoula MT 59802-4207

Phone:

Project: samples

Order Created by: Wynn Pippin
Shipped From: Billings, MT
Ship Date: 9/24/2019
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
one site							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		☐ H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		☐ H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		■ HNO3	Cu, Pb, Zn	1
two sites (2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		☐ H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		☐ H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				

1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		■ HNO3	Cu, Pb, Zn,	1

Three sites (3 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		☐ H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		☐ H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		■ HNO3	Cu, Pb, Zn, As, Cd, Fe	1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		☐ AF		1

■ HNO3 - Nitric Acid	☐ H2SO4 - Sulfuric Acid	■ NaOH - Sodium Hydroxide	**We strongly suggest that the samples are shipped the same day as they are collected.**
■ ZnAc - Zinc Acetate	■ HCl - Hydrochloric Acid	☐ H3PO4 - Phosphoric Acid	

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

December 03, 2019

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B19111813
Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 11/20/2019 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B19111813-001	SNA-1563	11/19/19 11:15	11/20/19	Aqueous	Metals by ICP/ICPMS, Tot. Rec. Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B19111813-002	S86-35-OF	11/19/19 10:40	11/20/19	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B19111813

Report Date: 12/03/19

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/03/19
Project:	MS4 General Permit	**Collection Date:**	11/19/19 11:15
Lab ID:	B19111813-001	**DateReceived:**	11/20/19
Client Sample ID:	SNA-1563	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	80	mg/L	D	10		A2540 D	11/21/19 08:52 / drm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	101	mg/L	D	10		E410.4	11/22/19 13:52 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.44	mg/L		0.01		E353.2	11/22/19 15:41 / srh
Nitrogen, Kjeldahl, Total as N	1.2	mg/L		0.5		E351.2	11/27/19 16:47 / zas
Nitrogen, Total	1.6	mg/L		0.5		Calculation	12/02/19 08:22 / bas
Phosphorus, Total as P	0.527	mg/L		0.005		E365.1	12/03/19 13:03 / zas
METALS, TOTAL RECOVERABLE							
Copper	0.007	mg/L		0.002		E200.8	11/24/19 17:07 / car
Lead	0.0027	mg/L		0.0003		E200.8	11/24/19 17:07 / car
Zinc	0.047	mg/L		0.008		E200.8	11/24/19 17:07 / car
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	2	mg/L		1		E1664A	11/27/19 07:15 / eli-g

Report Definitions:

RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/03/19
Project:	MS4 General Permit	**Collection Date:**	11/19/19 10:40
Lab ID:	B19111813-002	**DateReceived:**	11/20/19
Client Sample ID:	S86-35-OF	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	62	mg/L		10		A2540 D	11/21/19 08:52 / drm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	108	mg/L	D	10		E410.4	11/22/19 13:52 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.28	mg/L		0.01		E353.2	11/22/19 15:43 / srh
Nitrogen, Kjeldahl, Total as N	1.1	mg/L		0.5		E351.2	11/27/19 16:48 / zas
Nitrogen, Total	1.4	mg/L		0.5		Calculation	12/02/19 08:22 / bas
Phosphorus, Total as P	0.396	mg/L		0.005		E365.1	12/03/19 13:05 / zas
METALS, TOTAL RECOVERABLE							
Copper	0.009	mg/L		0.002		E200.8	11/24/19 17:12 / car
Lead	0.0024	mg/L		0.0003		E200.8	11/24/19 17:12 / car
Zinc	0.058	mg/L		0.008		E200.8	11/24/19 17:12 / car
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	1	mg/L		1		E1664A	11/27/19 07:15 / eli-g

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 11/27/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 191127A
Lab ID: MBLK1911270655	Method Blank				Run: BAL-ACCU-124_191127A				11/27/19 07:10
Oil & Grease (HEM)	ND	mg/L	0.7						
Lab ID: LCS1911270655	Laboratory Control Sample				Run: BAL-ACCU-124_191127A				11/27/19 07:10
Oil & Grease (HEM)	35	mg/L	5.0	87	78	114			
Lab ID: LCSD1911270655	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_191127A				11/27/19 07:10
Oil & Grease (HEM)	35	mg/L	5.0	87	78	114	0.3	18	
Lab ID: G19110405-001DMS	Sample Matrix Spike				Run: BAL-ACCU-124_191127A				11/27/19 07:12
Oil & Grease (HEM)	25	mg/L	5.0	63	78	114			S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 11/26/19

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8						Analytical Run: ICPMS208-B_191122A			
Lab ID: QCS	Initial Calibration Verification Standard								11/24/19 09:45
Copper	0.0508	mg/L	0.010	102	90	110			
Lead	0.0492	mg/L	0.010	98	90	110			
Zinc	0.0501	mg/L	0.010	100	90	110			
Method: E200.8									Batch: 139475
Lab ID: MB-139475	Method Blank				Run: ICPMS208-B_191122A				11/24/19 10:22
Copper	ND	mg/L	0.0004						
Lead	ND	mg/L	0.00009						
Zinc	ND	mg/L	0.005						
Lab ID: LCS4-139475	Laboratory Control Sample				Run: ICPMS208-B_191122A				11/24/19 10:27
Copper	0.101	mg/L	0.0050	101	85	115			
Lead	0.101	mg/L	0.0010	101	85	115			
Zinc	0.0947	mg/L	0.010	95	85	115			
Lab ID: B19111799-001CMS4	Sample Matrix Spike				Run: ICPMS208-B_191122A				11/24/19 15:39
Copper	0.0974	mg/L	0.0050	90	70	130			
Lead	0.0892	mg/L	0.0010	89	70	130			
Zinc	0.0947	mg/L	0.010	95	70	130			
Lab ID: B19111799-001CMSD4	Sample Matrix Spike Duplicate				Run: ICPMS208-B_191122A				11/24/19 15:43
Copper	0.0991	mg/L	0.0050	91	70	130	1.7	20	
Lead	0.0914	mg/L	0.0010	91	70	130	2.4	20	
Zinc	0.0946	mg/L	0.010	95	70	130	0.1	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 12/03/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 139485
Lab ID: MB-139485		Method Blank				Run: BAL #SD-15_191121A				11/21/19 08:51
Solids, Total Suspended TSS @ 105 C		2	mg/L							
Lab ID: LCS-139485		Laboratory Control Sample				Run: BAL #SD-15_191121A				11/21/19 08:51
Solids, Total Suspended TSS @ 105 C		117	mg/L	10	117	80	120			
Lab ID: B19111829-001BDUP		Sample Duplicate				Run: BAL #SD-15_191121A				11/21/19 08:52
Solids, Total Suspended TSS @ 105 C		8.75	mg/L	10					5	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 12/03/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_191127B	
Lab ID: ICV		Initial Calibration Verification Standard							11/27/19 16:16	
Nitrogen, Kjeldahl, Total as N		9.34	mg/L	0.50	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/27/19 16:33	
Nitrogen, Kjeldahl, Total as N		9.68	mg/L	0.50	97	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/27/19 16:51	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Method: E351.2									Batch: 139678	
Lab ID: MB-139678		Method Blank				Run: FIA204-B_191127B			11/27/19 16:34	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.2						
Lab ID: LCS-139678		Laboratory Control Sample				Run: FIA204-B_191127B			11/27/19 16:36	
Nitrogen, Kjeldahl, Total as N		9.20	mg/L	0.50	92	90	110			
Lab ID: B19111377-005BMS		Sample Matrix Spike				Run: FIA204-B_191127B			11/27/19 16:38	
Nitrogen, Kjeldahl, Total as N		13.1	mg/L	0.50	93	90	110			
Lab ID: B19111377-005BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_191127B			11/27/19 16:39	
Nitrogen, Kjeldahl, Total as N		12.0	mg/L	0.50	82	90	110	8.8	10	S

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 12/03/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_191122A	
Lab ID: ICV		Initial Calibration Verification Standard							11/22/19 09:23	
Nitrogen, Nitrate+Nitrite as N		0.554	mg/L	0.010	98	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/22/19 15:31	
Nitrogen, Nitrate+Nitrite as N		0.994	mg/L	0.010	99	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/22/19 15:47	
Nitrogen, Nitrate+Nitrite as N		0.972	mg/L	0.010	97	90	110			
Method: E353.2									Batch: R331340	
Lab ID: MBLK		Method Blank				Run: FIA203-B_191122A			11/22/19 09:24	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_191122A			11/22/19 09:25	
Nitrogen, Nitrate+Nitrite as N		0.987	mg/L	0.010	99	90	110			
Lab ID: B19112001-001DMS		Sample Matrix Spike				Run: FIA203-B_191122A			11/22/19 16:21	
Nitrogen, Nitrate+Nitrite as N		17.5	mg/L	0.061	110	90	110			
Lab ID: B19112001-001DMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_191122A			11/22/19 16:22	
Nitrogen, Nitrate+Nitrite as N		17.5	mg/L	0.061	110	90	110	0.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 12/03/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4									Analytical Run: SPEC3_191122B	
Lab ID: CCV		Continuing Calibration Verification Standard							11/22/19 13:52	
Oxygen Demand, Chemical (COD)		53.4	mg/L	5.0	107	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/22/19 13:52	
Oxygen Demand, Chemical (COD)		50.7	mg/L	5.0	101	90	110			
Method: E410.4									Batch: 139521	
Lab ID: MB-139521		Method Blank				Run: SPEC3_191122B			11/22/19 13:52	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-139521		Laboratory Control Sample				Run: SPEC3_191122B			11/22/19 13:52	
Oxygen Demand, Chemical (COD)		25.2	mg/L	5.0	103	90	110			
Lab ID: B19111870-001CMS		Sample Matrix Spike				Run: SPEC3_191122B			11/22/19 13:52	
Oxygen Demand, Chemical (COD)		31.1	mg/L	5.0	95	90	110			
Lab ID: B19111870-001CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_191122B			11/22/19 13:52	
Oxygen Demand, Chemical (COD)		31.6	mg/L	5.0	97	90	110	1.5	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B19111813 **Report Date:** 12/03/19

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1								Analytical Run: FIA202-B_191203B		
Lab ID: ICV		Initial Calibration Verification Standard							12/03/19 12:41	
Phosphorus, Total as P		0.506	mg/L	0.0050	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/03/19 12:59	
Phosphorus, Total as P		0.513	mg/L	0.0050	103	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/03/19 13:17	
Phosphorus, Total as P		0.512	mg/L	0.0050	102	90	110			
Method: E365.1									Batch: 139721	
Lab ID: MB-139721		Method Blank				Run: FIA202-B_191203B			12/03/19 12:43	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-139721		Laboratory Control Sample				Run: FIA202-B_191203B			12/03/19 12:44	
Phosphorus, Total as P		0.196	mg/L	0.0050	98	90	110			
Lab ID: B19111860-001FMS		Sample Matrix Spike				Run: FIA202-B_191203B			12/03/19 13:08	
Phosphorus, Total as P		0.205	mg/L	0.0050	95	90	110			
Lab ID: B19111860-001FMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_191203B			12/03/19 13:09	
Phosphorus, Total as P		0.208	mg/L	0.0050	97	90	110	1.5	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Work Order Receipt Checklist

City of Missoula Storm Water Utility B19111813

Login completed by: Tabitha Edwards | Date Received: 11/20/2019
Reviewed by: BL2000\darcy | Received by: srm
Reviewed Date: 11/21/2019 | Carrier name: Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.2°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name	City of Missoula Storm Water
Contact	Tracy Campbell
Phone	406 552-6380
Mailing Address	435 Ryman St
City, State, Zip	Missoula MT 59802-4207
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	136499

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ____

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 General Permit
Sampler Name	T. Campbell
Sampler Phone	406-552-6380
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

#	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	TSS	COD	TP	TKN	Nitrate+Nitrite	TN	oil+grease	metals		See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1563	11-19-19	11:15	6	W	X	X	X	X	X	X	X	X				B19111813
2	S86-35-OF	11-19-19	10:40	6	W	X	X	X	X	X	X	X	X				
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be signed

Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
Tracy Campbell	11-19-19/11:45	[signature]			
Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Sonya Mallett	Date/Time 11-20-19 930	Signature Sonya Mallett

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-12/16 v.1

BOTTLE ORDER 136499

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
435 Ryman St
Missoula MT 59802-4207

Phone:

Project: samples

Order Created by: Wynn Pippin
Shipped From: Billings, MT
Ship Date: 9/24/2019
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
one site							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		HNO3	Cu, Pb, Zn	1
two sites (2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				

1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		HNO3	Cu, Pb, Zn,	1

Three sites (3 Sets)

1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		H2SO4		1
250 mL Plastic	1	E365.1	Phosphorus, Total		H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Tot. Rec.		HNO3	Cu, Pb, Zn, As, Cd, Fe	1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample	1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		AF		1

HNO3 - Nitric Acid	H2SO4 - Sulfuric Acid	NaOH - Sodium Hydroxide	**We strongly suggest that the samples are shipped the same day as they are collected.**
ZnAc - Zinc Acetate	HCl - Hydrochloric Acid	H3PO4 - Phosphoric Acid	

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

June 08, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20050942

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/13/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20050942-001	SNA-1521	05/12/20 10:15	05/13/20	Aqueous	Metals by ICP/ICPMS, Tot.Rec. Bacteria, Total and E-Coli Coliforms - QT Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B20050942-002	SNA-1526	05/12/20 11:30	05/13/20	Aqueous	Metals by ICP/ICPMS, Tot.Rec. Bacteria, Total and E-Coli Coliforms - QT Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20050942

Report Date: 06/08/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/08/20
Project:	MS4 General Permit	**Collection Date:**	05/12/20 10:15
Lab ID:	B20050942-001	**DateReceived:**	05/13/20
Client Sample ID:	SNA-1521	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	14500	mpn/100ml		1.0		A9223 B	05/13/20 14:13 / fap
Bacteria, E-Coli Coliform	1236	mpn/100ml		1.0		A9223 B	05/13/20 14:13 / fap
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	19	mg/L		10		A2540 D	05/13/20 14:43 / gie
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	29	mg/L		5		E410.4	05/15/20 13:44 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.67	mg/L		0.01		E353.2	05/15/20 11:13 / srh
Nitrogen, Kjeldahl, Total as N	0.6	mg/L		0.5		E351.2	05/14/20 15:26 / zas
Nitrogen, Total	1.3	mg/L		0.5		Calculation	05/15/20 13:22 / bas
Phosphorus, Orthophosphate as P	0.084	mg/L		0.005		E365.1	05/13/20 16:29 / zas
Phosphorus, Total as P	0.122	mg/L		0.005		E365.1	05/14/20 13:55 / zas
METALS, TOTAL RECOVERABLE							
Arsenic	0.002	mg/L		0.001		E200.8	05/14/20 21:03 / pap
Cadmium	0.00005	mg/L		0.00003		E200.8	05/14/20 21:03 / pap
Copper	0.007	mg/L		0.002		E200.8	05/14/20 21:03 / pap
Iron	0.51	mg/L		0.02		E200.8	05/14/20 21:03 / pap
Lead	0.0027	mg/L		0.0003		E200.8	05/14/20 21:03 / pap
Zinc	0.042	mg/L		0.008		E200.8	05/14/20 21:03 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/19/20 08:25 / eli-g
BIOLOGICAL							
Chlorophyll a	ND	mg/cu. m		0.98		A10200 H	06/04/20 23:42 / eli-h

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/08/20
Project:	MS4 General Permit	**Collection Date:**	05/12/20 11:30
Lab ID:	B20050942-002	**DateReceived:**	05/13/20
Client Sample ID:	SNA-1526	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	32550	mpn/100ml		1.0		A9223 B	05/13/20 14:13 / fap
Bacteria, E-Coli Coliform	7710	mpn/100ml		1.0		A9223 B	05/13/20 14:13 / fap
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	16	mg/L		10		A2540 D	05/13/20 15:57 / gie
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	63	mg/L		5		E410.4	05/15/20 13:44 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.60	mg/L		0.01		E353.2	05/15/20 11:14 / srh
Nitrogen, Kjeldahl, Total as N	0.8	mg/L		0.5		E351.2	05/14/20 15:27 / zas
Nitrogen, Total	1.4	mg/L		0.5		Calculation	05/15/20 13:22 / bas
Phosphorus, Orthophosphate as P	0.081	mg/L		0.005		E365.1	05/13/20 16:32 / zas
Phosphorus, Total as P	0.171	mg/L		0.005		E365.1	05/14/20 13:59 / zas
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	05/14/20 21:07 / pap
Cadmium	0.00007	mg/L		0.00003		E200.8	05/14/20 21:07 / pap
Copper	0.009	mg/L		0.002		E200.8	05/14/20 21:07 / pap
Iron	0.59	mg/L		0.02		E200.8	05/14/20 21:07 / pap
Lead	0.0019	mg/L		0.0003		E200.8	05/14/20 21:07 / pap
Zinc	0.096	mg/L		0.008		E200.8	05/14/20 21:07 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/19/20 08:25 / eli-g
BIOLOGICAL							
Chlorophyll a	ND	mg/cu. m		1.5		A10200 H	06/05/20 00:41 / eli-h

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/19/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 200519A
Lab ID: MBLK2005190809	Method Blank				Run: BAL-ACCU-124_200519B				05/19/20 08:21
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2005190809	Laboratory Control Sample				Run: BAL-ACCU-124_200519B				05/19/20 08:22
Oil & Grease (HEM)	36	mg/L	5.0	91	78	114			
Lab ID: LCSD2005190809	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_200519B				05/19/20 08:22
Oil & Grease (HEM)	34	mg/L	5.0	86	78	114	5.9	18	
Lab ID: G20050275-001AMS	Sample Matrix Spike				Run: BAL-ACCU-124_200519B				05/19/20 08:24
Oil & Grease (HEM)	17	mg/L	5.0	42	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 06/06/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A10200 H					Analytical Run: CHLOROPHYLL UV/VIS_200604A				
Lab ID: CCV_11r-W	Continuing Calibration Verification Standard								06/04/20 20:46
Chlorophyll a	2.6	mg/cu. m	0.1	105	85	115			
Method: A10200 H									Batch: 51474
Lab ID: MB-51474	Method Blank				Run: CHLOROPHYLL UV/VIS_2006				06/04/20 21:45
Chlorophyll a	ND	mg/cu. m	0.02						
Lab ID: LCS-51474	Laboratory Control Sample				Run: CHLOROPHYLL UV/VIS_2006				06/04/20 22:14
Chlorophyll a	2.6	mg/cu. m	0.1	102	80	120			
Lab ID: B20050942-002GMS	Sample Matrix Spike				Run: CHLOROPHYLL UV/VIS_2006				06/05/20 01:11
Chlorophyll a	3.8	mg/cu. m	0.1	150	80	120			S
Lab ID: B20050942-002GMSD	Sample Matrix Spike Duplicate				Run: CHLOROPHYLL UV/VIS_2006				06/05/20 01:40
Chlorophyll a	2.5	mg/cu. m	0.1	101	80	120	39	20	R

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

R - Relative Percent Difference (RPD) exceeds advisory limit

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 144586
Lab ID: MB-144586	Method Blank					Run: BAL #SD-15_200513A				05/13/20 13:25
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-144586	Laboratory Control Sample					Run: BAL #SD-15_200513A				05/13/20 13:25
Solids, Total Suspended TSS @ 105 C		98.0	mg/L	10	98	80	120			
Lab ID: B20050896-001BDUP	Sample Duplicate					Run: BAL #SD-15_200513A				05/13/20 13:27
Solids, Total Suspended TSS @ 105 C		100	mg/L	10				1.0	5	
Lab ID: B20050918-001BDUP	Sample Duplicate					Run: BAL #SD-15_200513A				05/13/20 14:43
Solids, Total Suspended TSS @ 105 C		195	mg/L	10				27	5	R

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

R - Relative Percent Difference (RPD) exceeds advisory limit

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_200514A	
Lab ID: ICV		Initial Calibration Verification Standard							05/14/20 15:15	
Nitrogen, Kjeldahl, Total as N		9.99	mg/L	0.50	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/14/20 15:33	
Nitrogen, Kjeldahl, Total as N		9.56	mg/L	0.50	96	90	110			
Method: E351.2									Batch: 144596	
Lab ID: MB-144596		Method Blank				Run: FIA204-B_200514A			05/14/20 15:17	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-144596		Laboratory Control Sample				Run: FIA204-B_200514A			05/14/20 15:18	
Nitrogen, Kjeldahl, Total as N		9.70	mg/L	0.50	97	90	110			
Lab ID: B20050942-002DMS		Sample Matrix Spike				Run: FIA204-B_200514A			05/14/20 15:28	
Nitrogen, Kjeldahl, Total as N		10.5	mg/L	0.50	97	90	110			
Lab ID: B20050942-002DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_200514A			05/14/20 15:29	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	98	90	110	0.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_200515A
Lab ID: ICV		Initial Calibration Verification Standard								05/15/20 10:13
Nitrogen, Nitrate+Nitrite as N		0.527	mg/L	0.010	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/15/20 11:01
Nitrogen, Nitrate+Nitrite as N		0.990	mg/L	0.010	99	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/15/20 11:18
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Method: E353.2										Batch: R342069
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_200515A				05/15/20 10:16
Nitrogen, Nitrate+Nitrite as N		0.995	mg/L	0.010	99	90	110			
Lab ID: MBLK		Method Blank				Run: FIA203-B_200515A				05/15/20 10:22
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: B20050871-001CMS		Sample Matrix Spike				Run: FIA203-B_200515A				05/15/20 11:03
Nitrogen, Nitrate+Nitrite as N		1.23	mg/L	0.010	104	90	110			
Lab ID: B20050871-001CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_200515A				05/15/20 11:05
Nitrogen, Nitrate+Nitrite as N		1.24	mg/L	0.010	105	90	110	0.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_200513D			
Lab ID: ICV		Initial Calibration Verification Standard							05/13/20 16:25	
Phosphorus, Orthophosphate as P		0.272	mg/L	0.0050	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/13/20 16:39	
Phosphorus, Orthophosphate as P		0.493	mg/L	0.0050	99	90	110			
Method: E365.1									Batch: R341948	
Lab ID: ICB		Method Blank				Run: FIA202-B_200513D			05/13/20 16:26	
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA202-B_200513D			05/13/20 16:27	
Phosphorus, Orthophosphate as P		0.244	mg/L	0.0051	98	90	110			
Lab ID: MB-144578		Method Blank				Run: FIA202-B_200513D			05/13/20 16:28	
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB-144578		Laboratory Fortified Blank				Run: FIA202-B_200513D			05/13/20 16:29	
Phosphorus, Orthophosphate as P		0.240	mg/L	0.0050	96	90	110			
Lab ID: B20050942-001BMS		Sample Matrix Spike				Run: FIA202-B_200513D			05/13/20 16:30	
Phosphorus, Orthophosphate as P		0.325	mg/L	0.0051	97	90	110			
Lab ID: B20050942-001BMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200513D			05/13/20 16:31	
Phosphorus, Orthophosphate as P		0.328	mg/L	0.0051	98	90	110	0.9	10	
Method: E365.1							Analytical Run: FIA202-B_200514C			
Lab ID: ICV		Initial Calibration Verification Standard							05/14/20 13:49	
Phosphorus, Total as P		0.506	mg/L	0.0050	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/14/20 14:09	
Phosphorus, Total as P		0.528	mg/L	0.0050	106	90	110			
Method: E365.1									Batch: 144598	
Lab ID: MB-144598		Method Blank				Run: FIA202-B_200514C			05/14/20 13:51	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-144598		Laboratory Control Sample				Run: FIA202-B_200514C			05/14/20 13:53	
Phosphorus, Total as P		0.192	mg/L	0.0050	96	90	110			
Lab ID: B20050942-001DMS		Sample Matrix Spike				Run: FIA202-B_200514C			05/14/20 13:56	
Phosphorus, Total as P		0.335	mg/L	0.0050	106	90	110			
Lab ID: B20050942-001DMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200514C			05/14/20 13:58	
Phosphorus, Total as P		0.330	mg/L	0.0050	104	90	110	1.5	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_200515A
Lab ID: CCV		Continuing Calibration Verification Standard								05/15/20 13:44
Oxygen Demand, Chemical (COD)		52.2	mg/L	5.0	104	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/15/20 13:44
Oxygen Demand, Chemical (COD)		53.9	mg/L	5.0	108	90	110			
Method: E410.4										Batch: 144649
Lab ID: MB-144649		Method Blank				Run: SPEC3_200515A				05/15/20 13:44
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-144649		Laboratory Control Sample				Run: SPEC3_200515A				05/15/20 13:44
Oxygen Demand, Chemical (COD)		24.5	mg/L	5.0	100	90	110			
Lab ID: B20050979-001CMS		Sample Matrix Spike				Run: SPEC3_200515A				05/15/20 13:44
Oxygen Demand, Chemical (COD)		136	mg/L	5.0	106	90	110			
Lab ID: B20050979-001CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_200515A				05/15/20 13:44
Oxygen Demand, Chemical (COD)		136	mg/L	5.0	106	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20050942 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_200514A
Lab ID: QCS	6	Initial Calibration Verification Standard								05/14/20 14:32
Arsenic		0.0528	mg/L	0.0050	106	90	110			
Cadmium		0.0257	mg/L	0.0010	103	90	110			
Copper		0.0546	mg/L	0.010	109	90	110			
Iron		0.259	mg/L	0.020	104	90	110			
Lead		0.0505	mg/L	0.010	101	90	110			
Zinc		0.0521	mg/L	0.010	104	90	110			
Method: E200.8										Batch: 144593
Lab ID: MB-144593	6	Method Blank				Run: ICPMS208-B_200514A				05/14/20 20:51
Arsenic		ND	mg/L	0.00006						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		ND	mg/L	0.004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-144593	6	Laboratory Control Sample				Run: ICPMS208-B_200514A				05/14/20 20:55
Arsenic		0.102	mg/L	0.0010	102	85	115			
Cadmium		0.0526	mg/L	0.0010	105	85	115			
Copper		0.102	mg/L	0.0050	102	85	115			
Iron		0.522	mg/L	0.020	104	85	115			
Lead		0.100	mg/L	0.0010	100	85	115			
Zinc		0.102	mg/L	0.010	103	85	115			
Lab ID: B20050942-002CMS4	6	Sample Matrix Spike				Run: ICPMS208-B_200514A				05/14/20 21:11
Arsenic		0.105	mg/L	0.0010	104	70	130			
Cadmium		0.0527	mg/L	0.0010	105	70	130			
Copper		0.112	mg/L	0.0050	103	70	130			
Iron		1.18	mg/L	0.020	119	70	130			
Lead		0.105	mg/L	0.0010	103	70	130			
Zinc		0.200	mg/L	0.010	104	70	130			
Lab ID: B20050942-002CMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_200514A				05/14/20 21:14
Arsenic		0.105	mg/L	0.0010	104	70	130	0.1	20	
Cadmium		0.0533	mg/L	0.0010	107	70	130	1.3	20	
Copper		0.113	mg/L	0.0050	104	70	130	0.6	20	
Iron		1.17	mg/L	0.020	117	70	130	1.0	20	
Lead		0.105	mg/L	0.0010	103	70	130	0.4	20	
Zinc		0.199	mg/L	0.010	103	70	130	0.5	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20050942

Login completed by:	Briana G. Sangiuliano	Date Received:	5/13/2020
Reviewed by:	BL2000\darcy	Received by:	rs4
Reviewed Date:	5/14/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

"No Sample SNA-1526" was handwritten on the bottle order next to the analysis for Orthophosphate. Analysis is needed for all samples per email from Tracy Campbell on 5/14/2020.

The sample SNA-1526 for Orthophosphate was subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

Only page one of two of bottle order 138710 was submitted by the client.

ENERGY
Trust our People Trust our Data

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula - Storm Water
Contact	Tracy Campbell
Phone	406-552-6364
Mailing Address	1345 W Broadway St
City, State, Zip	Missoula, MT 59802-2239
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	138710/40644

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats:	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other

Comments

Collection Date and time taken from Sample Containers
NA 5/13/2020

Project Information

Project Name, PWSID, Permit, etc	MS4 General Permit
Sampler Name	Campbell, Tracy
Sampler Phone	406-552-6364
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐No

MINING CLIENTS, please indicate sample type
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

Analysis Requested

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1521	5/12/2020	10:15	8	W	X		B20050942
2	SNA-1526	5/12/2020	11:30	~~8~~ 7	W	X		
3			NA 5/13/2020					
4								
5								
6								
7								
8								
9								
10								

Custody Record MUST be signed

Relinquished by (print): Tracy Campbell	Date/Time: 5-12-2020/1150	Signature: [signature]	
Relinquished by (print)	Date/Time	Signature	
Received by (print)	Date/Time	Signature	
Received by Laboratory (print): Richard Skokel	Date/Time: 5/13/2020 09:20	Signature: [signature]	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

BOTTLE ORDER 138710

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 12/11/2019
VIA. Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		☐ H2SO4		1
		E353 2	Nitrogen, Nitrate + Nitrite				
		E351 2	Nitrogen, Total Kjeldahl				
		E365 1	Phosphorus, Total				
		E410 4	Chemical Oxygen Demand				
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Tot Rec		■ HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		☐ AF		1
120 mL Plastic	1	E365 1	Phosphorus, Orthophosphate as P	48.00 hrs		Filter Sample halfsample SNA-1521 No sample SNA-1526	1

■ HNO3 - Nitric Acid	☐ H2SO4 - Sulfuric Acid	■ NaOH - Sodium Hydroxide
■	■	☐

BOTTLE ORDER 140644

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River E.Coli

Order Created by: Shari Endy
Shipped From: Billings, MT
Ship Date: 3/3/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
100 mL Plastic Sterile	1	A9223 B	Bacteria, Total and E-Coli Coliforms - QT	30.00 hrs			1

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide
■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

ANALYTICAL SUMMARY REPORT

June 08, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20051018

Project Name: MS4 Permit

Energy Laboratories Inc Billings MT received the following 1 sample for City of Missoula Storm Water Utility on 5/13/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20051018-001	CFR-1	05/12/20 13:00	05/13/20	Aqueous	Metals by ICP/ICPMS, Tot.Rec. Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 Permit
Work Order: B20051018

Report Date: 06/08/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	06/08/20
Project:	MS4 Permit	**Collection Date:**	05/12/20 13:00
Lab ID:	B20051018-001	**DateReceived:**	05/13/20
Client Sample ID:	CFR-1	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	13	mg/L		10		A2540 D	05/14/20 11:25 / drm
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	8	mg/L		5		E410.4	05/15/20 13:44 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.04	mg/L		0.01		E353.2	05/18/20 11:03 / srh
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	05/14/20 15:42 / zas
Nitrogen, Total	ND	mg/L		0.5		Calculation	05/18/20 14:42 / bas
Phosphorus, Orthophosphate as P	0.005	mg/L		0.005		E365.1	05/14/20 09:39 / zas
Phosphorus, Total as P	0.024	mg/L		0.005		E365.1	05/14/20 14:15 / zas
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	05/14/20 22:06 / pap
Cadmium	ND	mg/L		0.00003		E200.8	05/14/20 22:06 / pap
Copper	ND	mg/L		0.002		E200.8	05/14/20 22:06 / pap
Iron	0.25	mg/L		0.02		E200.8	05/14/20 22:06 / pap
Lead	ND	mg/L		0.0003		E200.8	05/14/20 22:06 / pap
Zinc	ND	mg/L		0.008		E200.8	05/14/20 22:06 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/20/20 08:02 / eli-g
BIOLOGICAL							
Chlorophyll a	ND	mg/cu. m		0.97		A10200 H	06/05/20 00:12 / eli-h

Report Definitions:	RL - Analyte Reporting Limit	MCL - Maximum Contaminant Level
	QCL - Quality Control Limit	ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 06/06/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A10200 H						Analytical Run: CHLOROPHYLL UV/VIS_200604A			
Lab ID: CCV_11r-W	Continuing Calibration Verification Standard								06/04/20 20:46
Chlorophyll a	2.6	mg/cu. m	0.1	105	85	115			
Method: A10200 H									Batch: 51474
Lab ID: MB-51474	Method Blank				Run: CHLOROPHYLL UV/VIS_2006				06/04/20 21:45
Chlorophyll a	ND	mg/cu. m	0.02						
Lab ID: LCS-51474	Laboratory Control Sample				Run: CHLOROPHYLL UV/VIS_2006				06/04/20 22:14
Chlorophyll a	2.6	mg/cu. m	0.1	102	80	120			
Lab ID: H20050285-002GMS	Sample Matrix Spike				Run: CHLOROPHYLL UV/VIS_2006				06/05/20 01:11
Chlorophyll a	3.8	mg/cu. m	0.1	150	80	120			S
Lab ID: H20050285-002GMSD	Sample Matrix Spike Duplicate				Run: CHLOROPHYLL UV/VIS_2006				06/05/20 01:40
Chlorophyll a	2.5	mg/cu. m	0.1	101	80	120	39	20	R

Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/20/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 200520A
Lab ID: MBLK2005200725	Method Blank				Run: BAL-ACCU-124_200520A				05/20/20 07:56
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2005200725	Laboratory Control Sample				Run: BAL-ACCU-124_200520A				05/20/20 07:56
Oil & Grease (HEM)	35	mg/L	5.0	89	78	114			
Lab ID: LCSD2005200725	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_200520A				05/20/20 07:57
Oil & Grease (HEM)	34	mg/L	5.0	86	78	114	3.2	18	
Lab ID: G20050299-002EMS	Sample Matrix Spike				Run: BAL-ACCU-124_200520A				05/20/20 08:00
Oil & Grease (HEM)	4.7	mg/L	5.0	12	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 144622
Lab ID: MB-144622	Method Blank					Run: BAL #SD-15_200514A				05/14/20 11:24
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-144622	Laboratory Control Sample					Run: BAL #SD-15_200514A				05/14/20 11:24
Solids, Total Suspended TSS @ 105 C		101	mg/L	10	101	80	120			
Lab ID: B20050764-002BDUP	Sample Duplicate					Run: BAL #SD-15_200514A				05/14/20 11:24
Solids, Total Suspended TSS @ 105 C		90.7	mg/L	13				1.5	5	
Lab ID: B20051021-001BDUP	Sample Duplicate					Run: BAL #SD-15_200514A				05/14/20 11:25
Solids, Total Suspended TSS @ 105 C		37.5	mg/L	10				12	5	R

- Since the difference between the analytical result for the sample and its duplicate is less than the reporting limit, the RPD variance is not considered significant.

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

R - Relative Percent Difference (RPD) exceeds advisory limit

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_200514A			
Lab ID: ICV		Initial Calibration Verification Standard							05/14/20 15:15	
Nitrogen, Kjeldahl, Total as N		9.99	mg/L	0.50	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/14/20 15:33	
Nitrogen, Kjeldahl, Total as N		9.56	mg/L	0.50	96	90	110			
Method: E351.2							Batch: 144596			
Lab ID: MB-144596		Method Blank				Run: FIA204-B_200514A			05/14/20 15:17	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-144596		Laboratory Control Sample				Run: FIA204-B_200514A			05/14/20 15:18	
Nitrogen, Kjeldahl, Total as N		9.70	mg/L	0.50	97	90	110			
Lab ID: B20051018-001DMS		Sample Matrix Spike				Run: FIA204-B_200514A			05/14/20 15:43	
Nitrogen, Kjeldahl, Total as N		9.61	mg/L	0.50	96	90	110			
Lab ID: B20051018-001DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_200514A			05/14/20 15:44	
Nitrogen, Kjeldahl, Total as N		9.70	mg/L	0.50	97	90	110	0.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_200518A
Lab ID: ICV		Initial Calibration Verification Standard								05/18/20 10:12
Nitrogen, Nitrate+Nitrite as N		0.519	mg/L	0.010	92	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/18/20 10:54
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/18/20 11:11
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Method: E353.2										Batch: R342146
Lab ID: MBLK		Method Blank				Run: FIA203-B_200518A				05/18/20 10:14
Nitrogen, Nitrate+Nitrite as N		0.008	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_200518A				05/18/20 10:15
Nitrogen, Nitrate+Nitrite as N		0.978	mg/L	0.010	98	90	110			
Lab ID: B20051012-003AMS		Sample Matrix Spike				Run: FIA203-B_200518A				05/18/20 10:57
Nitrogen, Nitrate+Nitrite as N		5.63	mg/L	0.020	106	90	110			
Lab ID: B20051012-003AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_200518A				05/18/20 10:58
Nitrogen, Nitrate+Nitrite as N		5.58	mg/L	0.020	104	90	110	0.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_200514A
Lab ID: ICV		Initial Calibration Verification Standard								05/14/20 09:35
Phosphorus, Orthophosphate as P		0.233	mg/L	0.0050	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/14/20 09:42
Phosphorus, Orthophosphate as P		0.494	mg/L	0.0050	99	90	110			
Method: E365.1										Batch: R341978
Lab ID: ICB		Method Blank				Run: FIA202-B_200514A				05/14/20 09:36
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA202-B_200514A				05/14/20 09:37
Phosphorus, Orthophosphate as P		0.244	mg/L	0.0051	98	90	110			
Lab ID: MB-144590		Method Blank				Run: FIA202-B_200514A				05/14/20 09:37
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB-144590		Laboratory Fortified Blank				Run: FIA202-B_200514A				05/14/20 09:38
Phosphorus, Orthophosphate as P		0.241	mg/L	0.0050	96	90	110			
Lab ID: B20051018-001BMS		Sample Matrix Spike				Run: FIA202-B_200514A				05/14/20 09:40
Phosphorus, Orthophosphate as P		0.252	mg/L	0.0051	99	90	110			
Lab ID: B20051018-001BMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200514A				05/14/20 09:41
Phosphorus, Orthophosphate as P		0.250	mg/L	0.0051	98	90	110	0.8	10	
Method: E365.1										Analytical Run: FIA202-B_200514C
Lab ID: ICV		Initial Calibration Verification Standard								05/14/20 13:49
Phosphorus, Total as P		0.506	mg/L	0.0050	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/14/20 14:09
Phosphorus, Total as P		0.528	mg/L	0.0050	106	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/14/20 14:17
Phosphorus, Total as P		0.528	mg/L	0.0050	106	90	110			
Method: E365.1										Batch: 144598
Lab ID: MB-144598		Method Blank				Run: FIA202-B_200514C				05/14/20 13:51
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-144598		Laboratory Control Sample				Run: FIA202-B_200514C				05/14/20 13:53
Phosphorus, Total as P		0.192	mg/L	0.0050	96	90	110			
Lab ID: B20051014-002CMS		Sample Matrix Spike				Run: FIA202-B_200514C				05/14/20 14:12
Phosphorus, Total as P		0.377	mg/L	0.0050	106	90	110			
Lab ID: B20051014-002CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200514C				05/14/20 14:13
Phosphorus, Total as P		0.395	mg/L	0.0050	116	90	110	4.7	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4							Analytical Run: SPEC3_200515A			
Lab ID: CCV		Continuing Calibration Verification Standard							05/15/20 13:44	
Oxygen Demand, Chemical (COD)		52.2	mg/L	5.0	104	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/15/20 13:44	
Oxygen Demand, Chemical (COD)		53.9	mg/L	5.0	108	90	110			
Method: E410.4									Batch: 144649	
Lab ID: MB-144649		Method Blank				Run: SPEC3_200515A			05/15/20 13:44	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-144649		Laboratory Control Sample				Run: SPEC3_200515A			05/15/20 13:44	
Oxygen Demand, Chemical (COD)		24.5	mg/L	5.0	100	90	110			
Lab ID: B20051064-001BMS		Sample Matrix Spike				Run: SPEC3_200515A			05/15/20 13:44	
Oxygen Demand, Chemical (COD)		79.7	mg/L	5.0	106	90	110			
Lab ID: B20051064-001BMSD		Sample Matrix Spike Duplicate				Run: SPEC3_200515A			05/15/20 13:44	
Oxygen Demand, Chemical (COD)		79.4	mg/L	5.0	105	90	110	0.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051018 **Report Date:** 05/22/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_200514A
Lab ID: QCS	6	Initial Calibration Verification Standard								05/14/20 14:32
Arsenic		0.0528	mg/L	0.0050	106	90	110			
Cadmium		0.0257	mg/L	0.0010	103	90	110			
Copper		0.0546	mg/L	0.010	109	90	110			
Iron		0.259	mg/L	0.020	104	90	110			
Lead		0.0505	mg/L	0.010	101	90	110			
Zinc		0.0521	mg/L	0.010	104	90	110			
Method: E200.8										Batch: 144593
Lab ID: MB-144593	6	Method Blank				Run: ICPMS208-B_200514A				05/14/20 20:51
Arsenic		ND	mg/L	0.00006						
Cadmium		ND	mg/L	0.00002						
Copper		ND	mg/L	0.0004						
Iron		ND	mg/L	0.004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.001						
Lab ID: LCS4-144593	6	Laboratory Control Sample				Run: ICPMS208-B_200514A				05/14/20 20:55
Arsenic		0.102	mg/L	0.0010	102	85	115			
Cadmium		0.0526	mg/L	0.0010	105	85	115			
Copper		0.102	mg/L	0.0050	102	85	115			
Iron		0.522	mg/L	0.020	104	85	115			
Lead		0.100	mg/L	0.0010	100	85	115			
Zinc		0.102	mg/L	0.010	103	85	115			
Lab ID: B20050942-002CMS4	6	Sample Matrix Spike				Run: ICPMS208-B_200514A				05/14/20 21:11
Arsenic		0.105	mg/L	0.0010	104	70	130			
Cadmium		0.0527	mg/L	0.0010	105	70	130			
Copper		0.112	mg/L	0.0050	103	70	130			
Iron		1.18	mg/L	0.020	119	70	130			
Lead		0.105	mg/L	0.0010	103	70	130			
Zinc		0.200	mg/L	0.010	104	70	130			
Lab ID: B20050942-002CMSD	6	Sample Matrix Spike Duplicate				Run: ICPMS208-B_200514A				05/14/20 21:14
Arsenic		0.105	mg/L	0.0010	104	70	130	0.1	20	
Cadmium		0.0533	mg/L	0.0010	107	70	130	1.3	20	
Copper		0.113	mg/L	0.0050	104	70	130	0.6	20	
Iron		1.17	mg/L	0.020	117	70	130	1.0	20	
Lead		0.105	mg/L	0.0010	103	70	130	0.4	20	
Zinc		0.199	mg/L	0.010	103	70	130	0.5	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20051018

Login completed by: Briana G. Sangiuliano Date Received: 5/13/2020
Reviewed by: BL2000\darcy Received by: slm
Reviewed Date: 5/15/2020 Carrier name: Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

"Not Sampled" was handwritten on the bottle order next to the analysis for Orthophosphate. Analysis is needed per email from Tracy Campbell on 5/14/2020.

The sample for Orthophosphate was subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

Only page one of two of bottle order was submitted by the client.

ENERGY
Trust our People. Trust our Data

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula - StormWater
Contact	Tracy Campbell
Phone	406-552-6364
Mailing Address	1345 W Broadway St.
City, State, Zip	Missoula, MT 59802-2239
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	138710

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ______

Comments

Project Information

Project Name, PWSID, Permit, etc	MS4 Permit
Sampler Name	T. Campbell
Sampler Phone	406-552-6364
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐ No

MINING CLIENTS, please indicate sample type
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	CFR-1	5-12-20	13:00	6	W	X		B20051018
2								
3								
4								
5								
6								
7								
8								
9								
10								

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	5-12-2020/13:00	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Sydney McCleary	Date/Time 5/13/2020 0920	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check ______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report

ELI-COC-12/16 v 1

BOTTLE ORDER 138710

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River

Order Created by: Darcy Chirrick
Shipped From Billings, MT
Ship Date: 12/11/2019
VIA. Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		☐ H2SO4		1
		E353 2	Nitrogen, Nitrate + Nitrite				
		E351 2	Nitrogen, Total Kjeldahl				
		E365 1	Phosphorus, Total				
		E410 4	Chemical Oxygen Demand				
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Tot. Rec.		■ HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		☐ AF		1
120 mL Plastic	1	E365.1	Phosphorus, Orthophosphate as P	48 00 hrs		Filter Sample - Not Sampled	1

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide
■ ■ ☐

ANALYTICAL SUMMARY REPORT

May 29, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20051713

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 5/21/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20051713-001	SNA-1563	05/20/20 9:00	05/21/20	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B20051713-002	S86-35-OF	05/20/20 10:00	05/21/20	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20051713

Report Date: 05/29/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	05/29/20
Project:	MS4 General Permit	**Collection Date:**	05/20/20 09:00
Lab ID:	B20051713-001	**DateReceived:**	05/21/20
Client Sample ID:	SNA-1563	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	19	mg/L		10		A2540 D	05/22/20 14:43 / keh
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	14	mg/L		5		E410.4	05/22/20 12:42 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.86	mg/L		0.01		E353.2	05/26/20 10:16 / srh
Nitrogen, Kjeldahl, Total as N	0.7	mg/L		0.5		E351.2	05/22/20 16:02 / zas
Nitrogen, Total	1.6	mg/L		0.5		Calculation	05/26/20 13:11 / bas
Phosphorus, Total as P	0.111	mg/L		0.005		E365.1	05/22/20 13:44 / zas
METALS, TOTAL							
Copper	0.002	mg/L		0.002		E200.8	05/23/20 07:48 / pap
Lead	0.0006	mg/L		0.0003		E200.8	05/23/20 07:48 / pap
Zinc	0.011	mg/L		0.008		E200.8	05/23/20 07:48 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/28/20 08:29 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	05/29/20
Project:	MS4 General Permit	**Collection Date:**	05/20/20 10:00
Lab ID:	B20051713-002	**DateReceived:**	05/21/20
Client Sample ID:	S86-35-OF	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	50	mg/L		10		A2540 D	05/26/20 12:37 / gie
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	25	mg/L		5		E410.4	05/22/20 12:42 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.14	mg/L		0.01		E353.2	05/26/20 10:25 / srh
Nitrogen, Kjeldahl, Total as N	0.8	mg/L		0.5		E351.2	05/22/20 16:06 / zas
Nitrogen, Total	0.9	mg/L		0.5		Calculation	05/26/20 13:11 / bas
Phosphorus, Total as P	0.153	mg/L		0.005		E365.1	05/22/20 13:45 / zas
METALS, TOTAL							
Copper	0.005	mg/L		0.002		E200.8	05/23/20 07:52 / pap
Lead	0.0019	mg/L		0.0003		E200.8	05/23/20 07:52 / pap
Zinc	0.016	mg/L		0.008		E200.8	05/23/20 07:52 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/28/20 08:30 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/28/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 200528A
Lab ID: MBLK2005280809	Method Blank				Run: BAL-ACCU-124_200528A				05/28/20 08:23
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2005280809	Laboratory Control Sample				Run: BAL-ACCU-124_200528A				05/28/20 08:24
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114			
Lab ID: LCSD2005280809	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_200528A				05/28/20 08:24
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114	0.0	18	
Lab ID: G20050404-001BMS	Sample Matrix Spike				Run: BAL-ACCU-124_200528A				05/28/20 08:25
Oil & Grease (HEM), Sulfur Corrected	39	mg/L	5.0	85	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 144900
Lab ID: MB-144900		Method Blank				Run: BAL #SD-15_200522B				05/22/20 14:43
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-144900		Laboratory Control Sample				Run: BAL #SD-15_200522B				05/22/20 14:43
Solids, Total Suspended TSS @ 105 C		92.0	mg/L	10	92	80	120			
Lab ID: B20051713-001ADUP		Sample Duplicate				Run: BAL #SD-15_200522B				05/22/20 14:43
Solids, Total Suspended TSS @ 105 C		19.0	mg/L	10				0.0	5	
Method: A2540 D										Batch: 144915
Lab ID: MB-144915		Method Blank				Run: BAL #SD-15_200526A				05/26/20 12:35
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-144915		Laboratory Control Sample				Run: BAL #SD-15_200526A				05/26/20 12:36
Solids, Total Suspended TSS @ 105 C		102	mg/L	10	102	80	120			
Lab ID: B20051713-002ADUP		Sample Duplicate				Run: BAL #SD-15_200526A				05/26/20 12:37
Solids, Total Suspended TSS @ 105 C		50.5	mg/L	10				2.0	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS208-B_200522A			
Lab ID: QCS	3	Initial Calibration Verification Standard								05/23/20 02:48
Copper		0.0521	mg/L	0.010	104	90	110			
Lead		0.0488	mg/L	0.010	98	90	110			
Zinc		0.0520	mg/L	0.010	104	90	110			
Method: E200.8										Batch: 144864
Lab ID: MB-144864	3	Method Blank				Run: ICPMS208-B_200522A				05/23/20 05:26
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.0010						
Lab ID: LCS4-144864	3	Laboratory Control Sample				Run: ICPMS208-B_200522A				05/23/20 05:30
Copper		0.103	mg/L	0.0050	103	85	115			
Lead		0.0991	mg/L	0.0010	99	85	115			
Zinc		0.105	mg/L	0.010	105	85	115			
Lab ID: B20051719-001BMS4	3	Sample Matrix Spike				Run: ICPMS208-B_200522A				05/23/20 08:39
Copper		0.182	mg/L	0.0050	106	70	130			
Lead		0.178	mg/L	0.0010	99	70	130			
Zinc		0.398	mg/L	0.010	112	70	130			
Lab ID: B20051719-001BMSD	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_200522A				05/23/20 08:43
Copper		0.182	mg/L	0.0050	107	70	130	0.3	20	
Lead		0.181	mg/L	0.0010	102	70	130	1.8	20	
Zinc		0.398	mg/L	0.010	111	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_200522A
Lab ID: ICV		Initial Calibration Verification Standard								05/22/20 15:02
Nitrogen, Kjeldahl, Total as N		9.86	mg/L	0.50	99	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 15:59
Nitrogen, Kjeldahl, Total as N		9.75	mg/L	0.50	98	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 16:15
Nitrogen, Kjeldahl, Total as N		9.83	mg/L	0.50	98	90	110			
Method: E351.2										Batch: 144869
Lab ID: MB-144869		Method Blank				Run: FIA204-B_200522A				05/22/20 15:34
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-144869		Laboratory Control Sample				Run: FIA204-B_200522A				05/22/20 15:35
Nitrogen, Kjeldahl, Total as N		10.0	mg/L	0.50	100	90	110			
Lab ID: B20051713-001CMS		Sample Matrix Spike				Run: FIA204-B_200522A				05/22/20 16:03
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	102	90	110			
Lab ID: B20051713-001CMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_200522A				05/22/20 16:05
Nitrogen, Kjeldahl, Total as N		10.7	mg/L	0.50	100	90	110	1.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_200526A
Lab ID: ICV		Initial Calibration Verification Standard								05/26/20 09:51
Nitrogen, Nitrate+Nitrite as N		0.545	mg/L	0.010	96	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/26/20 10:14
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/26/20 10:31
Nitrogen, Nitrate+Nitrite as N		0.952	mg/L	0.010	95	90	110			
Method: E353.2										Batch: R342533
Lab ID: MBLK		Method Blank				Run: FIA203-B_200526A				05/26/20 09:52
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_200526A				05/26/20 09:53
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Lab ID: B20051713-001CMS		Sample Matrix Spike				Run: FIA203-B_200526A				05/26/20 10:17
Nitrogen, Nitrate+Nitrite as N		1.96	mg/L	0.010	109	90	110			
Lab ID: B20051713-001CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_200526A				05/26/20 10:18
Nitrogen, Nitrate+Nitrite as N		1.97	mg/L	0.010	111	90	110	0.7	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_200522B			
Lab ID: ICV		Initial Calibration Verification Standard							05/22/20 13:24	
Phosphorus, Total as P		0.523	mg/L	0.0050	105	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/22/20 13:46	
Phosphorus, Total as P		0.541	mg/L	0.0050	108	90	110			
Method: E365.1									Batch: 144871	
Lab ID: MB-144871		Method Blank				Run: FIA202-B_200522B			05/22/20 13:27	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-144871		Laboratory Control Sample				Run: FIA202-B_200522B			05/22/20 13:29	
Phosphorus, Total as P		0.197	mg/L	0.0050	99	90	110			
Lab ID: B20051636-001AMS		Sample Matrix Spike				Run: FIA202-B_200522B			05/22/20 13:35	
Phosphorus, Total as P		0.355	mg/L	0.0050	104	90	110			
Lab ID: B20051636-001AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200522B			05/22/20 13:36	
Phosphorus, Total as P		0.362	mg/L	0.0050	108	90	110	2.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051713 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_200522A
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 12:41
Oxygen Demand, Chemical (COD)		53.6	mg/L	5.0	107	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 12:42
Oxygen Demand, Chemical (COD)		54.6	mg/L	5.0	109	90	110			
Method: E410.4										Batch: 144865
Lab ID: MB-144865		Method Blank				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-144865		Laboratory Control Sample				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		25.3	mg/L	5.0	103	90	110			
Lab ID: B20051655-001BMS		Sample Matrix Spike				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		71.9	mg/L	5.0	107	90	110			
Lab ID: B20051655-001BMSD		Sample Matrix Spike Duplicate				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		72.1	mg/L	5.0	107	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20051713

Login completed by:	Briana G. Sangiuliano	Date Received:	5/21/2020
Reviewed by:	BL2000\darcy	Received by:	bgs
Reviewed Date:	5/26/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	3.0°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Storm Water
Contact	Tracy Campbell
Phone	406-552-6364
Mailing Address	1345 W Broadway
City, State, Zip	Missoula, MT 59801
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email	Receive Report ☐Hard Copy ☒Email
Purchase Order	Quote / Bottle Order 140646

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	
Special Report/Formats: ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other	

Comments

Project Information

Project Name, PWSID, Permit, etc	MS4 General Permit
Sampler Name: Tracy Campbell	Sampler Phone: 406-552-6364
Sample Origin State: MT	EPA/State Compliance ☒Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e (2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	Analysis Requested										See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1563	5-20-2020	9:00	5	W											X		B20051713
2	S86-35-OF	5-20-2020	10:00	5	W													
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Custody Record MUST be signed						
Relinquished by (print): Tracy Campbell	Date/Time: 5-20-2020 12:26	Signature: [signature]	Received by (print)	Date/Time	Signature
Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print): Briana Sanguilliano	Date/Time: 5/21/2020 0930	Signature: [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

BOTTLE ORDER 140646

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Bitterroot River

Order Created by: Shari Endy
Shipped From: Billings, MT
Ship Date: 3/3/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410 4	Chemical Oxygen Demand		☐ H2SO4		1
		E351 2	Nitrogen, Total Kjeldahl				
		E353 2	Nitrogen, Nitrate + Nitrite				
		E365 1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Total		■ HNO3		1

Comments

Metals. Cu, Pb, Zn

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide
■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

ANALYTICAL SUMMARY REPORT

May 29, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20051715

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 1 sample for City of Missoula Storm Water Utility on 5/21/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20051715-001	S06-16-OF	05/20/20 11:00	05/21/20	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20051715

Report Date: 05/29/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	05/29/20
Project:	MS4 General Permit	**Collection Date:**	05/20/20 11:00
Lab ID:	B20051715-001	**DateReceived:**	05/21/20
Client Sample ID:	S06-16-OF	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	267	mg/L		10		A2540 D	05/26/20 12:37 / gie
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	23	mg/L		5		E410.4	05/22/20 12:42 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.03	mg/L		0.01		E353.2	05/26/20 10:26 / srh
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	05/22/20 16:07 / zas
Nitrogen, Total	ND	mg/L		0.5		Calculation	05/26/20 13:11 / bas
Phosphorus, Total as P	0.056	mg/L		0.005		E365.1	05/22/20 13:48 / zas
METALS, TOTAL							
Copper	0.002	mg/L		0.002		E200.8	05/23/20 07:56 / pap
Lead	0.0004	mg/L		0.0003		E200.8	05/23/20 07:56 / pap
Zinc	ND	mg/L		0.008		E200.8	05/23/20 07:56 / pap
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	05/28/20 08:30 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/28/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 200528A
Lab ID: MBLK2005280809	Method Blank				Run: BAL-ACCU-124_200528A				05/28/20 08:23
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2005280809	Laboratory Control Sample				Run: BAL-ACCU-124_200528A				05/28/20 08:24
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114			
Lab ID: LCSD2005280809	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_200528A				05/28/20 08:24
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114	0.0	18	
Lab ID: G20050404-001BMS	Sample Matrix Spike				Run: BAL-ACCU-124_200528A				05/28/20 08:25
Oil & Grease (HEM), Sulfur Corrected	39	mg/L	5.0	85	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 144915
Lab ID: MB-144915	Method Blank					Run: BAL #SD-15_200526A				05/26/20 12:35
Solids, Total Suspended TSS @ 105 C		ND	mg/L	0.5						
Lab ID: LCS-144915	Laboratory Control Sample					Run: BAL #SD-15_200526A				05/26/20 12:36
Solids, Total Suspended TSS @ 105 C		102	mg/L	10	102	80	120			
Lab ID: B20051713-002ADUP	Sample Duplicate					Run: BAL #SD-15_200526A				05/26/20 12:37
Solids, Total Suspended TSS @ 105 C		50.5	mg/L	10				2.0	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8										Analytical Run: ICPMS208-B_200522A
Lab ID: QCS	3	Initial Calibration Verification Standard								05/23/20 02:48
Copper		0.0521	mg/L	0.010	104	90	110			
Lead		0.0488	mg/L	0.010	98	90	110			
Zinc		0.0520	mg/L	0.010	104	90	110			
Method: E200.8										Batch: 144864
Lab ID: MB-144864	3	Method Blank				Run: ICPMS208-B_200522A				05/23/20 05:26
Copper		ND	mg/L	0.0004						
Lead		ND	mg/L	0.00004						
Zinc		ND	mg/L	0.0010						
Lab ID: LCS4-144864	3	Laboratory Control Sample				Run: ICPMS208-B_200522A				05/23/20 05:30
Copper		0.103	mg/L	0.0050	103	85	115			
Lead		0.0991	mg/L	0.0010	99	85	115			
Zinc		0.105	mg/L	0.010	105	85	115			
Lab ID: B20051719-001BMS4	3	Sample Matrix Spike				Run: ICPMS208-B_200522A				05/23/20 08:39
Copper		0.182	mg/L	0.0050	106	70	130			
Lead		0.178	mg/L	0.0010	99	70	130			
Zinc		0.398	mg/L	0.010	112	70	130			
Lab ID: B20051719-001BMSD	3	Sample Matrix Spike Duplicate				Run: ICPMS208-B_200522A				05/23/20 08:43
Copper		0.182	mg/L	0.0050	107	70	130	0.3	20	
Lead		0.181	mg/L	0.0010	102	70	130	1.8	20	
Zinc		0.398	mg/L	0.010	111	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_200522A
Lab ID: ICV	Initial Calibration Verification Standard									05/22/20 15:02
Nitrogen, Kjeldahl, Total as N		9.86	mg/L	0.50	99	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard									05/22/20 15:59
Nitrogen, Kjeldahl, Total as N		9.75	mg/L	0.50	98	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard									05/22/20 16:15
Nitrogen, Kjeldahl, Total as N		9.83	mg/L	0.50	98	90	110			
Method: E351.2										Batch: 144869
Lab ID: MB-144869	Method Blank					Run: FIA204-B_200522A				05/22/20 15:34
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-144869	Laboratory Control Sample					Run: FIA204-B_200522A				05/22/20 15:35
Nitrogen, Kjeldahl, Total as N		10.0	mg/L	0.50	100	90	110			
Lab ID: B20051715-001CMS	Sample Matrix Spike					Run: FIA204-B_200522A				05/22/20 16:08
Nitrogen, Kjeldahl, Total as N		9.59	mg/L	0.50	91	90	110			
Lab ID: B20051715-001CMSD	Sample Matrix Spike Duplicate					Run: FIA204-B_200522A				05/22/20 16:09
Nitrogen, Kjeldahl, Total as N		9.01	mg/L	0.50	86	90	110	6.2	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_200526A	
Lab ID: ICV		Initial Calibration Verification Standard							05/26/20 09:51	
Nitrogen, Nitrate+Nitrite as N		0.545	mg/L	0.010	96	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/26/20 10:14	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							05/26/20 10:31	
Nitrogen, Nitrate+Nitrite as N		0.952	mg/L	0.010	95	90	110			
Method: E353.2									Batch: R342533	
Lab ID: MBLK		Method Blank				Run: FIA203-B_200526A			05/26/20 09:52	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_200526A			05/26/20 09:53	
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Lab ID: B20051724-002AMS		Sample Matrix Spike				Run: FIA203-B_200526A			05/26/20 10:33	
Nitrogen, Nitrate+Nitrite as N		8.41	mg/L	0.020	99	90	110			
Lab ID: B20051724-002AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_200526A			05/26/20 10:35	
Nitrogen, Nitrate+Nitrite as N		8.44	mg/L	0.020	100	90	110	0.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_200522B
Lab ID: ICV		Initial Calibration Verification Standard								05/22/20 13:24
Phosphorus, Total as P		0.523	mg/L	0.0050	105	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 13:46
Phosphorus, Total as P		0.541	mg/L	0.0050	108	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 13:59
Phosphorus, Total as P		0.542	mg/L	0.0050	108	90	110			
Method: E365.1										Batch: 144871
Lab ID: MB-144871		Method Blank				Run: FIA202-B_200522B				05/22/20 13:27
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-144871		Laboratory Control Sample				Run: FIA202-B_200522B				05/22/20 13:29
Phosphorus, Total as P		0.197	mg/L	0.0050	99	90	110			
Lab ID: B20051750-002CMS		Sample Matrix Spike				Run: FIA202-B_200522B				05/22/20 13:55
Phosphorus, Total as P		0.604	mg/L	0.0050	114	90	110			S
Lab ID: B20051750-002CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_200522B				05/22/20 13:56
Phosphorus, Total as P		0.592	mg/L	0.0050	108	90	110	2.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20051715 **Report Date:** 05/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_200522A
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 12:42
Oxygen Demand, Chemical (COD)		54.6	mg/L	5.0	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/22/20 12:42
Oxygen Demand, Chemical (COD)		53.0	mg/L	5.0	106	90	110			
Method: E410.4										Batch: 144865
Lab ID: MB-144865		Method Blank				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-144865		Laboratory Control Sample				Run: SPEC3_200522A				05/22/20 12:41
Oxygen Demand, Chemical (COD)		25.3	mg/L	5.0	103	90	110			
Lab ID: B20051734-001DMS		Sample Matrix Spike				Run: SPEC3_200522A				05/22/20 12:42
Oxygen Demand, Chemical (COD)		37.5	mg/L	5.0	99	90	110			
Lab ID: B20051734-001DMSD		Sample Matrix Spike Duplicate				Run: SPEC3_200522A				05/22/20 12:42
Oxygen Demand, Chemical (COD)		37.5	mg/L	5.0	99	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20051715

Login completed by:	Briana G. Sangiuliano	Date Received:	5/21/2020
Reviewed by:	BL2000\darcy	Received by:	bgs
Reviewed Date:	5/26/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.7°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name: City of Missoula Storm Water
Contact: Tracy Campbell
Phone: 406-552-6364
Mailing Address: 1345 W Broadway
City, State, Zip: Missoula, MT 59801
Email: CampbellTL@ci.missoula.mt.us
Receive Invoice ☐ Hard Copy ☒ Email | Receive Report ☐ Hard Copy ☒ Email
Purchase Order: | Quote: | Bottle Order: 140645

Report Information (if different than Account Information)

Company/Name:
Contact:
Phone:
Mailing Address:
City, State, Zip:
Email:
Receive Report ☐ Hard Copy ☐ Email
Special Report/Formats:
☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ____

Comments

Project Information

Project Name, PWSID, Permit, etc.: MS4 General Permit
Sampler Name: Tracy Campbell | Sampler Phone: 406-552-6364
Sample Origin State: MT | EPA/State Compliance ☒ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e (2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	Analysis Requested: See Attached	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SW-16-OF	5-20-2020	11:00	5	W	X		B20051715
2								
3								
4								
5								
6								
7								
8								
9								
10								

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	5-20-2020 11:00	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print): Brianna Sangiuliano	Date/Time: 5/21/2020 0930	Signature: [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check ____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-10/18 v.3

BOTTLE ORDER 140645

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Grant Creek

Order Created by: Shari Endy
Shipped From: Billings, MT
Ship Date: 3/3/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended				1
500 mL Plastic	1	E410 4	Chemical Oxygen Demand		☐ H2SO4		1
		E351 2	Nitrogen, Total Kjeldahl				
		E353 2	Nitrogen, Nitrate + Nitrite				
		E365 1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Total		■ HNO3		1

Comments

Metals. Cu, Pb, Zn

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide
■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

ANALYTICAL SUMMARY REPORT

December 07, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20111474

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 11/19/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20111474-001	SNA-1526	11/18/20 13:45	11/19/20	Aqueous	Metals by ICP/ICPMS, Tot.Rec. Bacteria, Total and E-Coli Coliforms - QT Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended
B20111474-002	SNA-1521	11/18/20 13:00	11/19/20	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20111474

Report Date: 12/07/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/07/20
Project:	MS4 General Permit	**Collection Date:**	11/18/20 13:45
Lab ID:	B20111474-001	**DateReceived:**	11/19/20
Client Sample ID:	SNA-1526	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	21050	mpn/100ml		1.0		A9223 B	11/19/20 11:56 / fap
Bacteria, E-Coli Coliform	920.8	mpn/100ml		1.0		A9223 B	11/19/20 11:56 / fap
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	134	mg/L		10		A2540 D	11/19/20 15:04 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	135	mg/L	D	10		E410.4	11/20/20 12:07 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.32	mg/L		0.01		E353.2	11/19/20 15:56 / ean
Nitrogen, Kjeldahl, Total as N	1.3	mg/L		0.5		E351.2	11/20/20 14:38 / kej
Nitrogen, Total	1.6	mg/L		0.5		Calculation	11/20/20 16:21 / bap
Phosphorus, Orthophosphate as P	0.058	mg/L		0.005		E365.1	11/19/20 11:53 / kej
Phosphorus, Total as P	0.310	mg/L		0.005		E365.1	11/20/20 14:02 / kej
METALS, TOTAL RECOVERABLE							
Arsenic	0.003	mg/L		0.001		E200.8	11/21/20 05:08 / pap
Cadmium	ND	mg/L		0.001		E200.7	11/20/20 16:06 / rlh
Copper	0.014	mg/L		0.005		E200.8	11/21/20 05:08 / pap
Iron	4.04	mg/L		0.02		E200.7	11/20/20 16:06 / rlh
Lead	0.007	mg/L		0.001		E200.8	11/21/20 05:08 / pap
Zinc	0.17	mg/L		0.01		E200.7	11/20/20 16:06 / rlh
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/25/20 08:31 / eli-g
BIOLOGICAL							
Chlorophyll a	1.7	mg/cu. m	D	0.20		A10200 H	12/01/20 12:31 / eli-h

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
D - Reporting Limit (RL) increased due to sample matrix
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/07/20
Project:	MS4 General Permit	**Collection Date:**	11/18/20 13:00
Lab ID:	B20111474-002	**DateReceived:**	11/19/20
Client Sample ID:	SNA-1521	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MICROBIOLOGICAL							
Bacteria, Total Coliform	3500	mpn/100ml		1.0		A9223 B	11/19/20 11:56 / fap
Bacteria, E-Coli Coliform	137.6	mpn/100ml		1.0		A9223 B	11/19/20 11:56 / fap
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	10	mg/L		10		A2540 D	11/19/20 15:04 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	9	mg/L		5		E410.4	11/20/20 12:07 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.00	mg/L		0.01		E353.2	11/19/20 15:57 / ean
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	11/20/20 14:41 / kej
Nitrogen, Total	1.0	mg/L		0.5		Calculation	11/20/20 16:21 / bap
Phosphorus, Orthophosphate as P	0.018	mg/L		0.005		E365.1	11/19/20 11:56 / kej
Phosphorus, Total as P	0.044	mg/L		0.005		E365.1	11/20/20 14:05 / kej
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	11/21/20 05:12 / pap
Cadmium	ND	mg/L		0.001		E200.7	11/20/20 16:34 / rlh
Copper	ND	mg/L		0.005		E200.8	11/21/20 05:12 / pap
Iron	0.36	mg/L		0.02		E200.7	11/20/20 16:34 / rlh
Lead	ND	mg/L		0.001		E200.8	11/21/20 05:12 / pap
Zinc	0.02	mg/L		0.01		E200.7	11/20/20 16:34 / rlh
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/25/20 08:32 / eli-g
BIOLOGICAL							
Chlorophyll a	4.9	mg/cu. m		0.14		A10200 H	12/01/20 13:30 / eli-h

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/06/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A10200 H					Analytical Run: CHLOROPHYLL UV/VIS_201201A				
Lab ID: CCV_03r-W	Continuing Calibration Verification Standard								12/01/20 11:03
Chlorophyll a	2.2	mg/cu. m	0.1	90	85	115			
Method: A10200 H									Batch: 54391
Lab ID: LCS-54391	Laboratory Control Sample				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 11:32
Chlorophyll a	2.6	mg/cu. m	0.1	102	80	120			
Lab ID: MB-54391	Method Blank				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 12:02
Chlorophyll a	ND	mg/cu. m	0.002						
Lab ID: B20111474-002GMS	Sample Matrix Spike				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 13:59
Chlorophyll a	30	mg/cu. m	0.1	75	80	120			S
Lab ID: B20111474-002GMSD	Sample Matrix Spike Duplicate				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 14:29
Chlorophyll a	32	mg/cu. m	0.1	80	80	120	4.7	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 150693
Lab ID: MB-150693		Method Blank				Run: BAL #30_201119B				11/19/20 15:03
Solids, Total Suspended TSS @ 105 C		ND	mg/L							
Lab ID: LCS-150693		Laboratory Control Sample				Run: BAL #30_201119B				11/19/20 15:03
Solids, Total Suspended TSS @ 105 C		97.0	mg/L	10	97	80	120			
Lab ID: B20111457-001B DUP		Sample Duplicate				Run: BAL #30_201119B				11/19/20 15:04
Solids, Total Suspended TSS @ 105 C		9.80	mg/L	10					5	
Lab ID: B20111494-001B DUP		Sample Duplicate				Run: BAL #30_201119B				11/19/20 15:04
Solids, Total Suspended TSS @ 105 C		158	mg/L	20				3.9	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2							Analytical Run: FIA204-B_201120A			
Lab ID: ICV		Initial Calibration Verification Standard							11/20/20 13:55	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/20/20 14:35	
Nitrogen, Kjeldahl, Total as N		10.4	mg/L	0.50	104	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/20/20 14:53	
Nitrogen, Kjeldahl, Total as N		10.5	mg/L	0.50	105	90	110			
Method: E351.2									Batch: 150706	
Lab ID: MB-150706		Method Blank				Run: FIA204-B_201120A			11/20/20 14:30	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-150706		Laboratory Control Sample				Run: FIA204-B_201120A			11/20/20 14:32	
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110			
Lab ID: B20111474-001EMS		Sample Matrix Spike				Run: FIA204-B_201120A			11/20/20 14:39	
Nitrogen, Kjeldahl, Total as N		11.2	mg/L	0.50	99	90	110			
Lab ID: B20111474-001EMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_201120A			11/20/20 14:40	
Nitrogen, Kjeldahl, Total as N		11.3	mg/L	0.50	100	90	110	0.9	10	
Lab ID: B20111474-002EMS		Sample Matrix Spike				Run: FIA204-B_201120A			11/20/20 14:42	
Nitrogen, Kjeldahl, Total as N		9.99	mg/L	0.50	100	90	110			
Lab ID: B20111474-002EMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_201120A			11/20/20 14:43	
Nitrogen, Kjeldahl, Total as N		10.8	mg/L	0.50	108	90	110	7.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_201119B	
Lab ID: ICV		Initial Calibration Verification Standard							11/19/20 10:27	
Nitrogen, Nitrate+Nitrite as N		0.571	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/19/20 15:50	
Nitrogen, Nitrate+Nitrite as N		0.956	mg/L	0.010	96	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/19/20 16:06	
Nitrogen, Nitrate+Nitrite as N		0.959	mg/L	0.010	96	90	110			
Method: E353.2									Batch: R352262	
Lab ID: MBLK		Method Blank				Run: FIA203-B_201119B			11/19/20 10:29	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_201119B			11/19/20 10:30	
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Lab ID: B20111463-001AMS		Sample Matrix Spike				Run: FIA203-B_201119B			11/19/20 15:52	
Nitrogen, Nitrate+Nitrite as N		1.92	mg/L	0.010	105	90	110			
Lab ID: B20111463-001AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_201119B			11/19/20 15:53	
Nitrogen, Nitrate+Nitrite as N		1.92	mg/L	0.010	105	90	110	0.3	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_201119A			
Lab ID: ICV		Initial Calibration Verification Standard							11/19/20 10:48	
Phosphorus, Orthophosphate as P		0.233	mg/L	0.0050	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/19/20 11:14	
Phosphorus, Orthophosphate as P		0.523	mg/L	0.0050	105	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/19/20 11:57	
Phosphorus, Orthophosphate as P		0.515	mg/L	0.0050	103	90	110			
Method: E365.1									Batch: R352257	
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA202-B_201119A			11/19/20 10:50	
Phosphorus, Orthophosphate as P		0.248	mg/L	0.0051	99	90	110			
Lab ID: MB-150682		Method Blank				Run: FIA202-B_201119A			11/19/20 11:53	
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: B20111474-001AMS		Sample Matrix Spike				Run: FIA202-B_201119A			11/19/20 11:54	
Phosphorus, Orthophosphate as P		0.296	mg/L	0.0051	95	90	110			
Lab ID: B20111474-001AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201119A			11/19/20 11:55	
Phosphorus, Orthophosphate as P		0.324	mg/L	0.0051	107	90	110	9.2	10	
Method: E365.1							Analytical Run: FIA202-B_201120B			
Lab ID: ICV		Initial Calibration Verification Standard							11/20/20 13:47	
Phosphorus, Total as P		0.546	mg/L	0.0050	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/20/20 14:11	
Phosphorus, Total as P		0.510	mg/L	0.0050	102	90	110			
Method: E365.1									Batch: 150718	
Lab ID: MB-150718		Method Blank				Run: FIA202-B_201120B			11/20/20 13:49	
Phosphorus, Total as P		0.005	mg/L	0.004						
Lab ID: LCS-150718		Laboratory Control Sample				Run: FIA202-B_201120B			11/20/20 13:51	
Phosphorus, Total as P		0.207	mg/L	0.0050	103	90	110			
Lab ID: B20111474-001EMS		Sample Matrix Spike				Run: FIA202-B_201120B			11/20/20 14:03	
Phosphorus, Total as P		0.526	mg/L	0.0050	108	90	110			
Lab ID: B20111474-001EMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201120B			11/20/20 14:04	
Phosphorus, Total as P		0.535	mg/L	0.0050	113	90	110	1.7	10	S
Lab ID: B20111474-002EMS		Sample Matrix Spike				Run: FIA202-B_201120B			11/20/20 14:07	
Phosphorus, Total as P		0.262	mg/L	0.0050	109	90	110			
Lab ID: B20111474-002EMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201120B			11/20/20 14:08	
Phosphorus, Total as P		0.261	mg/L	0.0050	108	90	110	0.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4									Batch: 150712	
Lab ID: MB-150712		Method Blank				Run: SPEC3_201120B			11/20/20 12:07	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-150712		Laboratory Control Sample				Run: SPEC3_201120B			11/20/20 12:07	
Oxygen Demand, Chemical (COD)		25.4	mg/L	5.0	104	90	110			
Lab ID: B20111496-001BMS		Sample Matrix Spike				Run: SPEC3_201120B			11/20/20 12:07	
Oxygen Demand, Chemical (COD)		47.0	mg/L	5.0	110	90	110			
Lab ID: B20111496-001BMSD		Sample Matrix Spike Duplicate				Run: SPEC3_201120B			11/20/20 12:07	
Oxygen Demand, Chemical (COD)		47.1	mg/L	5.0	110	90	110	0.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Analytical Run: ICP203-B_201120A
Lab ID: ICV	3	Continuing Calibration Verification Standard								11/20/20 09:25
Cadmium		2.46	mg/L	0.010	99	95	105			
Iron		2.52	mg/L	0.020	101	95	105			
Zinc		2.48	mg/L	0.010	99	95	105			
Method: E200.7										Batch: 150688
Lab ID: MB-150688	3	Method Blank				Run: ICP203-B_201120A				11/20/20 15:05
Cadmium		ND	mg/L	0.0008						
Iron		ND	mg/L	0.007						
Zinc		ND	mg/L	0.002						
Lab ID: LCS3-150688	3	Laboratory Control Sample				Run: ICP203-B_201120A				11/20/20 15:10
Cadmium		0.479	mg/L	0.010	96	85	115			
Iron		4.99	mg/L	0.020	100	85	115			
Zinc		0.993	mg/L	0.010	99	85	115			
Lab ID: B20111474-001DMS3	3	Sample Matrix Spike				Run: ICP203-B_201120A				11/20/20 16:18
Cadmium		0.484	mg/L	0.0010	97	70	130			
Iron		9.51	mg/L	0.020	109	70	130			
Zinc		1.18	mg/L	0.010	102	70	130			
Lab ID: B20111474-001DMSD	3	Sample Matrix Spike Duplicate				Run: ICP203-B_201120A				11/20/20 16:22
Cadmium		0.482	mg/L	0.0010	96	70	130	0.5	20	
Iron		9.53	mg/L	0.020	110	70	130	0.3	20	
Zinc		1.18	mg/L	0.010	102	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS207-B_201120A			
Lab ID: QCS	3	Initial Calibration Verification Standard								11/20/20 18:37
Arsenic		0.0518	mg/L	0.0050	104	90	110			
Copper		0.0543	mg/L	0.010	109	90	110			
Lead		0.0504	mg/L	0.010	101	90	110			
Method: E200.8										Batch: 150688
Lab ID: MB-150688	3	Method Blank				Run: ICPMS207-B_201120A				11/21/20 03:37
Arsenic		ND	mg/L	0.0001						
Copper		ND	mg/L	0.0002						
Lead		ND	mg/L	0.00008						
Lab ID: LCS4-150688	3	Laboratory Control Sample				Run: ICPMS207-B_201120A				11/21/20 03:42
Arsenic		0.100	mg/L	0.0010	100	85	115			
Copper		0.0987	mg/L	0.0050	99	85	115			
Lead		0.0941	mg/L	0.0010	94	85	115			
Lab ID: B20111474-002DMS4	3	Sample Matrix Spike				Run: ICPMS207-B_201120A				11/21/20 05:16
Arsenic		0.101	mg/L	0.0010	100	70	130			
Copper		0.100	mg/L	0.0050	96	70	130			
Lead		0.0968	mg/L	0.0010	96	70	130			
Lab ID: B20111474-002DMSD	3	Sample Matrix Spike Duplicate				Run: ICPMS207-B_201120A				11/21/20 05:38
Arsenic		0.0991	mg/L	0.0010	98	70	130	2.2	20	
Copper		0.0982	mg/L	0.0050	94	70	130	1.9	20	
Lead		0.0963	mg/L	0.0010	96	70	130	0.5	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111474 **Report Date:** 11/30/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 201125A
Lab ID: MBLK2011250810	Method Blank				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2011250810	Laboratory Control Sample				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	35	mg/L	5.0	88	78	114			
Lab ID: LCSD2011250810	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_201125A				11/25/20 08:28
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114	1.7	18	
Lab ID: G20110379-001EMS	Sample Matrix Spike				Run: BAL-ACCU-124_201125A				11/25/20 08:29
Oil & Grease (HEM)	29	mg/L	5.0	68	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20111474

Login completed by: Tabitha Edwards
Reviewed by: BL2000\gmccartney
Reviewed Date: 11/20/2020

Date Received: 11/19/2020
Received by: tkb
Carrier name: Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	7.6°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

The sample for Orthophosphate was subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

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Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Storm Water
Contact	Tracy Campbell
Phone	~~406-531-5539~~ 406-552-6364
Mailing Address	1345 W. Broadway
City State Zip	Missoula, MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice ☐Hard Copy ☒Email	Receive Report ☐Hard Copy ☒Email
Purchase Order	Quote / Bottle Order 145862/140644

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report ☐Hard Copy ☐Email	
Special Report/Formats ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other	

Comments

Project Information

Project Name, PWSID, Permit, etc	MS4 General Permit
Sampler Name Tracy Campbell	Sampler Phone 406-552-6364
Sample Origin State MT	EPA/State Compliance ☒Yes ☐No

MINING CLIENTS, please indicate sample type
*If ore has been processed or refined, call before sending
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

Analysis Requested

See attached

See Attached

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1526	11/18/20	13:45	8	W		B20111474
2	SNA-1521	11/18/20	13:00	8	W		
3							
4							
5							
6							
7							
8							
9							
10							

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Carver Butterfield	11/18/20 18:51				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				Maylor Davis	11/19/20 0910	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC 12/16 v 1

BOTTLE ORDER 145802

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River

Order Created by: Jillian B. Miller
Shipped From Billings, MT
Ship Date. 9/8/2020
VIA Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container	1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		☐ H2SO4		1
		E365 1	Phosphorus, Total				
		E353 2	Nitrogen, Nitrate + Nitrite				
		E351 2	Nitrogen, Total Kjeldahl				
		E410 4	Chemical Oxygen Demand				
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Tot Rec		■ HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		☐ AF		1
120 mL Plastic	1	E365 1	Phosphorus, Orthophosphate as P	48 00 hrs		Filter Sample	1

■ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide

BOTTLE ORDER 140644

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River E.Coli

Order Created by: Shari Endy
Shipped From: Billings, MT
Ship Date: 3/3/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
100 mL Plastic Sterile	1	A9223 B	Bacteria, Total and E-Coli Coliforms - QT	30.00 hrs			1

■ HNO3 - Nitric Acid □ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide
■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid □ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report

ANALYTICAL SUMMARY REPORT

December 01, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20111517

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 1 sample for City of Missoula Storm Water Utility on 11/19/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20111517-001	S06-16-OF	11/18/20 15:45	11/19/20	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20111517

Report Date: 12/01/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/01/20
Project:	MS4 General Permit	**Collection Date:**	11/18/20 15:45
Lab ID:	B20111517-001	**DateReceived:**	11/19/20
Client Sample ID:	S06-16-OF	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	54	mg/L		10		A2540 D	11/20/20 10:06 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	73	mg/L	D	10		E410.4	11/20/20 14:11 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.32	mg/L		0.01		E353.2	11/20/20 13:23 / ean
Nitrogen, Kjeldahl, Total as N	1.5	mg/L		0.5		E351.2	11/24/20 10:25 / kej
Nitrogen, Total	1.8	mg/L		0.5		Calculation	11/25/20 16:43 / bap
Phosphorus, Total as P	0.244	mg/L		0.005		E365.1	11/23/20 12:00 / kej
METALS, TOTAL							
Copper	0.010	mg/L		0.002		E200.8	11/20/20 23:23 / pap
Lead	0.0022	mg/L		0.0003		E200.8	11/20/20 23:23 / pap
Zinc	0.044	mg/L		0.008		E200.7	11/20/20 16:46 / rlh
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/25/20 08:35 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
D - Reporting Limit (RL) increased due to sample matrix
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 11/30/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 201125A
Lab ID: MBLK2011250810	Method Blank				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2011250810	Laboratory Control Sample				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	35	mg/L	5.0	88	78	114			
Lab ID: LCSD2011250810	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_201125A				11/25/20 08:28
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114	1.7	18	
Lab ID: G20110379-001EMS	Sample Matrix Spike				Run: BAL-ACCU-124_201125A				11/25/20 08:29
Oil & Grease (HEM)	29	mg/L	5.0	68	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 150722
Lab ID: MB-150722	Method Blank					Run: BAL #30_201120B				11/20/20 10:06
Solids, Total Suspended TSS @ 105 C		ND	mg/L							
Lab ID: LCS-150722	Laboratory Control Sample					Run: BAL #30_201120B				11/20/20 10:06
Solids, Total Suspended TSS @ 105 C		90.0	mg/L	10	90	80	120			
Lab ID: B20111517-001A DUP	Sample Duplicate					Run: BAL #30_201120B				11/20/20 10:06
Solids, Total Suspended TSS @ 105 C		57.2	mg/L	10				5.0	5	R

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

R - Relative Percent Difference (RPD) exceeds advisory limit

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Analytical Run: ICP203-B_201120A
Lab ID: ICV		Continuing Calibration Verification Standard								11/20/20 09:25
Zinc		2.48	mg/L	0.010	99	95	105			
Method: E200.7										Batch: 150703
Lab ID: MB-150703		Method Blank				Run: ICP203-B_201120A				11/20/20 16:38
Zinc		ND	mg/L	0.002						
Lab ID: LCS3-150703		Laboratory Control Sample				Run: ICP203-B_201120A				11/20/20 16:42
Zinc		1.01	mg/L	0.010	101	85	115			
Lab ID: B20111517-001BMS3		Sample Matrix Spike				Run: ICP203-B_201120A				11/20/20 16:59
Zinc		1.06	mg/L	0.010	101	70	130			
Lab ID: B20111517-001BMSD		Sample Matrix Spike Duplicate				Run: ICP203-B_201120A				11/20/20 17:03
Zinc		1.06	mg/L	0.010	101	70	130	0.2	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8							Analytical Run: ICPMS207-B_201120A			
Lab ID: QCS	2	Initial Calibration Verification Standard								11/20/20 18:37
Copper		0.0543	mg/L	0.010	109	90	110			
Lead		0.0504	mg/L	0.010	101	90	110			
Method: E200.8									Batch: 150703	
Lab ID: MB-150703	2	Method Blank				Run: ICPMS207-B_201120A				11/20/20 22:54
Copper		ND	mg/L	0.0002						
Lead		ND	mg/L	0.00008						
Lab ID: LCS4-150703	2	Laboratory Control Sample				Run: ICPMS207-B_201120A				11/20/20 23:15
Copper		0.101	mg/L	0.0050	101	85	115			
Lead		0.0939	mg/L	0.0010	94	85	115			
Lab ID: B20111519-001AMS4	2	Sample Matrix Spike				Run: ICPMS207-B_201120A				11/20/20 23:32
Copper		0.101	mg/L	0.0050	101	70	130			
Lead		0.0966	mg/L	0.0010	97	70	130			
Lab ID: B20111519-001AMSD	2	Sample Matrix Spike Duplicate				Run: ICPMS207-B_201120A				11/20/20 23:36
Copper		0.102	mg/L	0.0050	101	70	130	0.6	20	
Lead		0.0949	mg/L	0.0010	95	70	130	1.7	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_201124A
Lab ID: ICV		Initial Calibration Verification Standard								11/24/20 09:38
Nitrogen, Kjeldahl, Total as N		9.74	mg/L	0.50	97	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/24/20 10:18
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/24/20 10:32
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Method: E351.2										Batch: 150759
Lab ID: MB-150759		Method Blank				Run: FIA204-B_201124A				11/24/20 10:13
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-150759		Laboratory Control Sample				Run: FIA204-B_201124A				11/24/20 10:15
Nitrogen, Kjeldahl, Total as N		9.86	mg/L	0.50	99	90	110			
Lab ID: B20111590-001BMS		Sample Matrix Spike				Run: FIA204-B_201124A				11/24/20 10:34
Nitrogen, Kjeldahl, Total as N		9.65	mg/L	0.50	92	90	110			
Lab ID: B20111590-001BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_201124A				11/24/20 10:35
Nitrogen, Kjeldahl, Total as N		9.66	mg/L	0.50	92	90	110	0.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2							Analytical Run: FIA203-B_201120B			
Lab ID: ICV		Initial Calibration Verification Standard							11/20/20 11:17	
Nitrogen, Nitrate+Nitrite as N		0.569	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/20/20 13:10	
Nitrogen, Nitrate+Nitrite as N		1.06	mg/L	0.010	106	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/20/20 13:29	
Nitrogen, Nitrate+Nitrite as N		1.07	mg/L	0.010	107	90	110			
Method: E353.2									Batch: R352357	
Lab ID: MBLK		Method Blank				Run: FIA203-B_201120B			11/20/20 11:18	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_201120B			11/20/20 11:19	
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Lab ID: B20111503-003CMS		Sample Matrix Spike				Run: FIA203-B_201120B			11/20/20 13:12	
Nitrogen, Nitrate+Nitrite as N		1.68	mg/L	0.010	111	90	110			S
Lab ID: B20111503-003CMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_201120B			11/20/20 13:14	
Nitrogen, Nitrate+Nitrite as N		1.70	mg/L	0.010	114	90	110	1.6	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1										Analytical Run: FIA202-B_201123A
Lab ID: ICV		Initial Calibration Verification Standard								11/23/20 11:47
Phosphorus, Total as P		0.547	mg/L	0.0050	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/23/20 12:09
Phosphorus, Total as P		0.523	mg/L	0.0050	105	90	110			
Method: E365.1										Batch: 150757
Lab ID: MB-150757		Method Blank				Run: FIA202-B_201123A				11/23/20 11:49
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-150757		Laboratory Control Sample				Run: FIA202-B_201123A				11/23/20 11:51
Phosphorus, Total as P		0.207	mg/L	0.0050	103	90	110			
Lab ID: B20111485-002CMS		Sample Matrix Spike				Run: FIA202-B_201123A				11/23/20 11:56
Phosphorus, Total as P		0.250	mg/L	0.0050	110	90	110			
Lab ID: B20111485-002CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201123A				11/23/20 11:57
Phosphorus, Total as P		0.251	mg/L	0.0050	110	90	110	0.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111517 **Report Date:** 12/01/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Analytical Run: SPEC3_201120C
Lab ID: CCV		Continuing Calibration Verification Standard								11/20/20 14:11
Oxygen Demand, Chemical (COD)		52.7	mg/L	5.0	105	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/20/20 14:11
Oxygen Demand, Chemical (COD)		49.9	mg/L	5.0	100	90	110			
Method: E410.4										Batch: 150713
Lab ID: MB-150713		Method Blank				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-150713		Laboratory Control Sample				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		25.9	mg/L	5.0	106	90	110			
Lab ID: B20111515-002CMS		Sample Matrix Spike				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		83.7	mg/L	5.0	106	90	110			
Lab ID: B20111515-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		83.6	mg/L	5.0	105	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20111517

Login completed by:	Taylor K. Burris	Date Received:	11/19/2020
Reviewed by:	BL2000\gmccartney	Received by:	rla
Reviewed Date:	11/23/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.6°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Storm Water
Contact	Tracy Campbell
Phone	406-552-6364
Mailing Address	1345 W. Broadway
City, State, Zip	Missoula, MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐Hard Copy ☒Email
Receive Report	☐Hard Copy ☒Email
Purchase Order	
Quote	
Bottle Order	145804

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City State, Zip	
Email	
Receive Report	☐Hard Copy ☐Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ______

Comments

Project Information

Project Name, PWSID, Permit, etc.	MS4 General Permit
Sampler Name	Tracy Campbell
Sampler Phone	406-552-6364
Sample Origin State	MT
EPA/State Compliance	☒Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

Analysis Requested

See attached

See Attached

All turnaround times are standard unless marked as RUSH.

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	RUSH TAT	ELI LAB ID Laboratory Use Only
1	S06-16-OF	11/18/20	15:45	5	W		B20111517
2							
3							
4							
5							
6							
7							
8							
9							
10							

Custody Record MUST be signed					
Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
Carer Butterfield	11/18/20 15:45	[signature]			
Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
			Rebecca Eschim	11/19/2020 0920	[signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check ______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-12/16 v 1

BOTTLE ORDER 145804

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Grant Creek

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 9/8/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container	1
500 mL Plastic	1	E410 4	Chemical Oxygen Demand		☐ H2SO4		1
		E351 2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365 1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		☐ H2SO4		1
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Total		■ HNO3		1

Comments

Metals Cu, Pb, Zn

■ HNO3 - Nitric Acid	☐ H2SO4 - Sulfuric Acid	■ NaOH - Sodium Hydroxide
■ ZnAc - Zinc Acetate	■ HCl - Hydrochloric Acid	☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

ANALYTICAL SUMMARY REPORT

December 04, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20111531

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 1 sample for City of Missoula Storm Water Utility on 11/19/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20111531-001	CFR-1	11/18/20 12:00	11/19/20	Aqueous	Metals by ICP/ICPMS, Tot.Rec. Chlorophyll A Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 Preparation, Filtration for Orthophosphate MCAWW E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Orthophosphate as P Phosphorus, Total Solids, Total Suspended

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20111531

Report Date: 12/04/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/04/20
Project:	MS4 General Permit	**Collection Date:**	11/18/20 12:00
Lab ID:	B20111531-001	**DateReceived:**	11/19/20
Client Sample ID:	CFR-1	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	11/20/20 10:07 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	ND	mg/L		5		E410.4	11/20/20 14:11 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.01		E353.2	11/23/20 12:40 / ean
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	11/24/20 10:29 / kej
Nitrogen, Total	ND	mg/L		0.5		Calculation	11/25/20 16:43 / bap
Phosphorus, Orthophosphate as P	0.006	mg/L		0.005		E365.1	11/19/20 15:28 / kej
Phosphorus, Total as P	0.008	mg/L		0.005		E365.1	11/23/20 12:03 / kej
METALS, TOTAL RECOVERABLE							
Arsenic	ND	mg/L		0.001		E200.8	11/21/20 01:28 / pap
Cadmium	ND	mg/L		0.001		E200.7	11/20/20 19:10 / rlh
Copper	ND	mg/L		0.005		E200.8	11/21/20 01:28 / pap
Iron	0.05	mg/L		0.02		E200.7	11/20/20 19:10 / rlh
Lead	ND	mg/L		0.001		E200.8	11/21/20 01:28 / pap
Zinc	ND	mg/L		0.01		E200.7	11/20/20 19:10 / rlh
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	11/25/20 08:36 / eli-g
BIOLOGICAL							
Chlorophyll a	ND	mg/cu. m		0.10		A10200 H	12/01/20 13:01 / eli-h

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/04/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A10200 H						Analytical Run: CHLOROPHYLL UV/VIS_201201A			
Lab ID: CCV_03r-W	Continuing Calibration Verification Standard								12/01/20 11:03
Chlorophyll a	2.2	mg/cu. m	0.1	90	85	115			
Method: A10200 H									Batch: 54391
Lab ID: LCS-54391	Laboratory Control Sample				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 11:32
Chlorophyll a	2.6	mg/cu. m	0.1	102	80	120			
Lab ID: MB-54391	Method Blank				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 12:02
Chlorophyll a	ND	mg/cu. m	0.002						
Lab ID: H20110509-002GMS	Sample Matrix Spike				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 13:59
Chlorophyll a	30	mg/cu. m	0.1	75	80	120			S
Lab ID: H20110509-002GMSD	Sample Matrix Spike Duplicate				Run: CHLOROPHYLL UV/VIS_2012				12/01/20 14:29
Chlorophyll a	32	mg/cu. m	0.1	80	80	120	4.7	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 11/30/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 201125A
Lab ID: MBLK2011250810	Method Blank				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2011250810	Laboratory Control Sample				Run: BAL-ACCU-124_201125A				11/25/20 08:27
Oil & Grease (HEM)	35	mg/L	5.0	88	78	114			
Lab ID: LCSD2011250810	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_201125A				11/25/20 08:28
Oil & Grease (HEM)	36	mg/L	5.0	89	78	114	1.7	18	
Lab ID: G20110379-001EMS	Sample Matrix Spike				Run: BAL-ACCU-124_201125A				11/25/20 08:29
Oil & Grease (HEM)	29	mg/L	5.0	68	78	114			S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D										Batch: 150722
Lab ID: MB-150722		Method Blank				Run: BAL #30_201120B				11/20/20 10:06
Solids, Total Suspended TSS @ 105 C		ND	mg/L							
Lab ID: LCS-150722		Laboratory Control Sample				Run: BAL #30_201120B				11/20/20 10:06
Solids, Total Suspended TSS @ 105 C		90.0	mg/L	10	90	80	120			
Lab ID: B20111592-002B DUP		Sample Duplicate				Run: BAL #30_201120B				11/20/20 10:07
Solids, Total Suspended TSS @ 105 C		195	mg/L	10				3.0	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_201124A	
Lab ID: ICV		Initial Calibration Verification Standard							11/24/20 09:38	
Nitrogen, Kjeldahl, Total as N		9.74	mg/L	0.50	97	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/24/20 10:18	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Method: E351.2									Batch: 150759	
Lab ID: MB-150759		Method Blank				Run: FIA204-B_201124A			11/24/20 10:13	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-150759		Laboratory Control Sample				Run: FIA204-B_201124A			11/24/20 10:15	
Nitrogen, Kjeldahl, Total as N		9.86	mg/L	0.50	99	90	110			
Lab ID: B20111590-001BMS		Sample Matrix Spike				Run: FIA204-B_201124A			11/24/20 10:34	
Nitrogen, Kjeldahl, Total as N		9.65	mg/L	0.50	92	90	110			
Lab ID: B20111590-001BMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_201124A			11/24/20 10:35	
Nitrogen, Kjeldahl, Total as N		9.66	mg/L	0.50	92	90	110	0.1	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_201123B
Lab ID: ICV		Initial Calibration Verification Standard								11/23/20 11:58
Nitrogen, Nitrate+Nitrite as N		0.583	mg/L	0.010	103	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/23/20 12:25
Nitrogen, Nitrate+Nitrite as N		1.08	mg/L	0.010	108	90	110			
Method: E353.2										Batch: R352456
Lab ID: MBLK		Method Blank				Run: FIA203-B_201123B				11/23/20 12:00
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_201123B				11/23/20 12:01
Nitrogen, Nitrate+Nitrite as N		1.07	mg/L	0.010	107	90	110			
Lab ID: B20111704-003BMS		Sample Matrix Spike				Run: FIA203-B_201123B				11/23/20 12:27
Nitrogen, Nitrate+Nitrite as N		31.9	mg/L	0.10	115	90	110			S
Lab ID: B20111704-003BMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_201123B				11/23/20 12:28
Nitrogen, Nitrate+Nitrite as N		31.8	mg/L	0.10	114	90	110	0.2	10	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_201119A			
Lab ID: ICV		Initial Calibration Verification Standard								11/19/20 10:48
Phosphorus, Orthophosphate as P		0.233	mg/L	0.0050	93	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/19/20 14:40
Phosphorus, Orthophosphate as P		0.541	mg/L	0.0050	108	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/19/20 15:28
Phosphorus, Orthophosphate as P		0.459	mg/L	0.0050	92	90	110			
Method: E365.1							Batch: R352257			
Lab ID: ICB		Method Blank				Run: FIA202-B_201119A				11/19/20 10:49
Phosphorus, Orthophosphate as P		ND	mg/L	0.003						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA202-B_201119A				11/19/20 10:50
Phosphorus, Orthophosphate as P		0.248	mg/L	0.0051	99	90	110			
Lab ID: B20111474-001AMS		Sample Matrix Spike				Run: FIA202-B_201119A				11/19/20 11:54
Phosphorus, Orthophosphate as P		0.296	mg/L	0.0051	95	90	110			
Lab ID: B20111474-001AMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201119A				11/19/20 11:55
Phosphorus, Orthophosphate as P		0.324	mg/L	0.0051	107	90	110	9.2	10	
Method: E365.1							Analytical Run: FIA202-B_201123A			
Lab ID: ICV		Initial Calibration Verification Standard								11/23/20 11:47
Phosphorus, Total as P		0.547	mg/L	0.0050	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								11/23/20 12:09
Phosphorus, Total as P		0.523	mg/L	0.0050	105	90	110			
Method: E365.1							Batch: 150757			
Lab ID: MB-150757		Method Blank				Run: FIA202-B_201123A				11/23/20 11:49
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-150757		Laboratory Control Sample				Run: FIA202-B_201123A				11/23/20 11:51
Phosphorus, Total as P		0.207	mg/L	0.0050	103	90	110			
Lab ID: B20111531-001DMS		Sample Matrix Spike				Run: FIA202-B_201123A				11/23/20 12:05
Phosphorus, Total as P		0.223	mg/L	0.0050	108	90	110			
Lab ID: B20111531-001DMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201123A				11/23/20 12:06
Phosphorus, Total as P		0.220	mg/L	0.0050	106	90	110	1.4	10	

Qualifiers:

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QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20111531 **Report Date:** 12/02/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4										Batch: 150713
Lab ID: MB-150713		Method Blank				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-150713		Laboratory Control Sample				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		25.9	mg/L	5.0	106	90	110			
Lab ID: B20111515-002CMS		Sample Matrix Spike				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		83.7	mg/L	5.0	106	90	110			
Lab ID: B20111515-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_201120C				11/20/20 14:11
Oxygen Demand, Chemical (COD)		83.6	mg/L	5.0	105	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility B20111531

Login completed by:	Tabitha Edwards	Date Received:	11/19/2020
Reviewed by:	BL2000\gmccartney	Received by:	car
Reviewed Date:	11/23/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.1°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

The sample for Orthophosphate was subsampled and filtered in the laboratory. According to 40CFR136, samples for Orthophosphate should be filtered within 15 minutes of collection.

ENERGY Trust our People Trust our Data

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information *(Billing information)*

Company/Name City of Missoula StormWater		
Contact Tracy Campbell		
Phone 406-552-6364		
Mailing Address 1345 W. Broadway		
City, State, Zip Missoula, MT 59802		
Email CampbellTL@ci.missoula.mt.us		
Receive Invoice ☐ Hard Copy ☒ Email	Receive Report ☐ Hard Copy ☒ Email	
Purchase Order	Quote	Bottle Order 145802/140644

Report Information *(if different than Account Information)*

Company/Name
Contact
Phone
Mailing Address
City State Zip
Email
Receive Report ☐ Hard Copy ☐ Email
Special Report/Formats ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT *(contact laboratory)* ☐ Other

Comments

Project Information

Project Name, PWSID, Permit, etc. MS4 General Permit	
Sampler Name Tracy Campbell	Sampler Phone 406-552-6364
Sample Origin State MT	EPA/State Compliance ☒ Yes ☐ No
MINING CLIENTS, please indicate sample type. *If ore has been processed or refined, call before sending ☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*	

Matrix Codes
A Air
W- Water
S - Soils/Solids
V Vegetation
B Bioassay
O Other
DW - Drinking Water

Analysis Requested

See attached

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification *(Name, Location, Interval, etc.)*	Collection Date	Collection Time	Number of Containers	Matrix *(See Codes Above)*	Analysis Requested	See Attached	RUSH TAT	ELI LAB ID *Laboratory Use Only*
1	CFR-1	11/18/20	12:00	7	W				B20111531
2									
3									
4									
5									
6									
7									
8									
9									
10									

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Carver Butterfield	11/18/2020 4:43PM	[signature]			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Cindy Ritchie	Date/Time 11/19/2020 9:20	Signature [signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number *(cash/check only)*
		Y N C B	Y N	°C	Y N	Y N	CC Cash Check	$	

In certain circumstances, samples submitted to Energy Laboratories Inc may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report

ELI-COC 12/16 v 1

BOTTLE ORDER 145802

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Clark Fork River

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 9/8/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(4 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container	1
500 mL Plastic	1	Calculation	Nitrogen, Total (TKN+NO3+NO2)		H2SO4		1
		E365.1	Phosphorus, Total				
		E353 2	Nitrogen, Nitrate + Nitrite				
		E351 2	Nitrogen, Total Kjeldahl				
		E410 4	Chemical Oxygen Demand				
250 mL Plastic	1	E200 7_8	Metals by ICP/ICPMS, Tot.Rec		HNO3	As Cd, Cu Fe Pb Zn	1
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		H2SO4		1
1 Liter Amber Glass Narrow Mouth	1	A10200 H	Chlorophyll A		AF		1
120 mL Plastic	1	E365 1	Phosphorus, Orthophosphate as P	48 00 hrs		Filter Sample	1

HNO3 - Nitric Acid | H2SO4 - Sulfuric Acid | NaOH - Sodium Hydroxide

ANALYTICAL SUMMARY REPORT

December 29, 2020

City of Missoula Storm Water Utility
1345 W Broadway St
Missoula, MT 59802-2239

Work Order: B20121539

Project Name: MS4 General Permit

Energy Laboratories Inc Billings MT received the following 2 samples for City of Missoula Storm Water Utility on 12/17/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B20121539-001	SNA-1563	12/16/20 12:15	12/17/20	Aqueous	Metals by ICP/ICPMS, Total Chemical Oxygen Demand Oil & Grease, Gravimetric Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) Metals Digestion by E200.2 Preparation for COD testing HACH 8000 E365.1 Digestion, Total P TKN preparation E351.2 Preparation for TSS A2540 D Phosphorus, Total Solids, Total Suspended
B20121539-002	S86-35-OF	12/16/20 11:30	12/17/20	Aqueous	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: City of Missoula Storm Water Utility
Project: MS4 General Permit
Work Order: B20121539

Report Date: 12/29/20

CASE NARRATIVE

Tests associated with analyst identified as ELI-G were subcontracted to Energy Laboratories, 400 W Boxelder Rd, Gillette, WY, EPA Number WY00006.

Tests associated with analyst identified as ELI-H were subcontracted to Energy Laboratories, 3161 East Lyndale Ave, Helena, MT, EPA Number MT00945.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/29/20
Project:	MS4 General Permit	**Collection Date:**	12/16/20 12:15
Lab ID:	B20121539-001	**DateReceived:**	12/17/20
Client Sample ID:	SNA-1563	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	102	mg/L		10		A2540 D	12/17/20 17:53 / pjw
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	72	mg/L		5		E410.4	12/18/20 14:39 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	1.71	mg/L		0.01		E353.2	12/22/20 13:49 / ean
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/22/20 11:03 / eli-h
Nitrogen, Total	1.7	mg/L		0.5		Calculation	12/28/20 08:06 / bap
Phosphorus, Total as P	0.104	mg/L		0.005		E365.1	12/21/20 12:53 / kej
METALS, TOTAL							
Copper	0.005	mg/L		0.002		E200.8	12/19/20 00:07 / jpv
Lead	0.0013	mg/L		0.0003		E200.8	12/19/20 00:07 / jpv
Zinc	0.027	mg/L		0.008		E200.8	12/19/20 00:07 / jpv
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	4	mg/L		1		E1664A	12/28/20 15:13 / eli-g

Report Definitions:	RL - Analyte Reporting Limit	MCL - Maximum Contaminant Level
	QCL - Quality Control Limit	ND - Not detected at the Reporting Limit (RL)

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client:	City of Missoula Storm Water Utility	**Report Date:**	12/29/20
Project:	MS4 General Permit	**Collection Date:**	12/16/20 11:30
Lab ID:	B20121539-002	**DateReceived:**	12/17/20
Client Sample ID:	S86-35-OF	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	12/17/20 17:53 / pjw
- TSS did not obtain the minimum residue requirement of 2.5 mg residue.							
AGGREGATE ORGANICS							
Oxygen Demand, Chemical (COD)	6	mg/L		5		E410.4	12/18/20 14:39 / mas
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	2.32	mg/L		0.01		E353.2	12/22/20 13:50 / ean
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	12/22/20 11:04 / eli-h
Nitrogen, Total	2.3	mg/L		0.5		Calculation	12/28/20 08:06 / bap
Phosphorus, Total as P	0.081	mg/L		0.005		E365.1	12/21/20 12:57 / kej
METALS, TOTAL							
Copper	ND	mg/L		0.002		E200.8	12/19/20 00:11 / jpv
Lead	ND	mg/L		0.0003		E200.8	12/19/20 00:11 / jpv
Zinc	0.011	mg/L		0.008		E200.8	12/19/20 00:11 / jpv
ORGANIC CHARACTERISTICS							
Oil & Grease (HEM)	ND	mg/L		1		E1664A	12/28/20 15:13 / eli-g

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E1664A									Batch: 201228A
Lab ID: MBLK2012281420	Method Blank				Run: BAL-ACCU-124_201228A				12/28/20 15:11
Oil & Grease (HEM)	ND	mg/L	0.9						
Lab ID: LCS2012281420	Laboratory Control Sample				Run: BAL-ACCU-124_201228A				12/28/20 15:11
Oil & Grease (HEM)	36	mg/L	5.0	90	78	114			
Lab ID: LCSD2012281420	Laboratory Control Sample Duplicate				Run: BAL-ACCU-124_201228A				12/28/20 15:11
Oil & Grease (HEM)	35	mg/L	5.0	89	78	114	2.0	18	
Lab ID: G20120410-001AMS	Sample Matrix Spike				Run: BAL-ACCU-124_201228A				12/28/20 15:12
Oil & Grease (HEM), Sulfur Corrected	40	mg/L	5.0	83	78	114			

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/24/20

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA202-HE_201222A
Lab ID: ICV	Initial Calibration Verification Standard								12/22/20 10:33
Nitrogen, Kjeldahl, Total as N	10.7	mg/L	0.50	107	90	110			
Lab ID: CCV	Continuing Calibration Verification Standard								12/22/20 10:51
Nitrogen, Kjeldahl, Total as N	9.86	mg/L	0.50	99	90	110			
Method: E351.2									Batch: 54663
Lab ID: MB-54663	Method Blank				Run: FIA202-HE_201222A				12/22/20 10:52
Nitrogen, Kjeldahl, Total as N	ND	mg/L	0.1						
Lab ID: LCS-54663	Laboratory Control Sample				Run: FIA202-HE_201222A				12/22/20 10:53
Nitrogen, Kjeldahl, Total as N	9.46	mg/L	0.50	95	90	110			
Lab ID: H20120523-001BMS	Sample Matrix Spike				Run: FIA202-HE_201222A				12/22/20 11:06
Nitrogen, Kjeldahl, Total as N	9.99	mg/L	0.50	100	90	110			
Lab ID: H20120523-001BMSD	Sample Matrix Spike Duplicate				Run: FIA202-HE_201222A				12/22/20 11:07
Nitrogen, Kjeldahl, Total as N	10.0	mg/L	0.50	100	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 D									Batch: 151422	
Lab ID: MB-151422	Method Blank					Run: BAL #30_201217C			12/17/20 16:24	
Solids, Total Suspended TSS @ 105 C		0.1	mg/L							
Lab ID: LCS-151422	Laboratory Control Sample					Run: BAL #30_201217C			12/17/20 16:24	
Solids, Total Suspended TSS @ 105 C		93.0	mg/L	10	93	80	120			
Lab ID: B20121502-002C DUP	Sample Duplicate					Run: BAL #30_201217C			12/17/20 17:53	
Solids, Total Suspended TSS @ 105 C		1698	mg/L	20				0.2	5	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS207-B_201218B	
Lab ID: QCS	3	Initial Calibration Verification Standard							12/18/20 15:11	
Copper		0.0546	mg/L	0.010	109	90	110			
Lead		0.0502	mg/L	0.010	100	90	110			
Zinc		0.0533	mg/L	0.010	107	90	110			
Method: E200.8									Batch: 151429	
Lab ID: MB-151429	3	Method Blank				Run: ICPMS207-B_201218B			12/18/20 21:52	
Copper		ND	mg/L	0.0002						
Lead		ND	mg/L	0.00008						
Zinc		ND	mg/L	0.005						
Lab ID: LCS4-151429	3	Laboratory Control Sample				Run: ICPMS207-B_201218B			12/18/20 21:56	
Copper		0.104	mg/L	0.0010	104	85	115			
Lead		0.0998	mg/L	0.0010	100	85	115			
Zinc		0.103	mg/L	0.0055	103	85	115			
Lab ID: B20121539-002BMS4	3	Sample Matrix Spike				Run: ICPMS207-B_201218B			12/19/20 00:15	
Copper		0.0979	mg/L	0.0050	97	70	130			
Lead		0.0984	mg/L	0.0010	98	70	130			
Zinc		0.110	mg/L	0.010	99	70	130			
Lab ID: B20121539-002BMSD	3	Sample Matrix Spike Duplicate				Run: ICPMS207-B_201218B			12/19/20 00:19	
Copper		0.0994	mg/L	0.0050	98	70	130	1.5	20	
Lead		0.0986	mg/L	0.0010	99	70	130	0.1	20	
Zinc		0.110	mg/L	0.010	99	70	130	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_201222B
Lab ID: ICV		Initial Calibration Verification Standard								12/22/20 13:13
Nitrogen, Nitrate+Nitrite as N		0.608	mg/L	0.010	108	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								12/22/20 13:37
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								12/22/20 13:53
Nitrogen, Nitrate+Nitrite as N		1.00	mg/L	0.010	100	90	110			
Method: E353.2										Batch: R353921
Lab ID: MBLK		Method Blank				Run: FIA203-B_201222B				12/22/20 13:09
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_201222B				12/22/20 13:11
Nitrogen, Nitrate+Nitrite as N		1.10	mg/L	0.010	110	90	110			
Lab ID: B20121541-002AMS		Sample Matrix Spike				Run: FIA203-B_201222B				12/22/20 13:56
Nitrogen, Nitrate+Nitrite as N		10.1	mg/L	0.020	103	90	110			E
Lab ID: B20121541-002AMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_201222B				12/22/20 13:57
Nitrogen, Nitrate+Nitrite as N		10.1	mg/L	0.020	104	90	110	0.3	10	E

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

E - Estimated value - result exceeds the instrument upper quantitation limit

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1							Analytical Run: FIA202-B_201221A			
Lab ID: ICV		Initial Calibration Verification Standard							12/21/20 12:40	
Phosphorus, Total as P		0.547	mg/L	0.0050	109	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/21/20 13:02	
Phosphorus, Total as P		0.475	mg/L	0.0050	95	90	110			
Method: E365.1									Batch: 151456	
Lab ID: MB-151456		Method Blank				Run: FIA202-B_201221A			12/21/20 12:42	
Phosphorus, Total as P		ND	mg/L	0.004						
Lab ID: LCS-151456		Laboratory Control Sample				Run: FIA202-B_201221A			12/21/20 12:45	
Phosphorus, Total as P		0.207	mg/L	0.0050	103	90	110			
Lab ID: B20121539-001CMS		Sample Matrix Spike				Run: FIA202-B_201221A			12/21/20 12:54	
Phosphorus, Total as P		0.314	mg/L	0.0050	105	90	110			
Lab ID: B20121539-001CMSD		Sample Matrix Spike Duplicate				Run: FIA202-B_201221A			12/21/20 12:56	
Phosphorus, Total as P		0.314	mg/L	0.0050	105	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: City of Missoula Storm Water Utility **Work Order:** B20121539 **Report Date:** 12/29/20

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E410.4							Analytical Run: SPEC3_201218B			
Lab ID: CCV		Continuing Calibration Verification Standard							12/18/20 14:39	
Oxygen Demand, Chemical (COD)		50.0	mg/L	5.0	100	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							12/18/20 14:39	
Oxygen Demand, Chemical (COD)		50.4	mg/L	5.0	101	90	110			
Method: E410.4									Batch: 151434	
Lab ID: MB-151434		Method Blank				Run: SPEC3_201218B			12/18/20 14:39	
Oxygen Demand, Chemical (COD)		ND	mg/L	3						
Lab ID: LCS-151434		Laboratory Control Sample				Run: SPEC3_201218B			12/18/20 14:39	
Oxygen Demand, Chemical (COD)		23.7	mg/L	5.0	97	90	110			
Lab ID: B20121485-002CMS		Sample Matrix Spike				Run: SPEC3_201218B			12/18/20 14:39	
Oxygen Demand, Chemical (COD)		52.1	mg/L	5.0	94	90	110			
Lab ID: B20121485-002CMSD		Sample Matrix Spike Duplicate				Run: SPEC3_201218B			12/18/20 14:39	
Oxygen Demand, Chemical (COD)		51.8	mg/L	5.0	93	90	110	0.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

City of Missoula Storm Water Utility   B20121539

Login completed by:	Taylor K. Burris	Date Received:	12/17/2020
Reviewed by:	BL2000\tedwards	Received by:	bjb
Reviewed Date:	12/18/2020	Carrier name:	Return-UPS Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	3.9°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY
Trust our People. Trust our Data

Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	City of Missoula Storm Water
Contact	Tracy Campbell
Phone	406-552-6364
Mailing Address	345 W. Broadway
City, State, Zip	Missoula, MT 59802
Email	CampbellTL@ci.missoula.mt.us
Receive Invoice	☐ Hard Copy ☒ Email
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	
Bottle Order	145801

Report Information (if different than Account Information)

Company/Name	
Contact	
Phone	
Mailing Address	
City, State, Zip	
Email	
Receive Report	☐ Hard Copy ☐ Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other ______

Comments

Project Information

Project Name, PWSID, Permit, etc	MS4 General Permit
Sampler Name	Tracy Campbell
Sampler Phone	406 552-6364
Sample Origin State	MT
EPA/State Compliance	☒ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

Analysis Requested

(see attached)

See Attached

All turnaround times are standard unless marked as RUSH

Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	RUSH TAT	ELI LAB ID Laboratory Use Only
1	SNA-1563	12-16-20	12:15	5	W		B20121539
2	S86-35-OF	12-16-20	11:30	5	W		
3							
4							
5							
6							
7							
8							
9							
10							

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Tracy Campbell	13:15/12-16-2020	[signature]		0930	
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				[illegible]	12/17/2020	[signature]

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check ______	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

BOTTLE ORDER 145801

SHIPPED TO: City of Missoula Storm Water Utility

Contact: Tracy Campbell
1345 W Broadway St
Missoula MT 59802-2239
Phone: (406) 542-6364
Project: Bitterroot River

Order Created by: Jillian B. Miller
Shipped From: Billings, MT
Ship Date: 9/8/2020
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
(2 Sets)							
1 Liter Plastic Wide Mouth	1	A2540 D	Solids, Total Suspended			Fill to the neck of the container.	1
500 mL Plastic	1	E410.4	Chemical Oxygen Demand		□ H2SO4		1
		E351.2	Nitrogen, Total Kjeldahl				
		E353.2	Nitrogen, Nitrate + Nitrite				
		E365.1	Phosphorus, Total				
		Calculation	Nitrogen, Total (TKN+NO3+NO2)				
1 Liter Clear Glass Narrow Mouth	2	E1664A	Oil & Grease, Gravimetric		□ H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		■ HNO3		1

Comments

Metals: Cu, Pb, Zn

■ HNO3 - Nitric Acid □ H2SO4 - Sulfuric Acid ■ NaOH - Sodium Hydroxide

■ ZnAc - Zinc Acetate ■ HCl - Hydrochloric Acid □ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Pattee Creek above Grit Chamber (Asset ID SNA-1563) UpStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

	Parameter	Method	29-Jun-2020	26-Aug-2020	Average
Self-reporting requirements	**Temperature (°C)**	Field Probe	11.7	15.4	13.6
	Specific Conductivity (µS/cm)	Field Probe	152.6	236.1	194.4
	Conductivity (µS/cm)	Field Probe	113.8	195	154.4
	TDS (mg/L)	Field Probe	99	155	127.0
	pH	Field Probe	7.77	8.14	8.0
	Total Suspended Solids (mg/L)	SM 2540D	14.75	25.8	20.3
	Total Phosphorus (mg/L)	EPA 365.1	0.13	0.15	0.1
	Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.56	0.79	0.7

Pattee Creek above Grit Chamber (MS4 Asset ID SNA-1563) DownStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

	Parameter	Method	29-Jun-2020	26-Aug-2020	Average
Self-reporting requirements	**Temperature (°C)**	Field Probe	11.6	15.7	13.65
	Specific Conductivity (µS/cm)	Field Probe	165.2	250.9	208.05
	Conductivity (µS/cm)	Field Probe	123	206.1	164.55
	TDS (mg/L)	Field Probe	107	163	135
	pH	Field Probe	7.62	7.96	7.79
	Total Suspended Solids (mg/L)	SM 2540D	10.13	2	6.065
	Total Phosphorus (mg/L)	EPA 365.1	0.12	0.04	0.08
	Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.58	0.48	0.53

Bancroft Pond (Asset ID SNA-DP5) UpStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

Self-reporting requirements

Parameter	Method	June 29, 2020	26-Aug-20	Average
Temperature (°C)	Field Probe	12.4	17.9	15.15
Specific Conductivity (µS/cm)	Field Probe	154.9	244.7	199.8
Conductivity (µS/cm)	Field Probe	117.6	211.4	164.5
TDS (mg/L)	Field Probe	101	159	130
pH	Field Probe	7.68	8.19	7.935
Total Suspended Solids (mg/L)	SM 2540D	9.25	3.8	6.525
Total Phosphorus (mg/L)	EPA 365.1	0.14	0.05	0.095
Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.68	0.31	0.495

Bancroft Pond (Asset ID SNA-DP5) DownStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

	Parameter	Method	June 29, 2020	26-Aug-20	Average
Self-reporting requirements	**Temperature (°C)**	Field Probe	15.3	18.7	17
	Specific Conductivity (µS/cm)	Field Probe	168.8	238.6	203.7
	Conductivity (µS/cm)	Field Probe	137.7	209.9	173.8
	TDS (mg/L)	Field Probe	110	155	132.5
	pH	Field Probe	7.4	7.21	7.305
	Total Suspended Solids (mg/L)	SM 2540D	1.75	24	12.875
	Total Phosphorus (mg/L)	EPA 365.1	0.09	0.03	0.06
	Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.35	0.42	0.385

Bitterroot Swale UpStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

Self-reporting requirements

Parameter	Method	June 29, 2020	August 26,2020	Average
Temperature (°C)	Field Probe	15.0	16.3	15.7
Specific Conductivity (µS/cm)	Field Probe	123.7	405.2	264.5
Conductivity (µS/cm)	Field Probe	100	338	219.0
TDS (mg/L)	Field Probe	80	263	171.5
pH	Field Probe	7.9	7.66	7.8
Total Suspended Solids (mg/L)	SM 2540D	36.38	29.4	32.9
Total Phosphorus (mg/L)	EPA 365.1	0.12	0.27	0.2
Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.98	1.57	1.3

Bitterroot Swale DownStream

Receiving Water - Pattee Creek (flows to Bitterroot River, MT76H001_030)

	Parameter	Method	June 29, 2020	August 26,2020	Average
Self-reporting requirements	**Temperature (°C)**	Field Probe	14.9	18.3	16.6
	Specific Conductivity (µS/cm)	Field Probe	125.1	402.1	263.6
	Conductivity (µS/cm)	Field Probe	101	350.6	225.8
	TDS (mg/L)	Field Probe	81	261	171.0
	pH	Field Probe	7.85	7.91	7.9
	Total Suspended Solids (mg/L)	SM 2540D	42.75	7.8	25.3
	Total Phosphorus (mg/L)	EPA 365.1	0.12	0.11	0.1
	Total Persulfate Nitrogen (mg/L)	SM 4500-N C	0.56	1.26	0.9

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BP_DS **Area:** **Sampling Location:**

Sample ID: **2381** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		24
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.03
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.42

Laboratory Signature ____________

Missoula Wastewater Division Laboratory Results

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City of Missoula-Storm Water

BP_US **Area:** **Sampling Location:**

Sample ID: **2382** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		3.8
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.05
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.31

Laboratory Signature

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

GC_DS

Area: **Sampling Location:**

Sample ID: **2383** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		2
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.04
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.48

Laboratory Signature ____________

Missoula Wastewater Division Laboratory Results

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City of Missoula-Storm Water

GC_US

Area: **Sampling Location:**

Sample ID: **2384** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		25.8
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.15
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.79

Laboratory Signature ____________

Missoula Wastewater Division Laboratory Results

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City of Missoula-Storm Water

BRS_DS **Area:** **Sampling Location:**

Sample ID: **2385** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		7.8
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.11
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		1.26

Laboratory Signature

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BRS_US **Area:** **Sampling Location:**

Sample ID: **2386** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
8/26/2020		9/2/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		29.4
8/26/2020		9/9/2020	BC	Phosphorus: Total	EPA 365.1		0.27
8/26/2020		9/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		1.57

Laboratory Signature ____________

Missoula Wastewater Division Laboratory Results

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City of Missoula-Storm Water

GC_DS

Area: **Sampling Location:**

Sample ID: **2358** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		10.13
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.12
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.58

Laboratory Signature ______________________

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

GC_US **Area:** **Sampling Location:**

Sample ID: **2359** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		14.75
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.13
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.56

Laboratory Signature ______________________

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BRS_US

Area: **Sampling Location:**

Sample ID: **2360** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		36.38
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.12
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.98

Laboratory Signature ____________________

Missoula Wastewater Division Laboratory Results

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BRS_DS

Area: **Sampling Location:**

Sample ID: **2361** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		42.75
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.12
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.56

Laboratory Signature ______________________

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BP_US

Area: **Sampling Location:**

Sample ID: **2362** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		9.25
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.14
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.68

Laboratory Signature ______________________________

Missoula Wastewater Division Laboratory Results

435 Ryman, Missoula, MT 59802 phone: (406)552-6606 fax: (406)552-6614

City of Missoula-Storm Water

BP_DS **Area:** **Sampling Location:**

Sample ID: **2363** MIU#: Manifest#

Sample Date	Sample Time	Analysis Date	Analyst	Analysis	Method	Qualifier	Test Results (mg/l)
6/29/2020		7/1/2020	BC	Non-Filterable Residue(TSS)	SM 2540D		1.75
6/29/2020		7/9/2020	BC	Phosphorus: Total	EPA 365.1		0.09
6/29/2020		7/9/2020	BC	Total Persulfate Nitrogen	SM 4500-N C		0.35

Laboratory Signature ______________________

Appendix C – Data Sheets

MISSOULA — THE GARDEN CITY — HUB OF FIVE VALLEYS

PUBLIC WORKS • STORM WATER UTILITY

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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

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:	

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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): 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: 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

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
- [x] 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
[x] **Pipe**	[ ] RCP [x] CMP [ ] PVC [ ] HDPE [ ] Steel [ ] Other: ______	[x] Circular [ ] Elliptical [ ] Box [ ] Other: ______	[x] Single [ ] Double [ ] Triple [ ] Other: ______	Diameter/Dimensions: 18"	In Water: [x] No [ ] Partially [ ] Fully With Sediment: [x] No [ ] Partially [ ] Fully
[ ] **Open drainage**	[ ] Concrete [ ] Earthen [ ] rip-rap [ ] Other: ______	[ ] Trapezoid [ ] Parabolic [ ] Other: ______		Depth: ______ Top Width: ______ Bottom Width: ______	
[ ] **In-Stream**					
Flow Present?	[x] Yes [ ] No	***If No, Skip to Section 5***			
Flow Description (If present)	[ ] Trickle [x] 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

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

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: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57º	Rainfall (in.): Last 24 hours: 0.26 Last 48 hours: 0
Latitude: 46.89475436º / Longitude: -113.97396673º	GPS Unit: iPhone 8 / GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ________

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57°	Rainfall (in.): Last 24 hours: 0.26 Last 48 hours: 0
Latitude: 46.89475436° Longitude: -113.97396673°	GPS Unit: iPhone 8 GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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

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:	

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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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours: 0.26 Last 48 hours: 0		
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek	Outfall ID: UNK-17
Today's date: 1 June 2020	Time (Military): 13:03
Investigators: James Moxley & Carver Butterfield	Form completed by: James Moxley
Temperature (°F): 57º	Rainfall (in.): Last 24 hours: 0.65 Last 48 hours: 0
Latitude: 46.89475436º Longitude: -113.97396673º	GPS Unit: iPhone 8 GPS LMK #:
Camera: Samsung Galaxy tablet	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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

Section 2: Outfall Description

LOCATION	MATERIAL		SHAPE		DIMENSIONS (IN.)	SUBMERGED
☒ **Pipe**	☐ RCP	☐ CMP	☒ Circular	☒ Single	Diameter/Dimensions: 25 in	In Water: ☒ No ☐ Partially ☐ Fully
	☐ PVC	☐ HDPE	☐ Elliptical	☐ Double		
	☒ Steel		☐ Box	☐ Triple		With Sediment: ☐ No ☐ Partially ☐ Fully
	☐ Other: ______		☐ Other: ______	☐ Other: ______		
☐ **Open drainage**	☐ Concrete		☐ Trapezoid		Depth: _____	
	☐ Earthen		☐ Parabolic		Top Width: _____	
	☐ rip-rap		☐ Other: _____		Bottom Width: _____	
	☐ Other: _____					
☐ **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			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

outfall submerged, flow measurement not practicable

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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57°	Rainfall (in.): Last 24 hours: 0.65 Last 48 hours: 0		
Latitude: 46.89475436°	Longitude: -113.97396673°	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ______

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

outfall submerged, flow measurement not practicable

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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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Rattlesnake Creek		Outfall ID: UNK-17	
Today's date: 1 June 2020		Time (Military): 13:03	
Investigators: James Moxley & Carver Butterfield		Form completed by: James Moxley	
Temperature (°F): 57º	Rainfall (in.): Last 24 hours: 0.65 Last 48 hours: 0		
Latitude: 46.89475436º	Longitude: -113.97396673º	GPS Unit: iPhone 8	GPS LMK #:
Camera: Samsung Galaxy tablet		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: Farming
- Known Industries: ____

Notes (e.g.., origin of outfall, if known): Draining from surrounding neighborhood and local farms. Drains into Rattlesnake Creek. Possible pollution from farming.

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: 25 in	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			µS/cm	Multi-probe
Specific Conductivity			µS/cm	Multi-probe
Total Dissolved Solids			mg/L	Multi-probe

outfall submerged, flow measurement not practicable

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)?

USGS stream gage 8,060 cfs (CFR above Missoula 12340500) = 3,617,590 gpm

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Clark Fork River		Outfall ID: CFR-1	
Today's date: 11-18-2020		Time (Military): 12:00	
Investigators: Carver, Marie, Tracy		Form completed by: Carver	
Temperature (°F): 43	Rainfall (in.): Last 24 hours:	Last 48 hours: .01 (last 24) .03 (last 48)	
Latitude: GIS	Longitude:	GPS Unit:	GPS LMK #:
Camera: Samsung tablet		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): This sample is of the Clark Fork River

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	____’ ____”	Ft, In	Tape measure
	Measured length	____’ ____”	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature		3.5	°C	Multi-probe
pH		8.4	pH Units	Multi-probe
Conductivity		141.6	µS/cm	Multi-probe
Specific Conductivity		240.5	µS/cm	Multi-probe
Total Dissolved Solids		156	mg/L	Multi-probe

USGS stream gage 12340500 2300 cfs

1,032,315 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: S06-16-OF	
Today's date: 11/18/2020		Time (Military): 15:45	
Investigators: Carver, Marie, Tracy		Form completed by: Tracy Campbell	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours: 0.01 last 24h; 0.03 last 48h	
Latitude: 46.89539448	Longitude: 114.08665790	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung tablet		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): drains the 44 ranch suburban neighborhood

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		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		6.2	°C	Multi-probe
pH		7.84	pH Units	Multi-probe
Conductivity		174.8	µS/cm	Multi-probe
Specific Conductivity		272.4	µS/cm	Multi-probe
Total Dissolved Solids		177	mg/L	Multi-probe

1000 ml, 3.79 sec; 1000 ml, 3.77 sec; 1100 ml, 3.35 sec

avg = 1033.3 ml/3.64 sec
17,032.4 ml/min
4.5 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: Clark Fork River	Outfall ID: SNA-1521
Today's date:	Time (Military): 13:23
Investigators: Carver, Marie, Tracy	Form completed by: Marie Noland
Temperature (°F): 48 / Rainfall (in.): Last 24 hours:	Last 48 hours: .01 (last 24) .03 (last 48)
Latitude: 46.86898280 / Longitude: 113.99722342	GPS Unit: Trimble R2 / 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): Drains downtown Missoula

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: 30	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		9.83	°C	Multi-probe
pH		7.81	pH Units	Multi-probe
Conductivity		192.2	µS/cm	Multi-probe
Specific Conductivity		274.9	µS/cm	Multi-probe
Total Dissolved Solids		178	mg/L	Multi-probe

2.75. gal. 1.4 sec

2.75 gal. 1.76 sec

2.8 gal. 1.5 sec

Average = 2.77 gal per 1.55 sec
107.2 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: Clark Fork River		Outfall ID: SNA-1526	
Today's date: 11/18/2020		Time (Military): 13:45	
Investigators: Carver, Marie, Tracy		Form completed by: T. Campbell	
Temperature (°F): 49	Rainfall (in.): Last 24 hours:	Last 48 hours: 0.01 in 24; 0.03 in 48	
Latitude: 46.87519177	Longitude: 114.00486962	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung tablet		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): drains commercial and urban area west of downtown

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: 15	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		9.3	°C	Multi-probe
pH		7.75	pH Units	Multi-probe
Conductivity		323.3	µS/cm	Multi-probe
Specific Conductivity		462.5	µS/cm	Multi-probe
Total Dissolved Solids		301	mg/L	Multi-probe

Flow measured from half channel, multply by 2; 34 sec, 0.25 gal; 68 sec, 0.333 gal; 34 sec, 0.25 ga

avg = 0.278 gal/45.33 sec
doubled = 0.556 gal/1.5 min
0.37 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: Bitterroot River		Outfall ID: S86-35-OF	
Today's date: 12/16/2020		Time (Military): 11:30	
Investigators: Tracy and Marie		Form completed by: Tracy and Marie	
Temperature (°F): 34	Rainfall (in.): Last 24 hours:	Last 48 hours: 0.04 and 0.04, 0.5 snow	
Latitude: 46.82789357	Longitude: 114.05340561	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung tablet		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): drains commercial and residential areas in Southern Missoula

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: 54	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	Snow melt			

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		6.7	°C	Multi-probe
pH		7.47	pH Units	Multi-probe
Conductivity		324.3	µS/cm	Multi-probe
Specific Conductivity		498.1	µS/cm	Multi-probe
Total Dissolved Solids		324	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	Flap gate stuck open
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)?

15 feet long; avg width 2.0 ft; depth 0.25, 1.75, 1.25; too shallow, float not functioning; with leaf 59.7 s, 52.75, 56.81

avg. depth = 1.08 feet; cross-sectional area = 2 * 1.08 = 2.16 sf avg. time = 56.42 s; 15/56.42 = 0.266 fps

discharge = 2.16 sf * 0.266 fps * 0.8 = 0.46 cfs; 0.46 cfs * 444.83 = 204 gpm

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OUTFALL RECONNAISSANCE/SAMPLE COLLECTION

Section 1: Background Data

Subwatershed: Pattee Creek		Outfall ID: SNA-1563	
Today's date: 12-16-2020		Time (Military): 12:15	
Investigators: Tracy and Marie		Form completed by: Tracy and Marie	
Temperature (°F): 34	Rainfall (in.): Last 24 hours:	Last 48 hours: 0.04 and 0.04, 0.5 snow	
Latitude: 46.84173394	Longitude: 113.99632322	GPS Unit: Trimble R2	GPS LMK #:
Camera: Samsung tablet		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): Drains from a Pattee Creek suburban neighborhood

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: 30	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 Snowmelt				

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		6.6	°C	Multi-probe
pH		7.84	pH Units	Multi-probe
Conductivity		1393	µS/cm	Multi-probe
Specific Conductivity		2147	µS/cm	Multi-probe
Total Dissolved Solids		1397	mg/L	Multi-probe

3.37 s, 1.5 gal; 4.38 s, 1.5 gal; 4.67 sec, 1.75 gal

26.7 gpm; 20.5 gpm; 22.5 gpm

avg. gpm = 23.23 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: 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

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)?

Attachment B:

Budget Resource Allocations

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Attachment B:
Budget Resource Allocations

Follow-up Response from Annual Report Form Page 2 of 12:

Answer the following five (5) questions on an additional page with corresponding reference or on a data storage device.

(1) What are the source(s) of funding for implementation of the MS4 permit and the estimated percentage of the total budget allocated from each source listed?
For fiscal year (FY) 2020, the funding source for the implementation of the MS4 permit was 99.6% from Storm Water Fees.

(2) Specific to the annual reporting calendar year, how did the permittee justify commitment of resources or budget allocations to the implementation of the MS4 permit to decision-makers and the public? Provide a summary of meetings and outcomes held with decision-makers and the public.

March 11, 2020 - (Dennis, Katie, Tracy, Marie, Michelle) Final quarter standing in FY20. Not enough budget for large projects remaining. Pre-Planning Budget for FY21.
March 31, 2020 - (Dennis, Katie, Marie) FY21 Budget Adjustments
June 8, 2020 - FY21 Budget review with Dennis Bowman
June 22, 2020 - FY21 Budget review with final adjustments w/ Dennis Bowman
July 22, 2020 - (Dennis, Katie, Marie, Michelle, Pat Brook, Jerry Ellis, etc.) Public Works Committee Final Budget Presentation via Skype and open to the public for comment.
November 30, 2020 – Storm Water Budget Rate Review (Skype Meeting – Dennis, Katie, Marie, Tracy, Allison, Andy) FY21 Budget status review.
December 4, 2020 – Storm Water Budget Review (Skype Meeting – Tracy, Marie, Andy, Dennis, Allison, Jeremy, Katie) CIP Financing, Automation of asset management, possible rate increase.

(3) Has the permittee demonstrated program effectiveness to obtain budget allocations for this annual reporting calendar year or previous years? Why or why not? If so, what program effectiveness metrics were presented?

Yes, the City of Missoula has demonstrated program effectiveness. While budget allocations are primarily obtained by actual rate revenue being collected, we do have to present contracts and projects for approval to City Council. A much needed maintenance contract was approved for $54,000. A significant project for Levee Maintenance was prepared late 2020 and will be approved and implemented in 2021. The Storm Water Utility has demonstrated an effectiveness not only with instituting our program, but with combining efforts with other entities such as Missoula Valley Water Quality District, Montana Fish Wildlife & Parks, and United States Army Corps of Engineers – all of which allows us greater support by Council and the public.

(4) How was this annual reporting calendar year's approach to allocate resources different than the previous year's approach?
2020 resource allocation focus shifted to build the program by fully staffing all positions that the utility requires to function at its highest level. Administrative/Billing, Engineering, and GIS positions were added which contribute directly to our ability to comply with all aspects of the MS4 Permit, and our main priority of ensuring local water quality.

(5) Was the permittee successful in their request for budget allocations? Describe the outcome and factors that affected or resulted in that outcome.
Yes, we were successful in our request for budget allocations. Our small utility has more than doubled in size in 2020. This growth initiated the approval of additional resources (rate funds) for staffing and equipment increases.

Attachment C:

Public Education and Outreach

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Attachment C:

Public Education and Outreach

Storm Water education to the general public via Bus Ads:

Three ads were run on three Mountain Line buses for the months of June, July, and August of 2020.

Don’t Pollute: Doo Good for clean water.

Don’t Drip and Drive

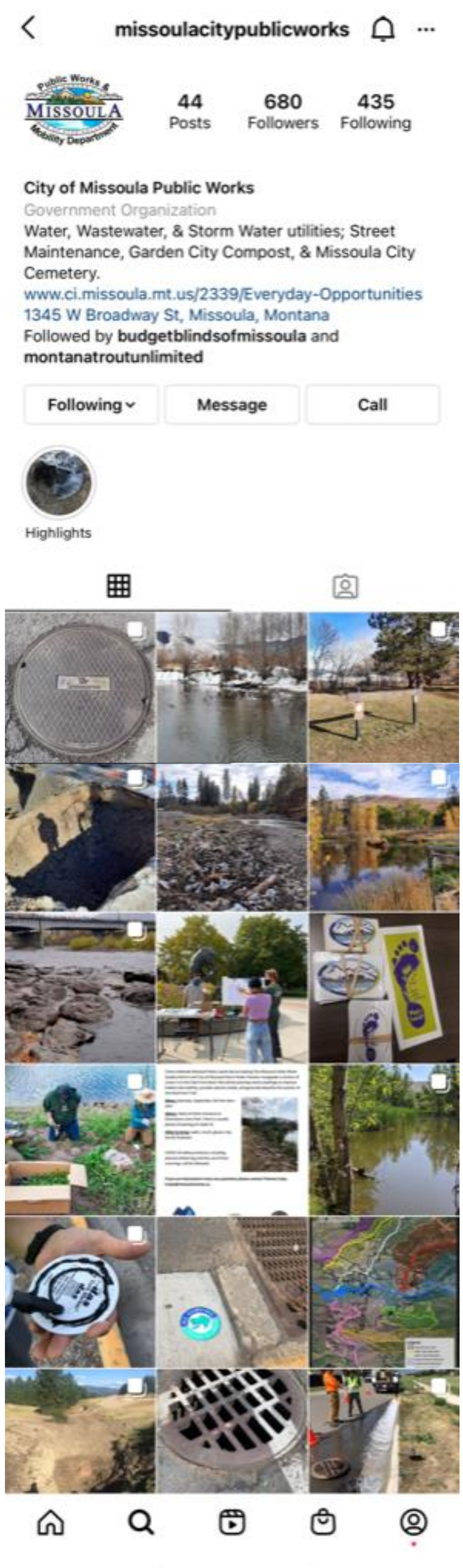
Don’t Blow it, Bag it

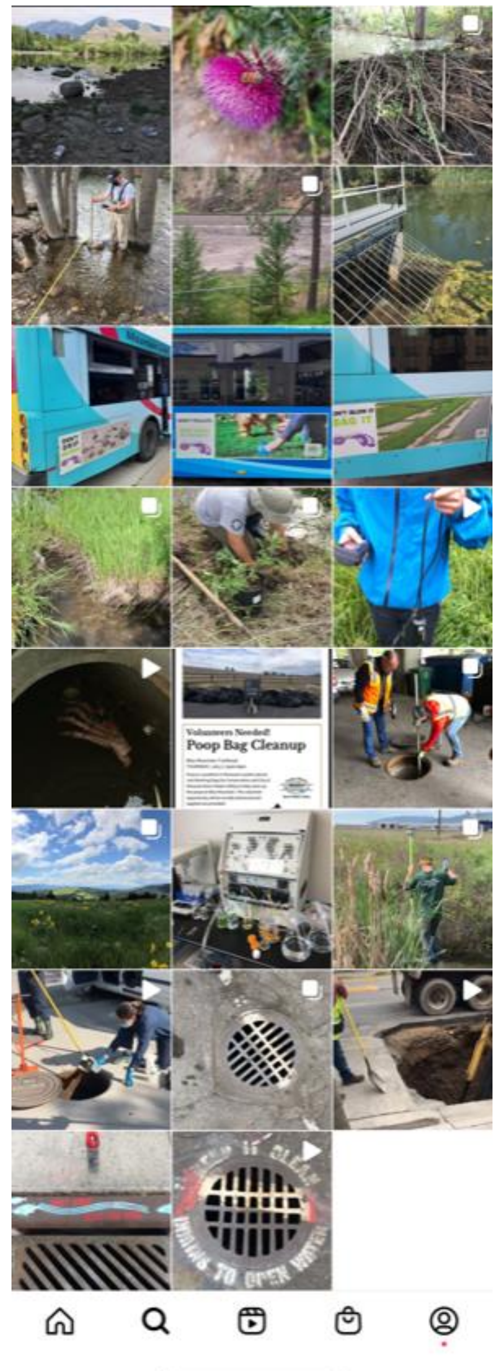
PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Storm Water Education & Outreach to General Public via Instagram:

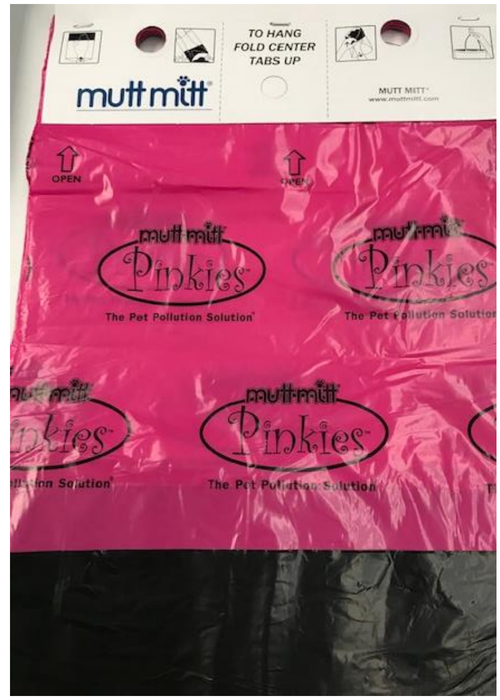
A new Instagram account @missoulacitypublicworks was created in May of 2020. As of year-end there were 39 Storm Water related posts and videos with 680 followers.





Storm Water Outreach to Pet Owners via Neon Pink Mutt Mitt bags:

Storm Water worked with the City Parks Conservation Lands to distribute over 4,000 neon pink Mutt Mitt bags between May 31 – August 10, 2020, at three (3) trailheads across town: Waterworks Hill, Lincoln Hills on Mt. Jumbo, and the Gasworks Trailhead on Mt. Sentinel. As observed by Clancy Jandreau, "Throughout this time, our park attendants checked and replaced mutt mitts at these locations every Monday and Thursday. In general, they anecdotally reported good compliance and saw few pink mutt mitts left on the trails. We also had park attendants report a quick count of the number of unattended bags they saw at these trailheads and three other trailheads which did not have pink mutt mitts. Admittedly, this simple study is not ultra-robust, but a quick crunch of the numbers does show a statistically significant difference (one tailed t-test, p=0.005) in the number of unattended mutt-mitts at trailheads with pink mutt-mitts compared to those without. So, there is some initial and preliminary data that suggests pink mutt-mitts find their way into trash cans more than our traditional black/grey ones do." Using this preliminary data, Storm Water will focus a more scientific data collection project within a major City dog park, Jacob's Island, in 2021.



Storm Water Education & Outreach via semi-permanent storm drain markers:

2020 Storm Water Americorps Members, James Moxley and Carver Butterfield, installed a total of 93 storm drain markers. Messages specific to, Creek – 14, River – 30, and Groundwater – 49. Using a DAS bonding adhesive the markers were installed near inlets and dry wells all over the City of Missoula and will last many years. (See map of markers in SWMP Attachment A)

MISSOULA

THE GARDEN CITY · HUB OF FIVE VALLEYS

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

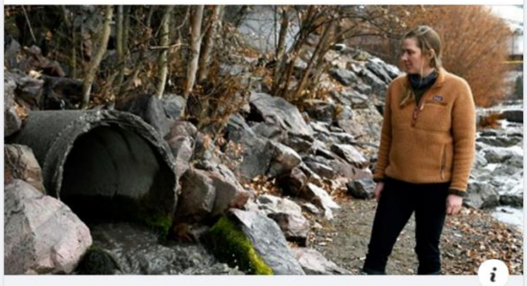
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Storm Water Education & Outreach via Facebook City/County Missoula Valley Water Quality District:

Missoula Valley Water Quality
December 18, 2020 ·

A new study in WA state has identified a chemical from tires (6PPD) that is harmful to salmon. Another great reason for water quality research and stormwater controls!

https://www.google.com/.../article_bfbf10e5-c887-52b6...



MISSOULIAN.COM

Car tire chemical linked to mass fish deaths

Roughly 3.1 billion vehicle tires are produced every year to replace ...

1 · 1 Share

Like · Comment · Share

Write a comment...

Missoula Valley Water Quality
September 9, 2020 ·

Missoula County residents looking to safely dispose of hazardous substances can do so during Household Haz Waste Days from 8 a.m. to 12 p.m. Friday through Sunday, Oct. 16-18, 2020. This years event will be held outdoors and by appointment only. Go to https://hazwastemissoula.com/hazwaste-days-event for all relevant event info including acceptable items and year-round disposal options.

Missoula City-County Health Department
Missoula County, Montana - Government

HAZWASTEMISSOULA.COM

Household Hazardous Waste Disposal

Let us help you keep our precious Missoula Valley aquifer clean.

2 · 2 Comments 1 Share

Like · Comment · Share

Missoula Valley Water Quality added an event.
September 2, 2020 ·

SAT, SEP 26, 2020

Revegetate the Levee!

Missoula

1 person went

Interested

Like · Comment · Share

Missoula Valley Water Quality
June 4, 2020 ·

Our 2020 Volunteer Monitoring season is underway!

In order to build upon water quality data gathered during the 2019 season, volunteers are again collecting samples on local tributaries of the Clark Fork and Bitterroot Rivers. Thanks to their hard work, we will be able to better understand the health of our watershed.

Pictured here is a sample site on O'Brien Creek as well as Thomas, our Big Sky Watershed Corps member, carefully preparing bottles for shipment and laborat... **See More**

Missoula Valley Water Quality
March 12, 2020 ·

44% of the US population depends on groundwater for it's drinking water. But what if you live in Missoula? Groundwater is our sole source of drinking water here! We are lucky to have it and proud to protect it! Happy National Groundwater Awareness Week! #GWAW Missoula Water Missoula County, Montana - Government

Missoula Valley Water Quality
January 2, 2020 ·

Troubling situation in Oregon's Harney Basin. A good reminder that aquifers are not a limitless supply of groundwater and how vital good research is for informing our water management decisions.

https://www.npr.org/.../water-crisis-puts-oregon...

THE GARDEN CITY
MISSOULA
HUB OF FIVE VALLEYS

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Storm Water Education & Outreach via storm drain stenciling in Caras Park:


2020 SPRING NEWSLETTER

City of Missoula Public Works Department

Jeremy Keene
Public Works Director

Our top priority at the Public Works Department is the health and safety of our citizens and employees. The COVID crisis put a spotlight on that mission. We moved quickly to change the way we deliver services and operate our facilities. This included suspending some activities, reducing staff in the office, and moving services online or by phone.

As Montana emerges from the Governor's Stay at Home order, Public Works will continue to prioritize emergency services, including the operation, inspection, and maintenance of essential public works facilities, utilities, roads, traffic signals, and communication equipment. Other essential construction and maintenance activities will be brought back on line as risks are evaluated and priorities established. Our goal is to continue to provide service and support community wellness and commerce while protecting employees and the public. The City will not engage in activity that puts employees or the public at further risk of contracting or spreading COVID-19.

We value a personal touch and the ability to interact with our customers, but for now, we'll keep our distance. Stay safe out there. As always, we welcome your feedback. Please feel free to reach out at keenej@ci.missoula.mt.us.

Infrastructure Improvement Projects Begin

Warmer weather is allowing infrastructure improvement projects all over the city to begin. We have rolled out a new map that shows all the infrastructure projects within the city for the year. Check it out at www.MissoulaMaps.com.

Missoula Water will complete the following projects in 2020:

- 3rd Street Water Main Replacement
- E. Pine Water Main Replacement
- Worden & Howell Water Main Replacement
- W. Pine Water Main Replacement
- Lincoln Hills Upper Water Tank Replacement
- Upper Prospect Water Tank Replacement

For more information on these projects and other Public Works projects, please visit www.ci.missoula.mt.us/2649/Projects.

Garden City Compost News

Back by popular demand: Premium Perlite Potting Soil!

Our potting soil is the perfect mix for seed starts, transplants, pots, and container gardens. Our blend is made right here in Missoula and contains our Class A compost, mulch from the yard waste that you drop off, peat moss from our friends at Peaco in Big Fork, and perlite from our neighbors in Idaho. This is the real deal and only $65 a cubic yard!

To continue our resource recovery efforts, we are accepting more materials than ever before. We would like to thank you, the community who keeps that grinder going by dropping off your lawn and garden waste. We're thanking you with discounts! Buy 9 yards of Class A compost, enriched topsoil, or lawn topdress and get the 10th FREE!

We are open 8 a.m. to 5 p.m., Monday - Saturday, and load our products until 4 p.m. Visit our website at www.ci.missoula.mt.us/2089/Garden-City-Compost or stop by 1125 Clark Fork Lane, just off Mullan Road.

It's a Clean Sweep

Spring is here, and the City of Missoula Street Maintenance Division has begun our spring street maintenance activities, including street cleaning and pothole patching.

Street cleaning preserves air quality by sweeping up winter's sand as it starts to blow in the spring winds. It also helps keep sediment and debris out of the storm water system.

To see the street sweeping schedule and map, visit: www.ci.missoula.mt.us/561/Street-Cleaning.

Residents can help in several ways:

- Park vehicles on the even-numbered side of the street on even-numbered days and the odd-numbered side of the street on odd-numbered days from 7 a.m. to 3 p.m.
- In Special Sweeping Districts, parking is prohibited on both sides of the street from 6 a.m. to 4 p.m.
- Don't dump yard waste or other materials onto streets or sidewalks, including dirt, landscaping materials, and leaves.

In addition, watch for our pothole patching crews. They are busy filling potholes caused by winter and spring moisture. Let us know if you spot a troublesome pothole by filling out our "Report a Pothole" form at www.ci.missoula.mt.us/498/Street-Maintenance.

Water Line Loan Program

Missoula Water is offering low-interest loans to water customers who need to repair or replace their service lines or internal plumbing, install a meter and meter pit, or connect to the municipal water system.

For more information, visit Missoula Water's website at www.ci.missoula.mt/1983/Missoula-Water or email us at wllp@ci.missoula.mt.us.

It's Time for Spring Cleaning!

Leaves and road debris can accumulate in the curb line, and street sweepers cannot reach all of it. It is important to remove this debris so it doesn't end up in the storm water system, clogging pipes and degrading streams. When the debris is left on the road, storm water runoff backs up. Over time, the standing water deteriorates the concrete and asphalt. Did you know, the best way to prevent potholes is to keep water off the streets?

While adhering to our City directive for COVID-19, the Storm Water Utility is hard at work ensuring our infrastructure is functioning and that we maintain compliance with our State and Federal water quality guidelines. Storm water drains to our streams, rivers, and aquifer! Please keep it clean.

Please visit the Storm Water Utility website at www.ci.missoula.mt.us/2138/Storm-Water-Division.

Neighborhood Greenways

Did you know the City of Missoula is working on a Neighborhood Greenways network? Neighborhood Greenways are residential streets that are close to main roads but have relatively low vehicle volumes and speeds. They provide more comfortable and safe options for people who bike and walk across the City. In an effort to build upon existing opportunities for biking and walking and "close the gaps" in the commuter trail, neighborhood sidewalk, and on-street bike systems, the City of Missoula mapped out a city-wide Greenway system, which you can access at: www.missoulainmotion.com/greenways.

During COVID-19 restrictions, Neighborhood Greenways are especially helpful by allowing people to walk and bike while still complying with physical distancing requirements. They provide a safe, convenient way for residents to enjoy outdoor activity or active transportation while staying close to home. While bike and pedestrian travel is prioritized on Neighborhood Greenways, streets remain open to vehicle travel. Please take safety precautions when using these facilities.

Encourage others to get outside safely by sharing the Neighborhood Greenways link. Stay safe while staying active!

Sewer Manhole Lid Safety Message

Wastewater Division personnel remind you that for your safety and the safety of others, please do not access the City sewer system.

Sewer manhole lids and septic tank effluent pumping (STEP) system lids can present safety hazards if accessed by unauthorized individuals. Per City Ordinance 13.04.110, it is unlawful for any unauthorized person to open or enter any manhole or other structure on the City sewer system or to deposit any item in the same.

Please visit the Wastewater Division website at www.ci.missoula.mt.us/562/Wastewater-Division, or call us at 552-6600 if you have any questions or concerns regarding the sewer system.

Sewer system manhole lid.

STEP system manhole lid.

Contact Us

Please note that many Public Works divisions are operating with reduced staffing and many other employees are working remotely to comply COVID-19 directives. We are still here to serve you and are available Monday – Friday, 8 a.m. to 5 p.m. Check our website for updates at http://ci.missoula.mt.us/403/Public-Works.

Missoula Water—Emergencies: 552-6700
Customer Service: email watercs@ci.missoula.mt.us
Pay your water bill online: www.ci.missoula.mt.us/1351/Pay
In person: Drop boxes at 435 Ryman St. & 1345 W. Broadway
By mail: P.O. Box 5388, Missoula, MT 59806
By phone: 866-790-7218

Wastewater—552-6600
Pay your sewer bill online: www.ci.missoula.mt.us/1351/Pay
In person: Drop boxes at 435 Ryman St. & 1345 W. Broadway
By mail: P.O. Box 5388, Missoula, MT 59806
By phone: 406-552-6125

Garden City Compost—552-6619

Missoula City Cemetery—552-6070

Storm Water—552-6744

Street Maintenance—552-6360

Public Works Department Administration
Jeremy Keene, Public Works Director: 552-6769
Dennis Bowman, Deputy Public Works Director—Utilities: 552-6700
Brian Hensel, Deputy Public Works Director—Streets: 552-6360

2020 SUMMER NEWSLETTER

City of Missoula Public Works Department

Jeremy Keene
Public Works Director

Public health and safety is a regular theme at Public Works, and we work every day to help ensure the safety of our residents and employees. We are deeply concerned about the recent crash on Higgins Ave. involving a bicyclist and a large SUV - as we are with all preventable crashes on Missoula streets.

Our Transportation Safety Team meets weekly to review transportation concerns, complaints, and requests, including incidents like the one on Higgins. This working group gathers information on traffic volumes, vehicle speeds, crash history, and existing site conditions to identify the underlying risks and causes. We work closely with our partners at the Montana Department of Transportation, who have jurisdiction over Higgins Ave. and many other routes in the city, to review the facts and determine what safety improvements may be needed.

Public Works is working hard to make our streets and transportation systems safer. But our success largely depends on you. Please slow down and watch out for bicyclists and pedestrians. Follow the rules of the road when you ride or drive. No one wants to have a crash or injury. I'm proud to live in a community where we care about each other. We can all make a difference in keeping our streets safe.

As always, we welcome your feedback. Please feel free to reach out at keenej@ci.missoula.mt.us

Garden City Compost News

As temperatures rise, are you looking to have a healthier lawn?

Our lawn topdress is a natural fertilizer that will enhance your soil's biology, help keep thatch under control, and increase the beneficial microorganisms in your yard. With levels of nitrogen, phosphorous, and potassium up to 2.04, 0.94, and 0.81 respectively, you will see a healthier, more productive lawn. By increasing organics, your lawn will have increased water retention as well.

Our lawn topdress is available year round but now is a great time for application. Screened down to 3/16 inch, you can spread it yourself and rake it in, rent a spreader locally, or have a landscaping crew come down and spread it for you. We recommend an application rate of at least ¼ inch. At this rate, every 1,000 square feet would take 0.75 cubic yards.

Lawn topdress helped improve the overall health of this lawn by increasing natural nutrients.

Our class A compost, lawn topdress, and enriched topsoil are buy 9, get 1 free!

We load products 8 a.m. – 4 p.m., Mon. – Sat. For more details, please visit our website at www.ci.missoula.mt.us/2089/Garden-City-Compost, or call us at 552-6619. We are located at 1125 Clark Fork Lane, just off Mullan Road. We hope to see you soon!

NATURAL • SUSTAINABLE • LOCAL
GARDEN CITY COMPOST City of Missoula

Montana Conservation Corps members collecting storm water samples at a biodetention basin off Grant Creek.

Green Infrastructure: Putting Nature to Work

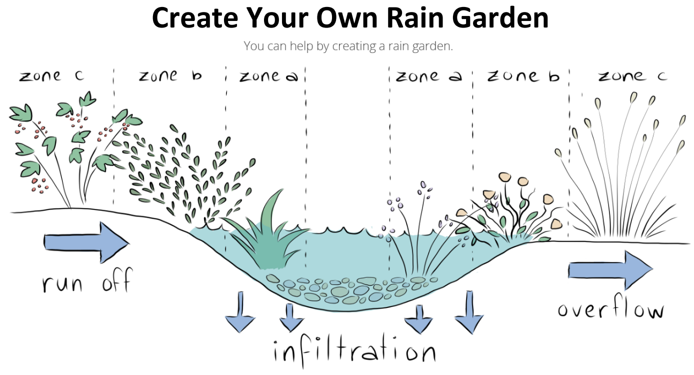
Did you know that the number one pollutant of surface water in Missoula AND across the United States is storm water runoff? The Storm Water Utility focuses on protecting Missoula's waterways and complying with the Clean Water Act.

Common pollutants in runoff are sediment, nitrogen, lead, phosphorus, and even water temperature, all of which impair the water's ability to sustain aquatic life and threaten the waterway's overall health. The best way to improve water quality is to introduce more green infrastructure, such as small rain gardens, native plants, pervious pavement, and biodetention basins.

The Storm Water Utility encourages citizens, developers, and our own City of Missoula projects to increase green infrastructure that helps reduce the amount of harmful pollutants which make it to our beautiful creeks and rivers as well as our aquifer.

Visit our website at www.ci.missoula.mt.us/2678/Green-Infrastructure for information on how you can *create your own* green infrastructure and do your part to reduce storm water pollution! Follow our adventures for clean water on Instagram @missoulacitypublicworks.

Create Your Own Rain Garden



Rules of the Road

Let's help keep all street and transportation system users safe by remembering and following these rules of the road:

MOTORISTS:

1) **Always** pass people on bikes with at least **3 feet** of space
2) **Look** for people on bikes coming from behind when slowing down to make a right turn
3) **Look** both ways when exiting driveways and side streets, as some people ride bikes on the sidewalks
4) **Look** over your left shoulder when opening your driver side car door to avoid hitting a bicyclist

BICYCLISTS:

1) **Always** ride with the direction of traffic
2) **Obey** all traffic signs and signals
3) **Use** lights at night
4) **Yield** to pedestrians and pass with caution
5) **Use** hand signals when changing lanes and making turns

Street Maintenance Work in Full Swing

Street Maintenance Division crews perform the tasks necessary to improve and preserve street pavement conditions:

- **Chip sealing**—liquid asphalt and rock chip are applied to seal out water and provide better traction.
- **Crack sealing**—patching material is applied to cracks to prevent further water damage to streets
- **Pothole filling**—patching material is used to fill in potholes, which prevents vehicle damage as well as further water damage to streets.
- **Milling and overlaying**—a few inches of old asphalt is milled off the street and a new layer is installed.
- **Installing dry well sumps**—installing them where water tends to collect keeps water off the street surface helps to increase asphalt longevity.

For more information, please visit our website at http://www.ci.missoula.mt.us/498/Street-Maintenance.

A steel wheel roller is used to compact newly applied asphalt.

Water Line Loan Program

Missoula Water is offering low-interest loans to water customers who need to repair or replace their service lines or internal plumbing, install a meter and meter pit, or connect to the municipal water system.

For more information, visit Missoula Water's website at www.ci.missoula.mt/1983/Missoula-Water or email us at wllp@ci.missoula.mt.us.

Missoula City Cemetery

Our staff invites the public to explore the beautiful and historic cemetery. Missoula City Cemetery (established in 1884) is one of the oldest operating cemeteries in the Missoula Valley and is recognized for its beauty, tranquility, and pristine grounds.

Our historic grounds provide the final resting place for more than 21,000 people. Please call 552-6067 or stop by our office to meet our caring staff who look forward to assisting with your needs.

See our new Niche Wall Plaza.

Infrastructure Improvement Projects Continue

As we enjoy the summer's sunshine, rest assured the City's taking advantage of the warm weather to complete our public infrastructure projects. Missoula Water will complete the following projects in 2020:

- 3rd Street Water Main Replacement
- E. Pine Water Main Replacement
- Worden & Howell Water Main Replacement
- W. Pine Water Main Replacement
- Lincoln Hills Upper Water Tank Replacement
- Upper Prospect Water Tank Replacement

For more information on these and other City projects, visit www.ci.missoula.mt.us/2649/Projects.

Contact Us

Please note that many Public Works divisions are operating with reduced staffing and many other employees are working remotely to comply COVID-19 directives. We are still here to serve you and are available Monday – Friday, 8 a.m. to 5 p.m. Check our website for updates at http://ci.missoula.mt.us/403/Public-Works.

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By phone: 406-552-6125

Garden City Compost—552-6619

Missoula City Cemetery—552-6070

Storm Water—552-6744

Street Maintenance—552-6360

Public Works Department Administration
Jeremy Keene, Public Works Director: 552-6769
Dennis Bowman, Deputy Public Works Director—Utilities: 552-6700
Brian Hensel, Deputy Public Works Director—Streets: 552-6360

2020 FALL NEWSLETTER

City of Missoula Public Works Department

Dennis Bowman
Deputy Public Works
Director – Utilities

As we head into fall and the City's construction season wraps up, we thought it would be the perfect time to give you a progress report on Missoula Water's successes under public ownership.

Since the City purchased Mountain Water in 2017, we have been reinvesting in our water system—from replacing worn out water pumps to replacing leaking mains from the 1910s—we're putting all funds that previously would have gone to corporate profits back into our system.

We are taking advantage of advances in water meter and leak indication technology to streamline the way we take meter readings and how we identify areas of the system that are leaking. We are now able to provide services that weren't possible before, such as our Water Line Loan Program for homeowners who need to replace their water line. Soon utility customers will receive one consolidated utility bill so that they can make just one monthly payment for their water, storm water, and wastewater charges.

All of us at Missoula Water look forward to continuing the great work we've started.

Your feedback is always appreciated, so feel free to reach out to me at bowmand@ci.missoula.mt.us.

Missoula Water—Successes under Public Ownership

Since the City purchased the water utility in 2017, Missoula Water has been working diligently on the following:

System Improvements

- Replaced 19,301 lineal feet (about 3.66 miles) of water main, much of which dated back to 1914;
- Installed 6,628 lineal feet (about 1.26 miles) of water main extensions to under-served areas to improve fire protection;
- Installed 39 fire hydrants;
- Saved 1.3 million gallons per day of water leaking from system due to main leaks;
- Began using hydrant listening devices to identify leaking water mains;
- Worked with public and private partners to remove the Rattlesnake Dam, which was a potential safety hazard and maintenance burden to Missoula Water;
- Initiated the Water Line Loan Program for customers to receive low-interest loans for home water line repairs;
- Began replacing water meters with new ones that automatically report usage without staff driving through neighborhoods to collect that data; and
- Created the Water Facilities Master Plan to identify and prioritize water main leaks and plan for their repair.

Collaboration

We're turning what previously would've been pavement patches over trenches over water main work into street repair and replacement projects. We work with other City departments to map out both short- and long-range plans for upcoming projects. We determine where our planned projects align with those of the City's Street Maintenance Division, Wastewater and Storm Water utilities, Missoula Redevelopment Agency, Parks and Recreation Department, and others. We then work together on project timing and funding. This collaborative effort benefits citizens by:

- Making multiple infrastructure improvements with one larger project instead of multiple smaller ones,
- Digging up and repairing streets once means fewer traffic disruptions and delays and saves money, and
- Getting the most value out of each dollar spent by sharing costs, and we generally get better unit prices for construction and materials for larger projects.

Challenges

Although we've made great progress in improving the water system, we still have many challenges in meeting our goals of continuing to provide citizens with the quality drinking water they need while expanding our system to meet the demands of our growing city. We've been able to keep rates flat, but we still have to keep up with inflation and increases in materials costs as we continue to address the backlog of deferred maintenance. We also need to explore ways to fund the system expansion required for new developments.

If you have questions about any of our projects or other initiatives, please visit our website at http://www.ci.missoula.mt.us/1983/Missoula-Water.

Missoula Water coordinated with the Storm Water Utility and Street Maintenance Division on the S. 3rd Street Project to replace old water main, improve storm water infrastructure, install Americans with Disabilities Act (ADA) ramps, and mill and overlay the full width of S. 3rd St. from Orange St. to Oak St.

Combined Utility Billing Begins February 2021

Beginning with your February 2021 bill, you will receive one convenient combined utility bill for all utility charges. It will include your monthly water, wastewater, and storm water charges. You will no longer receive a separate wastewater bill every six months (every three months for commercial customers). Some of the benefits to our utility customers include:

- One year of wastewater charges split into 12 monthly payments;
- Only one monthly bill to pay for all utility charges;
- Payment options available that were not possible for wastewater payments (direct debit, paperless billing); and
- Utility bill available to view online for water, wastewater, and storm water charges.

Garden City Compost Accepting Leaves at No Charge

Don't want to wait for City leaf pickup in your neighborhood? Bring your **LEAF ONLY** loads to us for FREE drop off!

NOTE: Loads mixed with tree trimmings or any other yard debris will be charged our regular drop off fees. Please, no garbage or pet waste.

Watch for details in December about how to recycle your Christmas trees with us!

Hours: 8 a.m. to 5 p.m., Monday – Saturday, *until December 1*

7:30 a.m. to 4 p.m. Monday – Friday, *December 1 to March 1*

Location: 1125 Clark Fork Lane, off Mullan Road

NATURAL • SUSTAINABLE • LOCAL
GARDEN CITY COMPOST City of Missoula

Phone: 406-552-6619

See our web page for more details at http://www.ci.missoula.mt.us/2089/Garden-City-Compost

Street Maintenance Crews to Begin Leaf Collection in November

The City's Street Maintenance crews will begin their regular leaf pick up in November and will continue until December 15. The schedule and instructions to residents are available at http://www.ci.missoula.mt.us/504/Leaf-Collection. Please be aware that the schedule may change due to snow and other weather conditions.

City Street Maintenance crews scoop up leaves and take them to Garden City Compost where they will be used to make compost.

Upper Gharrett Storm Water Project

The Storm Water Utility's Upper Gharrett Project is coming to a successful conclusion. This project was initiated due to the high volume of both natural spring water and storm water running through the Upper Gharrett drainage, which created hazardous levels of excessive erosion throughout the drainage.

The project includes a storm water feature new to the City of Missoula called a StormGate. The StormGate is a bypass design situated at the top of the drainage that allows sediment to settle out while maintaining moderate overland flow AND redirecting excess storm water through the piped system below. This design protects surrounding private property and City infrastructure from flood-related damage, reduces the likelihood of future erosion, and maintains the habitat of the natural drainage.

The Storm Water Utility strives to provide more solutions like this project to increase safety, retain habitat, and improve our beautiful city's water quality.

A section of the StormGate structure.

Gharrett Drainage following StormGate installation.

Water Line Loan Program

Missoula Water is offering low-interest loans to water customers who need to repair or replace their service lines or internal plumbing, install a meter and meter pit, or connect to the municipal water system. For more information, visit Missoula Water's website at www.ci.missoula.mt/1983/Missoula-Water or email us at wllp@ci.missoula.mt.us.

Contact Us

Please note that many Public Works divisions are operating with reduced staffing and many other employees are working remotely to comply COVID-19 directives. We are still here to serve you and are available Monday – Friday, 8 a.m. to 5 p.m. Check our website for updates at http://ci.missoula.mt.us/403/Public-Works.

Missoula Water—Emergencies: 552-6700
Customer Service: email watercs@ci.missoula.mt.us
Pay your water bill online: www.ci.missoula.mt.us/1351/Pay
In person: Drop boxes at 435 Ryman St. & 1345 W. Broadway
By mail: P.O. Box 5388, Missoula, MT 59806
By phone: 866-790-7218

Wastewater—552-6600
Pay your sewer bill online: www.ci.missoula.mt.us/1351/Pay
In person: Drop boxes at 435 Ryman St. & 1345 W. Broadway
By mail: P.O. Box 5388, Missoula, MT 59806
By phone: 406-552-6125

Garden City Compost—552-6619

Missoula City Cemetery—552-6070

Storm Water—552-6744

Street Maintenance—552-6360

Public Works Department Administration
Jeremy Keene, Public Works Director: 552-6769
Dennis Bowman, Deputy Public Works Director—Utilities: 552-6700
Brian Hensel, Deputy Public Works Director—Streets: 552-6360

2020 WINTER NEWSLETTER

City of Missoula - Public Works

Greetings from the Public Works Director!

Greetings from the Public Works Department. As we roll into winter, we'll be deploying our new fleet of residential snowplows to provide a faster response to major storms. We are also coordinating snow operations with other City departments and the County to improve efficiency and provide better service. Please help make winter safer for everyone by keeping sidewalks and fire hydrants clear, and remember, a great way to spread some holiday cheer is to help your neighbors shovel while you're at it.

As always, we welcome your input. To share concerns or suggestions about our new snowplowing plan, please reach out to me at streetsdept@ci.missoula.mt.us.

Happy Holidays, Jeremy Keene

Storm Water

Storm Water Rates

The newly proposed Storm Water Utility rates were adopted by City Council on December 16, 2019. Single-Family Residential customers will now be charged $4.21 per month for storm water services. Commercial customers can contact the Storm Water Utility at (406) 552-6358 to learn what classification their account will be designated. For more information, please visit https://www.ci.missoula.mt.us/2341/Utility-Rates.

Frequently Asked Questions

Q: What is Storm Water?

A: Storm water is runoff that occurs when rain or melting snow flows across impervious (hard) surfaces like roofs, driveways, streets, and parking lots, resulting in fewer opportunities to soak into the ground. This can cause flooding and increased pollution of our waterways.

Q: Why do we need a Storm Water Utility?

A: The City of Missoula established the Storm Water Utility in 2016 to better maintain compliance with the stringent requirements of the Clean Water Act, which is administered by the U.S. Environmental Protection Agency (EPA) and the Montana Department of Environmental Quality (MDEQ).

Q: How does the Storm Water Utility benefit the citizens?

A: Two words: water quality. Our goal is to educate citizens, the general public, school children, and businesses (including contractors and developers) on storm water pollution prevention solutions and techniques to protect our aquifer and waterways, improving the quality of our most precious resource. In addition, our storm water infrastructure protects roads and property, helping us assure access and emergency response and safeguard private investment.

Pattee Creek Outfall Sampling

Did you know the Storm Water Utility monitors and samples storm water outfalls all throughout Missoula? This picture shows Tracy Campbell, our Regulatory Compliance Specialist, calculating flow rate at the storm water outfall. Multiple water samples were taken during this rain event, which is referred to as a "first-flush" of storm water. This water contains a concentrated amount of pollution and allows the Storm Water Utility to better understand what is being introduced into our waterways and how best to address these pollutants.

Street Maintenance Division

Snowplowing Plan Information

Snow! It's that time of year, so the Street Maintenance Division wanted to share the following information on the City's snowplowing plan:

Two inches. The amount of snow that needs to accumulate on city streets before snowplowing will begin.

Residential streets. We now have pickup trucks with plows to clear snow from residential streets on a regular basis. This is a new process for us, but we will get to your street as quickly as we can.

Parking. Please park off of the streets when it snows, if possible. This allows our plows to clear streets more quickly.

Berms. There will be snow berms, especially when we have major snow events. Please clear the one in front of your driveway, but please DO NOT shovel the snow back into the plowed street—this causes safety issues and negates the work the plows just finished.

Berms on sidewalks. Streets with sidewalks adjacent to the curb may have some snow berm accumulation caused by City plows when there is no place else to put the snow. Property owners ARE NOT responsible for removing this berm, but they are responsible for clearing the rest of the sidewalk. Citizens will not be cited for a sidewalk berm created by City snowplows. If a berm covers more than 4 feet of sidewalk width, please contact us so that we can clear it.

Fire hydrants. Please do not pile snow so that it blocks access to any fire hydrants in case Fire or Water staff members need to access it.

Map. Please see the priority route map under "Snow Plowing Map" link on our webpage at http://www.ci.missoula.mt.us/558/Snow-Removal.

Questions or comments. Please contact us at **552-6360** or streetdept@ci.missoula.mt.us with any questions or comments on the residential plowing services. More information on snowplowing of Missoula streets can be found at http://www.ci.missoula.mt.us/558/Snow-Removal.

Combined Utility Billing

As of February 1, your regular monthly water bill will include a monthly storm water charge. The storm water charge will no longer be on your regular sewer bill.

City staff has been working hard to consolidate your City of Missoula utility charges onto one monthly bill. If you are a City of Missoula utility customer but do not receive all three of the utility services provided, you will only receive charges for the services you receive.

Combining the billing will reduce bill-printing costs and provide additional payment options.

The sewer charges residential customers (semiannually) and commercial customers (quarterly) would normally receive will also be combined on the monthly utility bill with water and storm water in July 2020.

If you have any questions regarding combined billing, please contact our utility billing staff at (406) 552-6700.

Cemetery

Check out our new information circle! A sign welcomes visitors and highlights some cemetery rules. A map shows the locations of six interpretive signs found within the cemetery that highlight some of Missoula's rich history. Missoula City Cemetery was pleased to partner with the Montana History Foundation on this project.

Winter season at the cemetery allows all floral or decorative items to remain on the grounds from Thanksgiving Day through the last day of February. Note: Glass is prohibited at all times. Missoula City Cemetery is not responsible for items placed on the grounds.

We welcome you to explore these sacred grounds, and we are always available to assist with your cemetery needs. For more information, please contact us at (406) 552-6070.

Garden City Compost

A great, big, thank you to our community for its continued commitment to sustainability and our Zero-By-Fifty initiative. We have diverted more material from the landfill than ever before with your help.

Christmas tree drop-off is free of charge no matter how long that tree stays up in the living room!

Our winter hours are 8 a.m. - 4 p.m. Monday-Friday through February with a spring kick-off when the Shack re-opens in March.

All the best in the New Year from your neighbors at Garden City Compost. Please contact us at (406) 552-6619 with any questions or inquiries.

Wastewater

STEP System Accessibility

If you have a City-owned STEP (Sewer Tank Effluent Pump) system, be sure to keep the green lid and STEP system control panel accessible to City staff. To maintain the system, it is critical for the City's Wastewater staff to access the lid and the STEP system control panel.

If your City-owned STEP system sounds an alarm, you can silence it by pushing the RED button on the STEP system control panel and then immediately call the Wastewater Division at the number located on your box, (406) 523-4886. We have collection staff ready to respond at any time, day or night, including weekends and holidays.

Missoula Water

Like Missoula Water on Facebook
www.facebook.com/missoulawater

Protecting your Service Line

As the temperatures outside drop for long periods of time, your service line can freeze even if it is the recommended six feet deep. If you know water isn't being used regularly, please keep faucets open enough to drip, and leave cabinets open to expose your plumbing to heat. This could help prevent a costly pipe from bursting and service line from freezing underground.

Water Line Loan Program

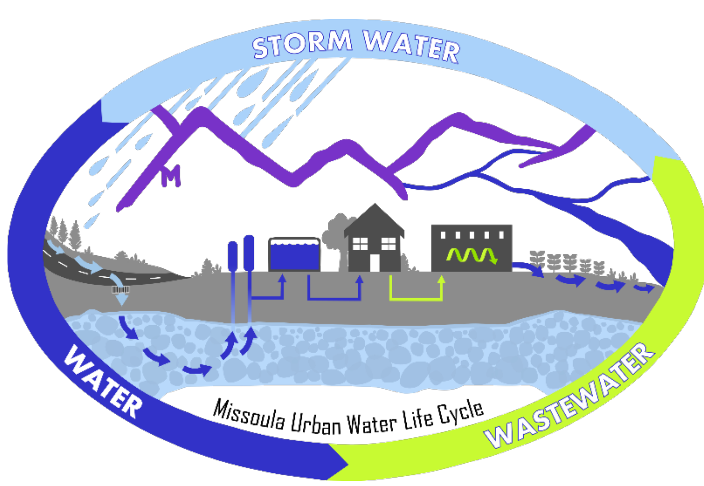
Missoula Water offers low-interest loans to water customers who need to repair or replace their service lines or internal plumbing, install a meter and meter pit, or connect to the municipal water system. Email wllp@ci.missoula.mt.us for more information.

Keeping Hydrants Clear

If your property includes a hydrant, it is your responsibility to keep the hydrant clear and accessible. Not doing so could result in a lowered response time by the Fire Department in an emergency.

Left Hydrant covered in snow

Right Hydrant Properly Uncovered



Contact Us

Compost	406.552.6619	composting@ci.missoula.mt.us
Missoula Water	406.552.6700	watercs@ci.missoula.mt.us
Storm Water	406.552.6358	stormwater@ci.missoula.mt.us
Streets	406.552.6360	streetsdept@ci.missoula.mt.us
Wastewater	406.552.6600	hendersons@ci.missoula.mt.us

City of Missoula Public Works – Working Together to Serve You.

www.ci.missoula.mt.us/publicworks

Attachment D:

Public Involvement and Participation

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division
1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Attachment D:

Public Involvement and Participation

Key target audiences included general public, pet owners, and construction industry. Due to Covid-19 our ability to meet with the public and create an environment that allowed participation was incredibly challenging. However, we were able to create several opportunities.

We were fortunate enough to be able to co-host a pet waste cleanup at the Blue Mountain Trailhead with Working Dogs for Conservation and the US Forest Service (USFS).

This location is technically outside the City limits, Lolo National Forest is under the direction of our local USFS, but was the only location of four that we were able to successfully schedule during the pandemic.

During the course of the evening we were able to discuss what we were doing with those visiting the trail. Many hikers had questions and many acknowledged the value of our service and thanked everyone in attendance. According to Working Dogs for Conservation program coordinator, Kayla Fratt, this was significantly less pet waste than what was collected last year. If this trend continues, we have successfully communicated to those who utilize this trail that no matter the location, rural or urban, their duty remains to protect against the harmful impact pet waste has on their environment.

Levee Revegetation was a tremendous success. Multiple volunteers from across the City, County, and non-profit partnerships, like Montana Americorps, came together to revegetate a 60' section of levee bank on Clark Fork Area Levee V. The Storm Water utility is responsible for maintenance of the Missoula levees and while this does not impact our MS4 compliance directly, the publicity from these type of events allows us to spread awareness of the new Storm Water Utility and all aspects of our mission to protect our waterways, while also fostering a water quality minded public service outlook.

CALL FOR VOLUNTEERS

Come celebrate National Public Lands Day by helping The Missoula Valley Water Quality District and City of Missoula Storm Water Division revegetate a section of Levee V on the Clark Fork River! We will be planting native seedlings to improve habitat and stability, provide riparian shade, and generally beautify this section of the Riverfront Trail.

When: Saturday, September 26 from 9am-2pm

Where: Meet at West entrance to Downtown Lions Park. There is usually plenty of parking on Cedar St.

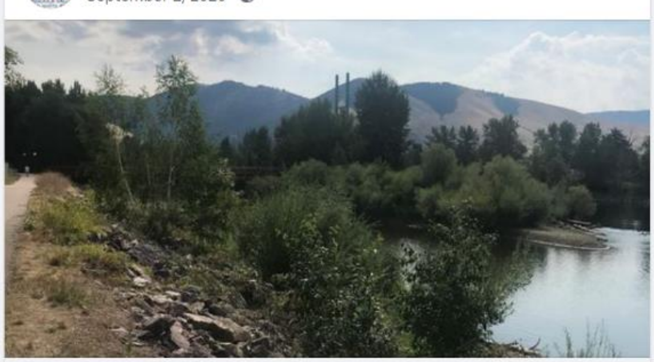
What to bring: water, lunch, gloves, hat, sturdy footwear

COVID-19 safety protocols, including physical distancing and the use of face coverings, will be followed.

If you are interested or have any questions please contact Thomas Cope, tcope@missoulacounty.us

MISSOULA VALLEY water quality district

Missoula Valley Water Quality added an event.
September 2, 2020



SAT, SEP 26, 2020
Revegetate the Levee!
Missoula
1 person went

Interested

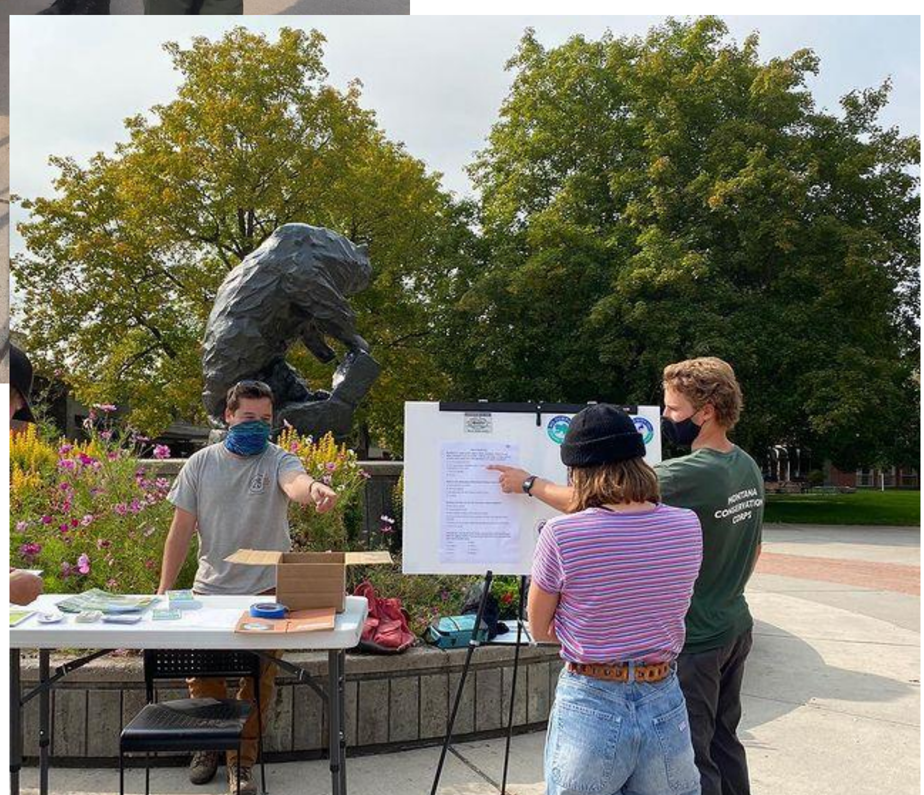
Like Comment Share

PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

University of Montana

2020 Storm Water Americorps members, James Moxley and Carver Butterfield, tabled an event at the University of Montana campus on October 1, 2020. Carefully following Covid-19 protocols, they were able to successfully educate over 23 community members on details of our Missoula storm water system, the dangers of storm water pollution and how they can make a difference!



PUBLIC WORKS & MOBILITY DEPARTMENT—Storm Water Division

1345 W. Broadway • Missoula, Montana 59802 • (406) 552-6744

Annual Household Hazardous Waste Days hosted by our Missoula Valley Water Quality District.

Missoula Valley Water Quality
October 6, 2020 ·

It's not too late to sign up for Household Hazardous Waste Days!

The annual event will take place from 8 a.m. to 12 p.m. Friday through Sunday, Oct. 16-18. The event will be held outdoors and by appointment only.

"Due to risks of COVID-19, the event will operate a bit differently this year," said Todd Seib, an environmental health specialist with the Missoula Valley Water Quality District.

To limit time, exposure and the number of interactions with the public, the event will be held outdoors and limited to 12 hours over three days, with a 720-person registration limit. No money will be exchanged during the event to limit contact with shared surfaces. "We also ask that attendees not attend if they are ill or exhibit any of the known symptoms of COVID-19," Seib said. Attendees are required to remain in their vehicles and to wear masks/face coverings whenever speaking with staff or when staff must enter the shared airspace inside the vehicle.

Other new conditions for 2020:
- Registration and pre-payment required for this event ($10)
- No refunds will be given
- Open to Missoula County residents only
- 25-gallon limit per vehicle

To register visit https://hazwastemissoula.com/

Missoula County, Montana - Government
Missoula, Montana
MissoulaEvents.Net & Indoor Ads
Missoula City-County Health Department

Home What is Hazardous Waste HazWaste Days Event More

MISSOULA VALLEY water quality district

HAZWASTE DAYS COLLECTION EVENT (SEPTEMBER 20TH AND 21ST)

What is HazWaste Days?

Each year since 1993 (with the exception of 2017) the Missoula Valley Water Quality District has held a Household Hazardous Waste Collection Event.

This years event will be Friday, Sept 20th from 9 am to 5 pm and Saturday, Sept 21st from 9 am to 3 pm at the City Shop, 1305 Scott St.

Piles of household hazardous waste

Many unwanted hazardous and toxic materials are accepted at this event from Missoula County Residents for no charge, including oil-based paints and stains, paint thinner, degreasers, gasoline, other flammable liquids, aerosol paints, fertilizer, non-alkaline household batteries (alkaline batteries can be thrown away), used motor oil (courtesy of Republic Services -up to 15 gal.), antifreeze and up to 6 fluorescent tubes (no bulbs -- see year-round options, below). Mercury fever thermometers are also accepted at HazWaste Days for free.
Items accepted for a fee include pesticides, caustics, strong acids and chlorinated solvents. The fee charged covers approximately 25% of our costs for shipping and disposing of the waste.
Businesses and out-of-county residents will be charged our costs for disposal of all waste.
Since we currently only offer this event once a year, please take a look at our Year-round Options Guide if you have waste that you are unable to keep until the next event. Please note that their may be a charge for disposing of items that are normally accepted for free at the annual event.