

February 28, 2023

Submitted via FACTS on 2/28/2023

Montana Department of Environmental Quality
Attn: Mr. Jon Kenning
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901

RE: City of Bozeman Small MS4 2022 Annual Report (MTR040002)

Mr. Jon Kenning,

The City of Bozeman (City) is pleased to submit the 2022 Phase II Small MS4 General Permit Annual Report, updated Stormwater Management Plan (SWMP), and supporting documents for your review.

In 2022, the City maintained its commitment to protecting water quality through the continued development of its Stormwater Management Program. During the upcoming year, the City will continue to facilitate the completion of several projects that will have positive impacts on water quality and MS4 Permit compliance.

These projects include an update to the Stormwater Facilities Plan, a pair of mechanical separators, and numerous pipe replacements or repairs. The City also prioritizes the maintenance of our compliance programs as well as infrastructure that work together to improve water quality.

The City looks forward to continuing to implement and improve its SWMP in 2023. Please do not hesitate to contact me with any questions.

Regards,

Adam Oliver

Adam Oliver, Stormwater Program Manager

Attachments:

- 2023 MS4 Annual Report Form
- The City of Bozeman and Montana State University Stormwater Management Plan



 Montana Department of Environmental Quality Water Protection Bureau Montana Pollutant Discharge Elimination System		Agency Use	
		Permit No.: MTR04	
		Date Rec'd	
		Amount Rec'd	
		Check No.	
		Rec'd By	
FORM MS4-AR	Annual Report Form Storm Water Discharges Associated with MS4s MTR040000		
This annual report form is to be completed by each permittee authorized under the General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Water Sewer Systems (MS4s). The completed form must be electronically submitted to DEQ by March 1 st of each year starting March 1 st , 2023.			
Reporting Year: ☒ 2023 ☐ 2024 ☐ 2025 ☐ 2026 (reporting period is for the preceding calendar year, Jan 1 st - Dec 31 st)			
MS4 Information			
Permit Number		M T R 0 4 0 0 0 2	
Small MS4 Name		City of Bozeman	
Contact Person, (name, title)		Adam Oliver, Stormwater Program Manager	
Mailing Address		7 E Beall St, Suite 100	
City, State, and Zip Code		Bozeman, MT, 59715	
Phone Number, Email Address		406-582-2916, aoliver@bozeman.net	
Authorized as a Co-permittee?		☒ Yes: Montana State University ☐ No	
(If, yes provide Co-permittee MS4 name in the blank provided. Each co-permittee must submit a separate complete annual report form.)			
1	Is the MS4 sharing responsibility? If yes, attach written acceptance and explanation of shared obligation(s). ☒ Yes ☐ No		
2	Attach an organizational chart identifying the primary SWMP coordinator, positions responsible for implementing requirements of the permit, and contact information for each individual. ☒ Attached ☐ Not Attached Contact Info		
Minimum Control Measure 1 & 2			
Link to storm water website		Stormwater Website	
List of four key target audiences:		Associated Pollutants:	Outreach strategy:
2	See SWMP Sections 3.3 and 3.4 for documentation of key target audiences, pollutants, outreach strategy and performance measures.		
Attach documentation of participation and/or feedback of key target audiences. ☒ Attached ☐ Not Attached			

Attachments are provided in order of this form, numbers along the left edge correspond with the file numbers. The SWMP is Attachment 2 and is referenced multiple times

Minimum Control Measure 3 (attach the following in the order listed)

2 List of potential non-storm water discharges identified as significant contributors of pollutants (i.e. illicit discharges), associated pollutants, and any local controls or conditions placed on these discharges. ☒ Attached ☐ Not Attached

Have there been updates to the MS4's storm sewer maps? ☒ Yes ☐ No, the map(s) were last updated: _____

If yes, submit the maps using one of the following options:

☐ Electronic GIS shapefiles emailed to DEQMPDESDataManagement@mt.gov

☐ Attached Hard copy

☒ Link to online maps: <https://gisweb.bozeman.net/Html5Viewer/?viewer=infrastructure/>

2 Summary of investigations and corrective actions taken over the past year per the Illicit Discharge and Corrective Action Plan. ☒ Attached ☐ Not Attached See SWMP Section 4.5

Number of outfalls inspected during dry weather: 190 of 466 (total number of outfalls)

Number of high priority outfalls inspected: 10 of 10 (total number of high priority outfalls)

Attach a summary of any resulting actions taken from screening results. ☒ Attached ☐ Not Applicable See SWMP Section 4.7

Year 2023 only, unless updates were made:

A copy or link to the adopted ordinance, policy, procedure, and/ or regulatory mechanism prohibiting illicit discharges.

☐ Attached or ☒ Link **BMC 40.04.200**

Minimum Control Measure 4 (attach the following in the order listed)

3 List of construction sites/projects inspected over the last year and any resulting actions. ☒ Attached ☐ Not Attached

Year 2023 only, unless updates were made:

4 A copy of the construction storm water management plan review checklist. ☒ Attached ☐ Not Attached

5 A copy of the construction site inspection form or checklist. ☒ Attached ☐ Not Attached

A copy or link to the adopted ordinance, policy, procedure, and/or regulatory mechanism requiring construction storm water controls. ☐ Attached or ☒ Link: **BMC 40.04.350**

Inventory of regulated projects using offsite treatment for post-construction runoff. ☐ Attached ☒ Not Applicable None

Number of high priority post-construction storm water management controls inspected: 15, includes MSU controls

6 Attach a summary of any resulting actions taken from inspections. ☒ Attached ☐ Not Applicable

Year 2023 only, unless updates were made:

7 A copy of the post-construction storm water management plan review checklist. ☒ Attached ☐ Not Attached

8 A copy of the post-construction site inspection form or checklist. ☒ Attached ☐ Not Attached

A copy or link to the adopted ordinance, policy, procedure, and/or regulatory mechanism requiring post-construction storm water controls. ☐ Attached or ☒ Link **Design Standards**

Year 2025 only: Submit a plan to modify relevant codes, ordinances, policies, and/or programs to implement LID/green infrastructure concepts. ☐ Attached ☐ Not Attached

Number of SOPs evaluated: 15 of 15 (total number of SOPs for permittee facilities/activities) (City only)

2 Summary of SOP updates made in the last year. ☒ Attached ☐ Not Applicable See SWMP Sections 7.4 and 7.5

2 Records of completed trainings in conformance with section II.B. of the General Permit. ☒ Attached ☐ Not Attached See SWMP Section 7.6

Year 2023 only, unless updates were made:

See SWMP Section 7.4 for inventory and summary

Inventory of permittee facilities/activities with potential to contribute contaminants. ☒ Attached ☐ Not AttachedSummary of inspection procedures for facilities and their structural storm water controls. ☒ Attached ☐ Not Attached**Storm Water Management Plan (SWMP)**In the last year, were any public comments received on the SWMP? ☐ Yes ☒ NoIf yes, attach a summary of comments received. ☐ Attached ☒ Not ApplicableIn the last year, have additional SWMP updates been made other than those listed above? ☒ Yes ☐ No

If yes, attach a summary including the date and description of updates and rationale for decision making.

☒ Attached ☐ Not Applicable See SWMP Section 9.0**Monitoring and Reporting** (attach the following in the order listed)☒ I verify all outfall monitoring has been performed and recorded in conformance with section II.C. and II.D. of the General Permit. (If not able to dependably obtain two samples a year at each monitoring location, attach a summary of rationale. Contact DEQ regarding requests for a change in monitoring locations.)Attach a summary of implemented BMPs used to target and reduce discharges to impaired waterbodies and a schedule for the following year's BMP implementation. ☒ Attached ☐ Not Applicable See SWMP 2.3 & 2.4**Year 2023 only, unless updates were made:** Attach an inventory of outfalls discharging to impaired waterbodies including associated pollutants. ☒ Attached ☐ Not Applicable See SWMP Section 4.7**MS4s with an approved TMDL:**

See SWMP Sections 2.0 and 8.0

Year 2023 only: Submit a TMDL-related sampling plan for DEQ review. ☒ Attached ☐ Not Applicable**Years 2024, 2025, and 2026:** In the last year, were any public comments received on the sampling plan? ☐ Yes ☐ NoIf yes, attach a summary of comments received and any resulting actions/modifications. ☐ Attached ☐ Not Applicable**Certification*****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 person or 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].

Name (Type or Print)

Jeff Mihelich

DocuSigned by:



Title (Type or Print)

City Manager

Phone Number

406.582.2306

Signature

DocuSigned by:

Jeff Mihelich

Date Signed

2/27/2023

* 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 ranking elected official.

1 - Sharing Responsibility - MOU

MEMORANDUM OF UNDERSTANDING

between

The City of Bozeman

and

Montana State University

for

General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4) Compliance and Storm Sewer Operation

This Memorandum of Understanding (MOU) made this ____ day of _____, 2022, between the City of Bozeman (COB) and Montana State University (MSU), collectively referred to as the "Parties", addresses areas of shared responsibility regarding the Montana Department of Environmental Quality (MDEQ) General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit) and storm sewer operation.

WHEREAS, the MDEQ requires the Parties to mitigate pollutants entering their storm sewers by implementing respective Stormwater Management Programs (SWMP) that include best management practices designed, installed, and maintained per sound engineering, hydrologic, and pollution control practices.

WHEREAS, the Parties are co-permittees, as authorized under Montana ARM 17.30.111(3) and ARM 17.30.111(7), and share select responsibility for the completion of defined SWMP activities.

WHEREAS, the MDEQ requires co-permittees to document shared activities and specifically requires them to have an MOU and organizational charts in order to be compliant with the MS4 Permit.

WHEREAS, MSU owns and operates storm sewers located on its property, which contains drainage basins and conveyances connected to COB infrastructure.

WHEREAS, MSU is a utility customer of the COB and pays monthly stormwater service fees.

NOW THEREFORE, in consideration of the mutual understandings contained herein, the Parties agree as follows:

1. The COB shall:
 - a. Provide a single contact point, unless otherwise designated.
 - b. Request permission 24 hours before completing any task on MSU property.
 - c. Facilitate and document regular coordination meetings.

- d. Carry out the roles associated with each Minimum Control Measure, listed in Appendix A.
 - e. Update MSU's stormwater service fees each fiscal year.
 - f. Provide SWMP technical assistance and compliance support upon request.
 - g. Deliver an updated copy of the Management Plan to MSU annually.
- 2. MSU shall:
 - a. Provide a single contact point, unless otherwise designated.
 - b. Participate in regular coordination meetings.
 - c. Carry out the roles associated with each Minimum Control Measure, listed in Appendix A.
 - d. Deliver information, review, and approve the Management Plan annually.
 - e. Provide parking and access for COB vehicles and equipment.

3. EFFECTIVE DATE AND DURATION:

The Parties agree that this MOU shall be effective on the date of its execution and shall continue for a period of five (5) years. The Parties may terminate this MOU at any time upon mutual written agreement. The Parties may extend the MOU for such additional period of time and under such terms as agreed upon in writing.

4. FEES FOR SERVICES:

The Parties agree that no fees for services performed under this MOU shall be applied, other than the COB's stormwater service charge applied to MSU.

5. INDEMNIFICATION:

The Parties agree to indemnify, defend, and hold harmless the other, their officers, agents and employees from and against any and all claims, losses, liabilities or damages and costs of its officers, agents, employees, and subcontractors.

IN WITNESS WHEREOF, the Parties have caused this MOU to be executed by their authorized representatives, on the day and year first written above.

CITY OF BOZEMAN

DocuSigned by:



251607FD8A824A6...
(Signature)

City Manager

(Title)

Jeff Mihelich

(Printed Name)

MONTANA STATE UNIVERSITY

DocuSigned by:



645692D56A2E4A0...
(Signature)

AVP University Services

(Title)

John How

(Printed Name)

Appendix A

Roles in the MS4 Permit

Administrative – SWMP Sec. 1.0

COB and MSU points of contact will establish meetings quarterly. On an annual basis, both Parties will update the GIS records and corresponding ratepayer records. This data review will also tie into the mapping required by MCM's 3 and 5.

MCM's 1 and 2: Public Education, Outreach, Involvement, and Participation

- a. Each Party will maintain a website, on the internet, separately and individually.
- b. The Parties will separately identify Key Target Audiences for stormwater outreach and education.
- c. The Parties will separately select the outreach formats per the MS4 permit.
- d. Perform outreach and public involvement separately, while looking for areas of overlap.

MCM 3: Illicit Discharge Detection and Elimination

- a. Each Party will review categories of non-stormwater discharges, and identify which are significant contributors of pollutants.
- b. Each Party will create, update, and store an inventory of their infrastructure. They will meet annually to review this information.
- c. COB will make infrastructure information publicly available on the internet.
- d. Each Party will develop and update a Corrective Action Plan to address illicit discharges. Initial response will be the responsibility of each Party in their respective area. Minor spills will be dealt with by the respective SWMP Coordinator, while major spills will be routed through 911 and then to the appropriate agency. The Parties have an existing emergency services contract, allowing City of Bozeman emergency services to respond to major spills in both jurisdictions.
- e. COB staff will perform dry weather screening field inspection of all outfalls as outlined in the MS4 permit, including those on MSU property. COB will provide relevant field forms to MSU in a timely fashion. Record keeping, reporting, prioritization, and illicit discharge resolution will be the responsibility of each Party separately.

MCM 4: Construction Site Storm Water Management

- a. Each Party will separately require construction site stormwater management plans and controls on regulated projects.
- b. Each Party will separately review stormwater management plans, using a checklist, for compliance with technology based effluent limitations contained within the most recent Construction General Permit.
- c. Each Party will separately inspect regulated projects using a site inspection checklist.
- d. Because of the status of COB as a traditional MS4 and MSU as a non-traditional MS4, ordinances and policies will be addressed separately.

MCM 5: Post-Construction Site Storm Water Management

- a. Each Party will separately require post-construction stormwater management controls on regulated projects.
- b. Each Party will separately develop and implement a plan review checklist.
- c. Each Party will separately maintain and update an inventory of post-construction controls annually. See MCM 3 b and c above.
- d. City of Bozeman and MSU will jointly complete a high-priority post-construction control analysis.
- e. COB will conduct field inspections on MSU owned high-priority post-construction controls annually.
- f. COB will provide field reports and maintenance recommendations for MSU high-priority post-construction controls.
- g. Maintenance and record keeping will be the responsibility of MSU for their post-construction facilities.

MCM 6: Pollution Prevention and Good Housekeeping

- a. The Parties will work together to identify facilities and activities per the most current MS4 Permit.
- b. COB staff will conduct field inspections of activities and facilities.
- c. COB will provide field inspection reports to MSU for identified facilities and activities.
- d. The Parties will be separately responsible for final documentation, SOG development, and SOG training.
- e. COB will maintain a map of identified COB and MSU facilities.
- f. MSU will provide COB good housekeeping information found in SWMP Section 7 about source load reduction.

Monitoring

Bozeman has a specialist who focuses on this requirement. It will be most efficient for COB staff to continue to set up and monitor sites as required by the MS4 permit and submitted sampling plan. COB will provide monitoring results.

Program Effectiveness Assessment

Each Party will perform this assessment based on required BMPs in each minimum control measure that have been adjusted or modified throughout the permit cycle. Outcomes, such as reducing pollutant loads, will be addressed together where possible.

City of Bozeman & Montana State University

Stormwater Management Plan MS4 General Permit Term 2022 – 2027

Updated January 21, 2023



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Section 1.0

Program Administration

Graphic 1.0.1: Street flooding resulting from clogged infrastructure



Graphic 1.0.2: Failed stormwater pipe



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1.1 Introduction

This Stormwater Management Plan (SWMP) describes the City of Bozeman (City) and Montana State University (University), collectively known as the MS4, the structural and administrative Best Management Practices (BMPs) engineered, implemented, maintained, and enforced to meet the following objectives:

- Protect public safety;
- Improve water quality; and
- Comply with environmental regulations.

This SWMP is an iterative and evolving document with updates occurring annually. The MS4 tracks updates in SWMP Section 9.0. SWMP Section 1.0 details the following components necessary to administer the MS4's Program, including:

- Background Information (1.2)
- City Program Framework (1.3)
- University Program Framework (1.4)
- Stormwater Management Team (1.5)
- Sharing Responsibility (1.6)
- Collaborative Organizations (1.7)
- Additional Regulatory Responsibilities (1.8)
- Annual Report (1.9)
- Public Comments (1.10)

1.2 Background Information

The MS4 is an incorporated town located in Gallatin County, Montana, and has a population of 53,293 as of the 2020 Census (University population 16,841). The MS4's primary land-use type is residential and commercial, with isolated industrial areas. Other notable geographical details include:

- Elevation: 4820 ft.
- Climate: Cold continental, with warm and dry summers, cold and dry winters
- Average Temperature: 44.6 °F
- Average Precipitation: 18.4 inches (University rain gauge)

The MS4 is located at the headwaters of the Upper Missouri Watershed and possesses relatively pristine surface water quality that supports several beneficial uses, including aquatic life, drinking water, agriculture, and recreation. Numerous waterways originate within and pass through the MS4.

The MS4's most notable waterway is Bozeman Creek (aka Sourdough Creek), which originates in the Gallatin Mountains south of its jurisdictional boundary. Flowing north, Bozeman Creek enters the MS4 at its southeastern border and continues until its confluence with the E. Gallatin River. The Montana Department of Environmental Quality (MDEQ) determined that Bozeman Creek has various impairments from natural and anthropogenic sources when developing its 2013 Lower Gallatin Planning Area Total Maximum Daily Load Report (TMDL).

The second most notable waterway is Mandeville Creek, a small, spring fed watercourse that originates in the south end of Bozeman. Mandeville Creek also flows north until its confluence with the E. Gallatin River. The MDEQ determined that Mandeville Creek also has various impairments from natural and anthropogenic sources when developing its TMDL.

Numerous perennial and intermittent spring creeks flow through the MS4 in a web of channels, irrigation ditches, and pipes. The MDEQ has not completed an assessment of these waterways.

The MS4's water resources represent a significant community value and are the backbone of its tourism, recreation, and neighboring agricultural industries. A growing threat to these invaluable resources is stormwater runoff, which occurs when rainfall and snowmelt flow across developed surfaces, such as yards, roadways, parking lots, and rooftops. Stormwater picks up pollutants before entering storm sewers, such as drains, pipes, and ditches, and eventually discharges into the MS4's waterways. Stormwater runoff can result in property damage, public health threats, and environmental degradation if not proactively managed. Specific pollutants of concern include:

- Sediment: Sourced from barren ground, construction sites, road sand, unpaved roads and trails, gravel parking lots, windblown dust, and vehicle grime, resulting in suffocated aquatic habitat and alterations to stream channel morphology.
- Nitrogen and Phosphorous: Sourced from improper lawn fertilizer application, grass clippings, and yard debris, resulting in oxygen-depleting algae blooms.
- E.coli: Sourced from substandard septic systems and pet waste, resulting in toxic conditions for the public and wildlife.
- Floatables: Sourced from littering, overfilled garbage cans, and unsecured loads, resulting in clogged infrastructure, impaired aesthetic value, and endangered wildlife.
- Oil, Grease, Metals, and Detergents: Sourced from motor vehicles, car spills, and car washing, resulting in toxic conditions for humans and wildlife.
- Temperature: Sourced from extensive and continuous impervious areas and lack of shade, resulting in harmful impacts to coldwater fisheries.

To counter stormwater runoff's impacts, the United States Congress established the National Pollutant Discharge Elimination System (NPDES) as a part of the Clean Water Act (CWA) in 1972 to preserve and restore the health of the United States' Waters. The U.S. Environmental Protection Agency (EPA) is the lead organization tasked with the implementation and oversight of the CWA. In Montana, the MDEQ has primacy, allowing for further state-scale interpretation, enactment, and enforcement.

The NPDES program regulates water pollution through a series of permits focused on point sources, such as industrial facilities, wastewater plants, and stormwater discharges. The driving permit behind the development and implementation of this SWMP is the MDEQ's Phase 2 General Permit for Stormwater Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4 Permit), which requires the City and University to implement a variety of programs to prevent and mitigate polluted discharges to waterways.

The MDEQ designates the City as a traditional permittee and the University as a non-traditional permittee. Both parties are co-permittees because their storm sewers are connected, and they work together on various administrative programs. The MDEQ requires the MS4 to complete the following:

- Prepare and submit individual Notices of Intent (NOI).
- Receive authorizations to discharge from MDEQ after permit issuance in 2022.
- Prepare and submit individual Annual Reports.
- Develop, implement, and update this SWMP throughout the MS4 Permit term.

Also, the MDEQ requires the MS4 to administer a program that works to accomplish the following:

- Educate the public (SWMP Section 3.0)
- Engage citizens through involvement and participation (SWMP Section 3.0)

- Detect and eliminate illicit discharges and connections (SWMP Section 4.0)
- Regulate construction sites (SWMP Section 5.0)
- Regulate stormwater facilities constructed with new and re-development (SWMP Section 6.0)
- Mitigate polluted discharges from municipal facilities and operations (SWMP Section 7.0)
- Collect and analyze water quality and stormwater runoff data (SWMP Section 8.0)

The following sections of this SWMP outline the MS4's work within each of these programs.

1.3 City Program Framework

On June 25, 2012, the City adopted Ordinance 1831, creating a Stormwater Utility, providing revenue collection for the operation and maintenance of the City's stormwater system. Funding was initially allocated to inventory, map, and assess the condition of the City's storm sewer. This effort was in response to findings identified during a 2011 MDEQ MS4 Permit audit, which included one violation, 16 program deficiencies, and 23 improvement recommendations.

On March 3, 2014, the City presented the results of their inventory, mapping, and assessment effort to City Commissioners. The City inventoried over ten thousand individual assets, many of which were clogged, cracked, buried, or in disrepair. Also, a program administration review identified significant shortfalls. Commissioners directed the City to develop options for addressing known issues.

On April 21, 2014, the City presented three levels of service, differing primarily on the timeline required to address issues and the annual funding level. Commissioners decided to implement a program that included a funding level of \$1.2 million annually for operations, treatment, and deferred maintenance.

On February 23, 2015, the City adopted a new level of service and a rate model to collect service fees based on individual property's impact on the stormwater system.

On December 1, 2015, the City implemented the final piece of the new rate model allowing a fully funded and functional Stormwater Utility for the first time in its history. The City's utility rate model includes the following components:

- Flat Charge: Charged evenly across the service area. Properties with a water meter receive a flat monthly charge per meter. The funding pays for deferred maintenance projects.
- Variable Charge: Charged proportionally to the amount of impervious area on a property. Impervious area does not allow water to soak into the ground during rain events, creating more stormwater runoff. Larger areas result in more impact on public storm sewers and waterways.
- Utility Credit: Properties that have installed quantity and quality-based stormwater controls receive a billing credit as these properties impact the stormwater system less than those without stormwater infrastructure.

The City's utility rate model includes the following funding allocations:

- Approximately \$600,000 annually for deferred maintenance, which includes costs associated with the replacement and cleaning of storm sewer assets.
- Approximately \$700,000 annually for operations and maintenance, which includes expenses related to personnel, reoccurring system maintenance, supplies, and equipment.
- Approximately \$200,000 annually for system enhancements, which includes costs associated with stormwater treatment projects to remove pollutants before discharging to waterways.

The Stormwater, Building, Strategic Services, and Finance Divisions work collaboratively to update the rate model regularly as new development occurs. The workflow includes:

1. Developers submit site plans to the Building Division through electronic permit software.

2. Staff review and upload site plans to a shared group folder on the City's internal drive.
3. Strategic Services Staff check the folder regularly, import site plans into GIS, digitize impervious area, and update each polygon's Equivalent Residential Unity (ERU) attribute.
4. Finance sends water meter notices to Staff when a project is nearing completion.
5. Stormwater Staff review impervious area data based on the address information provided by Finance and calculate an ERU total, including percentage credit, if applicable.
6. Stormwater Staff provide Finance Staff with an ERU value and credit value.
7. Finance Staff update software and generate a bill for customers.

Table 1.3.1 shows impervious area additions per year (single-family units and public roads excluded):

Table 1.3.1: Impervious Area Additions		
Calendar Year	Impervious Acres Added	New Site Plans
2017-2020 Average	71	95
2021	70	70
2022	67	62

Table 1.3.2: FY21 Budget Totals	
Fiscal Year	Budget
Salaries and Benefits	\$640,866
Operating	\$317,907
Capital	\$700,000
Debt Service	\$194,735
Total Budget:	\$1,853,508

- Fiscal Year 2022 Budget (July 1, 2021 - June 30, 2022)
- Resource Justification: Public budget approval process completed in June 2021. Staff gave a public presentation regarding past, current, and future work, and answered questions.
 - Program Effectiveness: See performance measures in SWMP Sections 2.0 - 8.0.
 - Resource Variation: +9% rate increase, steep increases in inflation this year
 - Staff: 8 FTEs, 1 additional Technician added, but several positions were vacant throughout the Fiscal Year

Table 1.3.3: FY22 Budget Totals	
Fiscal Year	Budget
Salaries and Benefits	\$676,084
Operating	\$329,467
Capital	\$675,000
Debt Service	\$194,735
Total Budget:	\$1,875,286

- Fiscal Year 2023 Budget (July 1, 2022 - June 30, 2023)
- Resource Justification: Public budget approval process completed in June 2021. Staff gave a public presentation regarding past, current, and future work, and answered questions.
 - Program Effectiveness: See performance measures in SWMP Sections 2.0 - 8.0.
 - Resource Variation: +9% rate increase
 - Staff: 8 FTEs, fully staffed at the end of the calendar year 2022

Table 1.3.4: FY23 Budget Totals

Fiscal Year	Budget
Salaries and Benefits	\$802,382
Operating	\$515,822
Capital	\$672,250
Debt Service	\$194,173
Total Budget:	\$2,184,627

1.4 University Program Framework

In the current year, the University has managed three projects of an acre or larger, which have influenced stormwater quantity and quality. Those projects are:

- Wellness Center: Over One Acre, Active, Fall 2023 Planned Completion
- Bobcat Athletic Complex: Over One Acre, SWPPP Terminated, Winter 2022 Final Completion
- American Indian Hall: Over One Acre, SWPPP closed winter 2022, Project complete Fall 2022

Recently completed projects include:

- Norm Asbjornson Hall Construction: Over One Acre, Complete 2020
- Hyalite Hall: Over One Acre, Complete 2020
- Montana Hall Elevator and Renovation: Under One Acre, Complete 2020
- Romney Oval Renovation Project: Over One Acre, Active, Completed 2021
- Romney Hall Renovation project: Under One Acre, Active, Completed 2021

Under one acre

- Lewis Hall: Active, Planned completion Summer 2023
- Montana Hall Elevator and Renovation: Under One Acre, Completed 2020

2022 update

In 2022, the University has devoted approximately 740 hours to stormwater maintenance, management, and improvements and tracks work activities and labor using a work order system. In cooperation with the Engineering and Utilities Director, the Facilities Services Director coordinates and ensures MS4 Permit compliance.

1. Current Staff:

- Engineering and Utility Manager: Directional and political support (*40 hours per year*)
- Director - Facilities Services: Overall program coordination. Administers and supports environmental compliance programs; manages support personnel; identifies and advocates for infrastructure projects; conducts training, inspections, permit reviews, data collection, and reporting; manages reoccurring infrastructure maintenance, structural inspections, repairs, and replacements (*350 hours/year*)
- Support Staff and Contracted Services: Groundskeepers, laborers, plumbers, storm drain cleaning/vactor, and street sweeping (*700 hours/year*)

The following representatives make up the University's stormwater management team. Regular communication occurs, allowing for the exchange of necessary information:

- Leader (Primary): Edward Hook – Director, Facilities Services MCM 1-6
- Leader: Megan Sterl – Director, Engineering & Utilities MCM 1-6

- Leader: Chris Catlett – Director, Safety & Risk Management MCM 1-3, 6
- Leader: Kathryn Pearson, Director, Campus Planning, Design & Construction MCM 1, 2, 4-6
- Leader: Kane Urdahl – Manager, Trades MCM 3-6
- Leader: Jim Waterman – Manager, Landscape & Grounds MCM 3-6
- Leader: Frank Stock – Manager, Operations MCM 5-6
- Leader: Denis Hill – Custodial Services Supervisor MCM 3, 5-6

Current funding is not a line item but included in the general campus maintenance operations budget for Facilities Services. As allowable and necessary funds from Facilities Services General Operating and the Engineering and Utilities Infrastructure budget are allocated to specific stormwater improvement projects.

- Fiscal Year 2022 Approved Budget (July 1, 2021 - June 30, 2022)
 - Resource Justification: Budget approval process completed June 29, 2019
 - Program Effectiveness: See SWMP Sections 2.0 - 8.0.
 - Resource Allocation Variation: None
 - Success Determination: See SWMP Sections 2.0 - 8.0.
 - Staff: 0.35 FTEs

Table 1.4.1: FY22 Budget Totals	
Fiscal Year	Budget
Operating	\$126,500
Capital	-
Total Budget:	\$126,500

- Fiscal Year 2023 Approved Budget (July 1, 2022 - June 30, 2023)
 - Resource Justification: Budget approval process completed June 29, 2019
 - Program Effectiveness: See SWMP Sections 2.0 - 8.0.
 - Resource Allocation Variation: None
 - Success Determination: See SWMP Sections 2.0 - 8.0.
 - Staff: 0.35 FTEs

Table 1.4.2: FY23 Budget Totals	
Fiscal Year	Budget
Operating	\$129,000
Capital	-
Total Budget:	\$126,500

1.5 Stormwater Management Team

The MS4's Stormwater Management Team is described in Graphic 1.5.1 and the following section. A single point of contact links the organization charts.

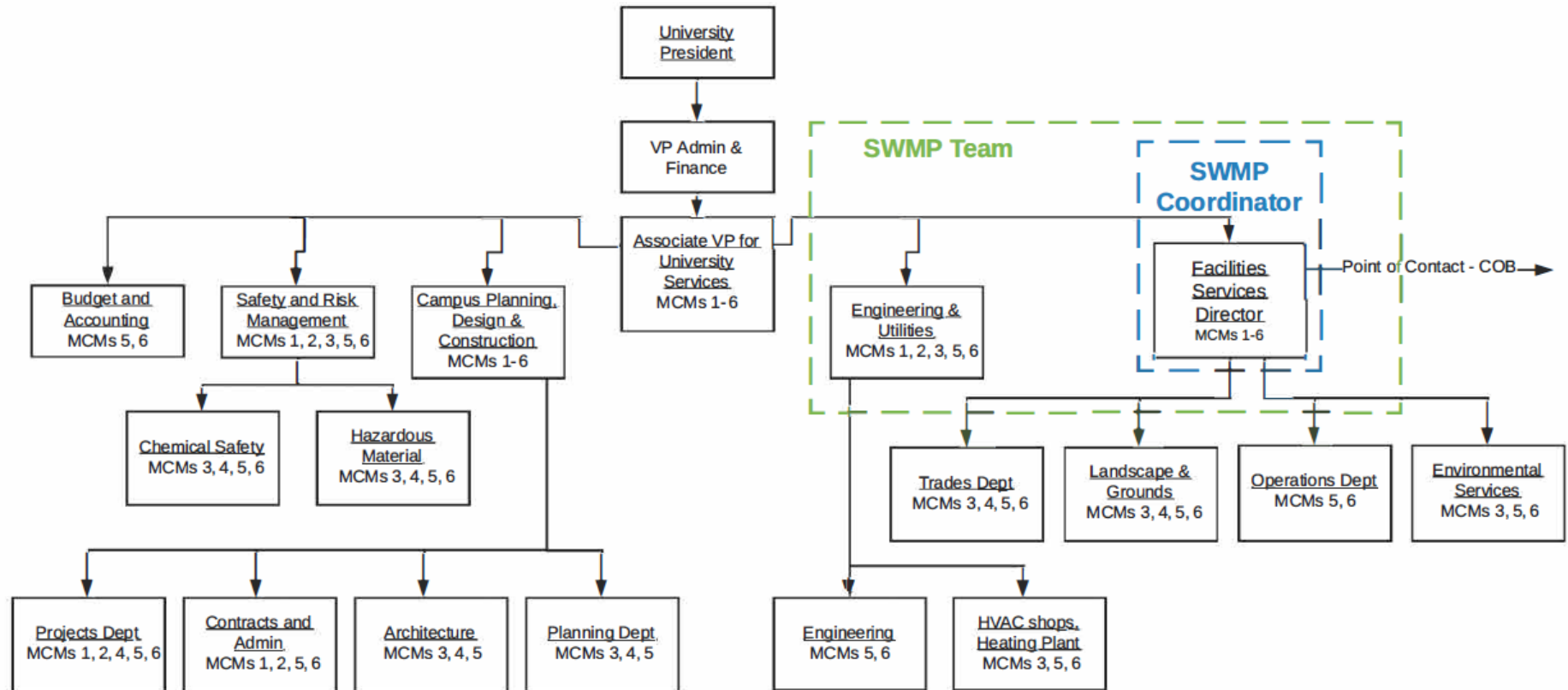
SWMP Team: Meets weekly and is comprised of the following positions:

1. Stormwater Program Manager: SWMP Coordinator as referred to in the MS4 Permit and the Enforcement Agent in Bozeman Municipal Code (BMC). Leads the SWMP Team, SWMP Subject Matter Experts, and coordination with SWMP Support Divisions. The Program Manager develops and manages the implementation of SWMP and MS4 Permit compliance activities, administers

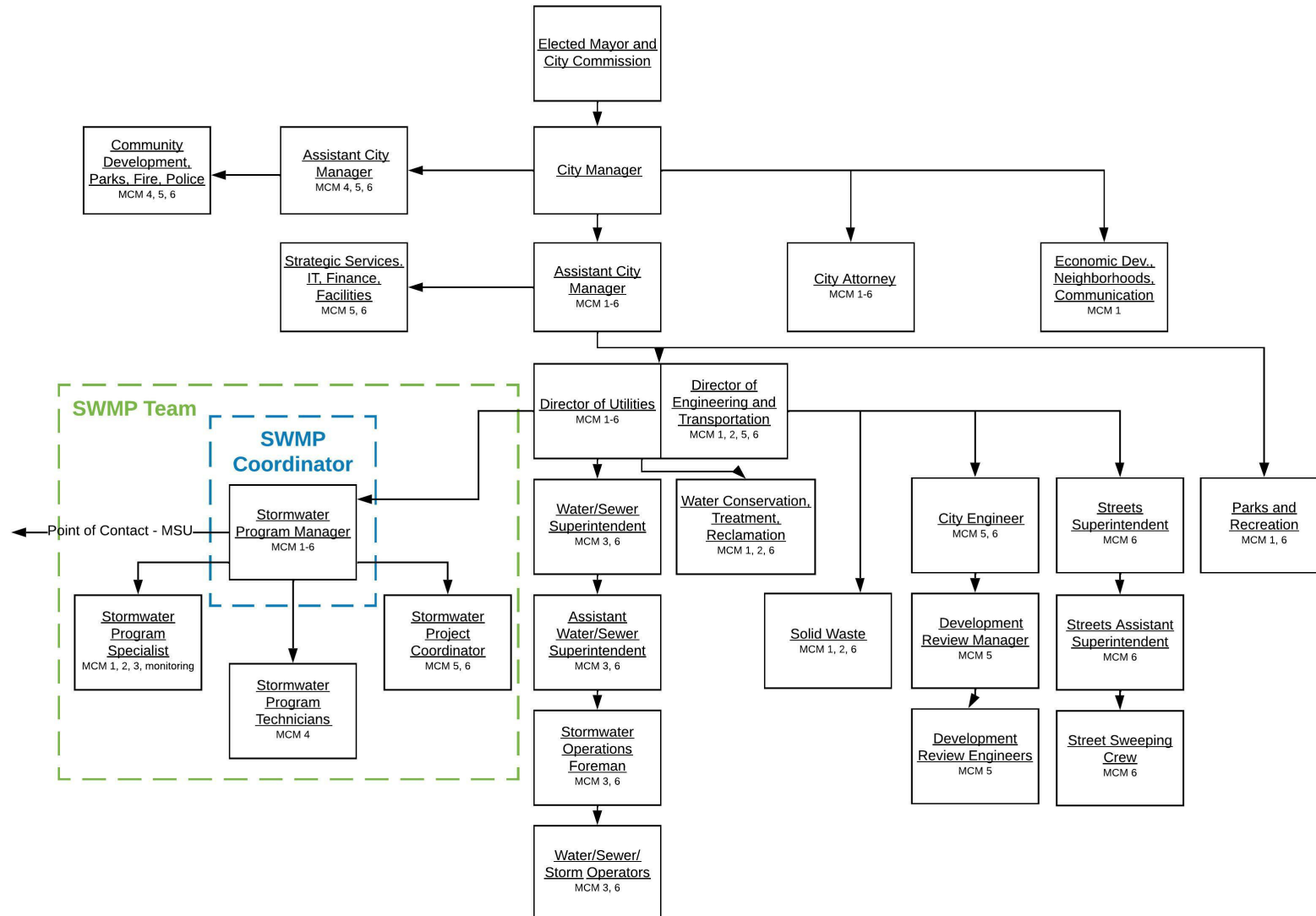
environmental compliance programs, manages personnel, prepares budgets, develops policies, coordinates infrastructure projects, and maintains the rate model. Primary permit responsibilities include:

- Program Administration (SWMP Section 1.0)
 - Capital Project Program (SWMP Section 2.0)
 - Public Education Program (SWMP Section 3.0)
 - Illicit Discharge Detection and Elimination Program (SWMP Section 4.0)
 - Construction Site Management Program (SWMP Section 5.0)
 - Post Construction Program (SWMP Section 6.0)
 - Good Housekeeping Program (SWMP Section 7.0)
 - Sampling and Evaluation Program (SWMP Section 8.0)
2. Stormwater Program Specialist: Develops and implements water quality monitoring, BMP effectiveness research, and data analysis. Primary permit responsibilities include:
- Public Education Program (SWMP Section 3.0)
 - Illicit Discharge Detection and Elimination Program (SWMP Section 4.0)
 - Good Housekeeping Program (SWMP Section 7.0)
 - Sampling and Evaluation Program (SWMP Section 8.0)
3. Stormwater Project Coordinator: Plans and manages stormwater conveyance, flood control, and treatment capital projects, implements the City's asset maintenance efforts, and regulates drainage infrastructure. Primary permit responsibilities include:
- Capital Project Program (SWMP Section 2.0)
 - Post Construction Program (SWMP Section 6.0)
 - Good Housekeeping Program (SWMP Section 7.0)
4. Two Stormwater Program Technicians: Perform permit reviews, site inspections, and reporting tasks. They assist in a wide variety of tasks. Primary permit responsibilities include:
- Construction Site Management Program (SWMP Section 5.0)

MSU Organization Chart



COB Organization Chart



The SWMP Team tracks phone call and email questions, requests, and complaints received from the public to gauge programmatic needs and workloads, including:

Table 1.5.1: Correspondence Tracking Totals			
Correspondence Type	Count		
	2021	2022	5-year Average
Resident: Flooding Inquiry or Report	15	15	10.8
Resident: Construction Inquiry or Report	3	10	12.6
Resident: Water Quality Inquiry or Report	3	1	2
Resident: Pollution Inquiry or Report	5	3	6.2
Resident: Basin Inquiry or Report	6	3	9
Resident: Outreach Inquiry or Report	1	5	4.4
Resident: Rate Model Inquiry	1	0	3.2
Professional: Post-Const. Program	30	21	42
Professional: Pollution Program	5	5	7.8
Professional: Const. Program	359	291	304.4
Professional: Project Management	38	13	64
Professional: Education Program	13	5	24.2
Professional: Division Administration	3	4	19
Professional: Water Quality Program	8	5	9.6
Professional: Service or Product Solicitation	3	6	10.8
Referral to other division	2	1	3.6
Total:	495	388	533

SWMP Subject Matter Experts (SME): Staff from these Divisions meet with the SWMP Team as necessary to discuss programmatic issues and are comprised of the following positions:

1. Engineering Division: Team that reviews and regulates new and redevelopment projects utilizing established engineering standards and Bozeman Municipal Code. The positions include the City Engineer, Development Review Manager, and a variety of staff engineers. Primary permit responsibilities include:
 - Post Construction Program (SWMP Section 6.0)
2. Operations and Maintenance: Team of five positions that operate and maintain the public storm sewer network, including the inspection, maintenance, and repair of infrastructure. This group also inspects underground pipes to identify illicit discharges and illegal connections. This team includes a Superintendent, Assistant Superintendent, Foreman, and two Operators. Primary permit responsibilities include:
 - Illicit Discharge Detection and Elimination Program (SWMP Section 4.0)
 - Good Housekeeping Program (SWMP Section 7.0)
3. Streets Division: Numerous positions that operate the City's street sweeping, spring and fall cleanups, and surface inlet grate obstruction removal and replacement activities. This team includes a Superintendent, Assistant Superintendent, and numerous Operators. Primary permit responsibilities include:
 - Good Housekeeping Program (SWMP Section 7.0)

SWMP Support Divisions: Group engaged by the SWMP Team as needs arise. Support Divisions do not typically participate in reoccurring meetings unless invited to discuss a particular topic.

1.6 Sharing Responsibility

The City and University work collaboratively on various programs, outlined further in an Memorandum Of Understanding (MOU), including:

- Participation in regular meetings.
- University payment of City stormwater fees, rate model update to occur during Q1 of each calendar year and an updated total should be in place by July 1.
- Performance tracking and reporting.
- Infrastructure project development and implementation.
- Inspection forms, training, methodologies, and program documentation sharing.
- Pollution event response and resolution, as requested.
- Stormwater treatment unit maintenance: The City measures and removes debris collected by University stormwater mechanical treatment units and incorporates totals into SWMP Section 8.0 annually, including:
 - University Field House Downstream Defender Mechanical Separation Unit
 - 11th and College Contech CDS Mechanical Separation Unit
- Water Sampling and Analysis Program: The City manages the University's portion of this program, including purchasing equipment, collecting samples/data, and analyzing results for the following:
 - Storm Event Monitoring
 - In-Stream Wet Weather Monitoring
 - Sediment Reduction Monitoring
 - Long-Term Trend Monitoring
- Post Construction Program: The City completes six high-priority stormwater facility inspections on MSU property annually, and provides completed reports.
- The City provides the University an updated SWMP by February 1 of each calendar year.

1.7 Collaborative Organizations

The MS4 collaborates with a variety of organizations, including:

- National Municipal Stormwater Alliance (NMSA): An organization formed in 2015 comprised of stormwater industry professionals that provides a unified voice for national scale policy changes, rules, issues, and initiatives.
- Montana Department of Environmental Quality (MDEQ): A state agency that administers and enforces the Montana Clean Water Act. MDEQ provides compliance training, conferences, and enforcement in cases where the MS4's resources become exhausted.
- Gallatin Local Water Quality District (GLWQD): A Gallatin County public agency that conducts water quality sampling and community education.
- Montana State Extension Water Quality: A University Extension agency that provides water quality sampling and community education.
- Montana Water Environment Association (MWEA): A Montana organization that represents water, wastewater, and stormwater professionals. MWEA is a member of the Water Environment Federation (WEF), which has over 34,000 members worldwide. WEF is working to raise knowledge regarding stormwater infrastructure, policy, and science at the national level.
- Gallatin Watershed Council (GWC): An education-based nonprofit organization that works to improve waterway health by implementing the Gallatin Watershed Restoration Plan.

1.8 Additional Regulatory Responsibilities

The following MPDES permits also fall under the purview of the MS4:

- General Permit for Stormwater Discharges Associated with Construction Activity (MTR100000): Construction projects that disturb one acre or more of land must obtain a stormwater discharge authorization from the MDEQ. The MS4 implements a Construction Management Program detailed in SWMP Section 5.0
- Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MTR000000): The MS4's Water Reclamation Facility (WRF) and Landfill obtain authorizations to discharge stormwater from their facilities. MS4 staff assists WRF and Landfill personnel with required inspections, BMP development, training, reporting, and records keeping.

1.9 Annual Report

The MS4 submits individual Annual Report Forms, an updated SWMP, and relevant documents to the MDEQ by March 1 of each year.

1.10 Public Comments

The MS4 considers and responds to all public comment related to the SWMP. To facilitate, a public comment form exists on the MS4's website and is available year round. Also, the MS4 publicly notices the SWMP after making annual updates in the Bozeman Daily Chronicle the second and third Sundays of March during each calendar year.

The MS4 has received the following comments:

Table 1.10.1: Public Comments

#	Date	Participant	Comment	MS4 Response
1	2/22/2021	Flooding Comment	Plowing on 10th Avenue & drainage of roadway unsatisfactory: The roads between 11th and 8th appear challenging to plow because of parallel parking, and are clearly not plowed enough. As a resident on 10th Avenue, I have watched numerous cars 'bottom out' and get stuck, damage the bottoms of their cars because the snow and ice accumulation in the street is too high. Additionally, the snow and ice in the street warms and drains into the low points of the resident sidewalks and driveways, consistently participating in a freeze/thaw cycle. This results in many residents constantly clearing their sidewalk only to have the street ice/snow melt and flood their sidewalks the very next day/evening. First off, ticketing residents for uncleared sidewalks is not the solution. Penalizing residents for the flooding and freezing of their sidewalks by the ice/snow in the street is not a solution. Secondly, I'd recommend more consistent plowing and better stormwater management so that water isn't kept in mini detention ponds in residents driveways and sidewalk low points.	Public Works Division Operations Manager responded after consulting with Stormwater and Streets personnel. Flooding is unavoidable due to clogged inlets and plowing is difficult due to parked cars. The City agreed to watch the area and complete work as practicable.

2	3/2/2021	Flooding Comment	The storm drain at the southeast corner of W. Babcock and S. 15th Ave. is completely clogged with frozen leaves. A neighbor and I have worked on this drain to no avail. Whoever plowed the street created a dam around it and it is really backing up on the street. Please get it flowing again. Thanks	Replied to the resident, and passed the complaint on to operations.
3	3/25/2021	Detention Facility Maintenance	My name is Johnny Dohner and I'm a landscape designer here in Bozeman. Unfortunately I have a concern regarding a property owner in the Ferguson Meadows Subdivision on the corner of Mineral Ave and Toole St. Last summer I noticed a vegetation removal effort in an engineered storm water detention area performed by (I believe to be) the property owners of the adjacent lot. This is a clearly designed storm water detention pond capturing runoff from Ferguson Ave, Mineral Ave, and Toole St. It is a part of a larger network of green infrastructure throughout the subdivision and is dedicated open space per subdivision city of Bozeman open space requirements. It contained native aspens, dogwoods, and willows and was a lovely corner in this heavily developed neighborhood. All of the existing trees and shrubs were removed, and now it is a big muddy hole, void of all vegetation and not performing to the standards it was designed for. All aesthetic and functional value have been eliminated and I'm sure there will be compaction/infiltration issues from now on due to the absence of vegetation which could also negatively effect the adjacent roadways/sidewalks. It is very unfortunate and very ugly and it should be of great concern to the city if residents are "vandalizing" green infrastructure systems. I would like a response to if either the city told these residents to do this, or if they took it upon themselves to vandalize this street corner shared by the whole neighborhood. And if so, they should be held responsible for their actions and get this street corner replanted ASAP!! Also, I believe the street trees on that corner were removed by the city due to them being young green ash trees killed by the early winter onset in 2019... it is unrelated but it adds to the overall effect of this corner's loss of aesthetic and functional value. Open space and native vegetation is a benefit not only to the community as a whole, but mitigates strain on grey infrastructure, connects wildlife habitat corridors, and helps develop the city image through green infrastructure. If you could please reach out to me on this I would very much appreciate it. I do not want to verbally confront the homeowners to find out more because that could worsen the whole situation. Again, this is about destruction and vandalism of community open space property. I will also send this same message to agenda@bozeman.net so I can attach an image taken from the Gallatin County Interactive Map that shows property boundaries, open space designation, and the location of said destruction. Thank you for your	

			consideration and I'm sorry for ranting, but I am passionate about this and I live right next to it.	
4	5/23/2022	Water Quality	Mr. Oliver, my name is Hunter, I go to Bozeman Creative Center. I am in first grade. I really care about rivers. I think out city would be better if we kept our rivers clean. I have some good ideas about how we can do this! We can use shovels and take the trash out. Then I can play in the creeks without shoes on! – Hunter Walls	Replied to resident thanking them for their appreciation for clean water and wanting to help. Extended an offer to joining the Adopt a Drain program.

Section 2.0

Capital Project Program

Graphic 2.0.1: Stormwater pipe replacement and repair



Graphic 2.0.2: Newly installed cure-in-place liner; downtown Bozeman



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2.1 Introduction

The MS4's Capital Project Program works to:

- Increase storm sewer capacity;
- Maintain the integrity of underground pipes and surface conveyances;
- Replace and/or repair failing infrastructure assets; and
- Meet water quality requirements set by the MDEQ.

SWMP Section 2.0 details the following components necessary to administer the MS4's Capital Project Program, including:

- Total Maximum Daily Load Action Plan (2.2)
- Planned Projects (2.3)
- Ongoing or Completed Projects (2.4)
- Pollutant Reduction Totals (2.5)
- Performance Measures (2.6)

2.2 Total Maximum Daily Load Action Plan

The MS4 implements the following BMPs to reduce negative impacts to local waterways:

- ✓ Stormwater Management Program implementation (SWMP Sections 1.0 - 8.0)
- ✓ Capital Improvement Plan (SWMP Section 2.0) including mechanical separation unit installation at select direct discharge outfalls that drain large urban basins and lack treatment (SWMP Sections 2.3, 2.4, and 2.5)
- ✓ Public Education Program implementation (SWMP Section 3.0), including, but not limited to: the Adopt-A-Drain Program (SWMP Section 3.4.1), Construction Training (SWMP Section 3.4.8), Lawn Care Targeted Outreach (SWMP Section 3.4.12) and the Dog Waste Campaign (SWMP Section 3.4.4)
- ✓ Construction Site Management Program implementation (SWMP Section 5.0), including the prioritization and elevated inspection rates for construction sites within the impaired watersheds (SWMP Section 5.4)
- ✓ Post-Construction Program implementation (SWMP Section 6.2), including the enforcement of water quality and flood control standards for new and redevelopment projects
- ✓ Good Housekeeping Program implementation (SWMP Section 7.0), including regular municipal storm sewer cleaning, spring/fall cleanups, and street sweeping (SWMP Sections 2.5 and 7.2), Facility Stormwater Pollution Prevention Plan execution, and Activity Stormwater Pollution Prevention Plan training
- ✓ Sampling and Evaluation Program implementation (SWMP Section 8.0), including the collection and analysis of stormwater runoff, in-stream water quality, BMP effectiveness, and long-term monitoring data

The MS4 prioritizes the following waterways based on impairment and priority:

1. Bozeman Creek, due to its total stormwater discharge points and impairments identified in the 2013 Lower Gallatin Planning Area TMDLs & Framework Water Quality Improvements Plan (TMDL), and the Waste Load Allocation, is a focal point for treatment. Active planning and design of additional treatment units is underway for implementation in FY 2024-2025. The capital projects plan includes treatment for:
 - Total Suspended Solids (TSS): Contributions from the MS4 require a 37% or 81 tons/year reduction. The TMDL does not hold the MS4 to numeric discharge limits. Instead, the TMDL

states that the MS4 will meet its Waste Load Allocation (WLA) by “adhering to the (MS4) permit requirements to minimize pollutant loads.”

- Total Nitrogen: Contributions from the MS4 require a 0% reduction. The TMDL does not hold the MS4 to numeric Total Nitrogen load limits. Instead, the TMDL states that the MS4 will meet its WLA by “adhering to the (MS4) permit requirements.”
 - E. coli: Contributions from the MS4 require a 0% reduction. The TMDL does not hold the MS4 to numeric E. coli load limits. Instead, the TMDL states that the MS4 will meet its WLA by “adhering to the (MS4) permit requirements.”
2. Mandeville Creek, due to its total stormwater discharge points and impairments identified in the TMDL, including:
 - Total Nitrogen and Total Phosphorous: Contributions from the MS4 require a 0% reduction. The TMDL does not hold the MS4 to numeric Total Nitrogen or Total Phosphorous load limits. Instead, the TMDL states that the MS4 will meet its WLA by “adhering to the (MS4) permit requirements.”
 3. The East Gallatin, due to its impairments identified in the TMDL, including:
 - Total Nitrogen and Total Phosphorous: Contributions from the MS4 require a 0% reduction. The TMDL does not hold the MS4 to numeric Total Nitrogen and Total Phosphorous load limits. Instead, the TMDL states that the MS4 will meet its WLA by “adhering to the (MS4) permit requirements.”
 4. Bridger Creek, due to its impairments identified in the TMDL, including:
 - Nitrate: Contributions from the MS4 require a 0% reduction. The TMDL does not hold the MS4 to numeric nitrate load limits. Instead, the TMDL states that the MS4 will meet its WLA by “adhering to the (MS4) permit requirements.”
 5. Other Notable Waterways: Numerous unassessed waterways exist that receive protections from the MS4’s broad programmatic efforts. These waterways include, but are not limited to, Cattail Creek, Catron Creek, Baxter Creek, Nash Spring Creek, Flat Creek, Mathew Bird Creek, Figgins Creek, and Aajker Creek.

Table 2.2.1: MS4 Waterbody TMDL Impairments

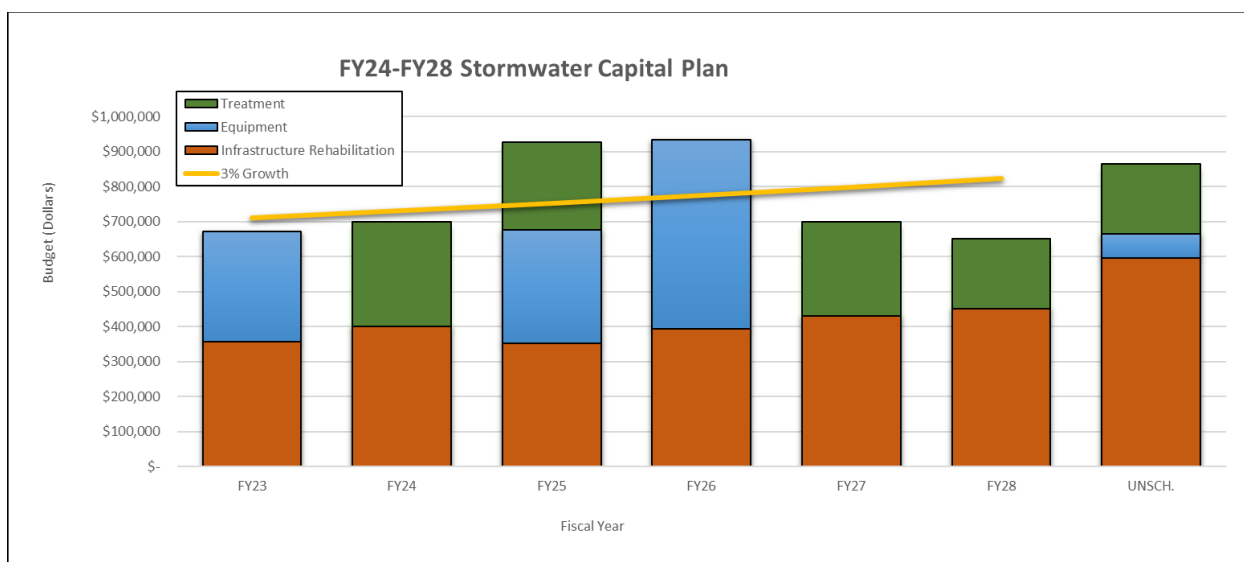
	Total Suspended Solids (TSS)	Total Nitrogen (TN)	Total Phosphorus (TP)	E. coli	Chlorophyll-a	Alteration in stream-side or littoral vegetative cover
Bozeman Creek	X	X		X	X	X
Mandeville Creek		X	X			
Bridger Creek		X			X	
East Gallatin River		X	X			

Capital Improvement Planning

Each year, the MS4 prepares a five-year Capital Improvement Plan (CIP) that outlines infrastructure projects and other capital needs. As a critical component of the TMDL Action Plan, projects that address water quality are inherent in capital project planning and the following identifies the measures and BMP's planned to address TMDL MS4-related requirements.

The CIP process is open for public comment, approved by the City Commission, and incorporated into the applicable fiscal year's budget. The MS4 accounts for the following when preparing CIPs:

- Urban waterway/watershed priority
- Development and land use
- Infrastructure condition analysis
- Programmatic goals
- Available budget
- Project coordination with other stakeholders and utilities



Graphic 2.2.2 – Capital Plan Budget Projection FY24-FY28

2.3 Planned Capital Improvement Projects

Prioritization of untreated sub-basins within the Bozeman Creek watershed has been incorporated into Fiscal Year 2023-2024 planning (see Graphic 2.3.1). In addition, the MS4 plans to complete the following stormwater capital improvements in the next five years to address TMDL Action Plan requirements:

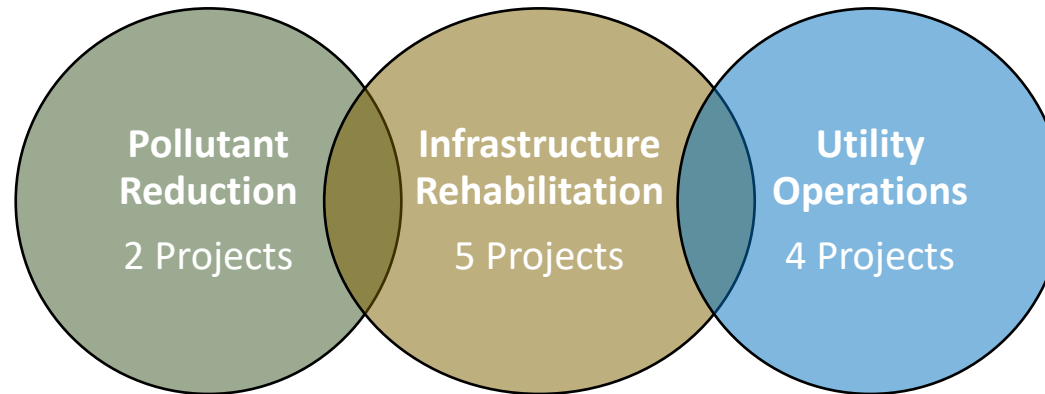


Table 2.3.1: Planned and completed pollutant reduction projects

FY24 FY28 Stormwater Capital Improvement Plan										
	PROJECT	TYPE	DETAIL	CIP #	FY23	FY24	FY25	FY26	FY27	FY28
1	River Health Project - Mechanical Treatment Units (Phase 4)	Design and Construction	Water Quality (50% Treatment)	STRH02	-	\$ 300,000	\$ 250,000	-	-	-
2	Deferred Maintenance Project - Historic Pipe Replacement	Design and Construction	Conveyance Rehabilitation	STDM04	\$ 310,000	\$ 300,000	\$ 300,000	\$ 339,000	\$ 373,000	\$ 391,650
3	Deferred Maintenance Project - Unplanned Infrastructure Rehab	Design and Construction	Unplanned Projects	STDM05	\$ 47,250	\$ 49,600	\$ 52,000	\$ 54,600	\$ 57,300	\$ 60,200
4	Deferred Maintenance Project - Downtown Stormwater Capacity	Design and Construction	Infiltration, pipe upsized or bypass	STDM19	-	-	-	-	\$ 150,000	\$ 200,000
5	Utility Operation Project - Rate Model Study	Analysis & Report	Match rates from facility plan update	STDM18	-	\$ 50,000	-	-	-	-
6	Utility Operation Project - Stormwater Facility Plan Phase 2	Analysis & Report	Conveyance, regional connections, CIP	STDM17	\$ 175,000	-	-	-	-	-
7	Utility Operation Project - Pipe Inspection Van (#01)	Equipment	Replace 2001 Ford E350 TV Van	STOP04	-	-	\$ 325,000	-	-	-
9	Utility Operation Project - Vacuum and Jetting Truck (#01)	Equipment	Replace 2015 Vactor	STOP08	-	-	-	\$ 540,000	-	-
Total:					\$ 532,250	\$ 699,600	\$ 927,000	\$ 933,600	\$ 580,300	\$ 651,850
Y2Y % increase						31%	33%	1%	38%	12%

1. Pollution Reduction: Mechanical Stormwater Treatment (Phase 4)

- ID: STRH02 (Phase 4)
- Description: Installation of two stormwater treatment units near the intersections of N. Rouse Ave. / E. Peach St. and N. Rouse Ave. / E. Tamarack St.
- Alternatives Considered: Staff has not identified an alternative treatment approach with comparable maintenance ease, construction footprint, or pollutant removal efficiency.
- Advantages of Approval: The units will collect over 27-tons of pollutants annually from 193-acres. These projects address Bozeman Creek watershed Waste Load Allocation (TSS) and are critical for the TMDL Action Plan.
- Additional Operating Cost in the Future: Staff will complete maintenance semi-annually using existing vacuuming equipment and drying beds. Debris will eventually be disposed at the landfill.

2. Infrastructure Rehabilitation: Historic Pipe Replacement Program

- ID: STDM04
- Description: Rehabilitation of 100-year-old vitrified clay storm sewer, which has exceeded its life cycle, does not meet modern capacity standards, and includes many structural failures.
- Alternatives Considered: The infrastructure is a critical component of the City's storm sewer network. Delay will increase chances of collapse, road failure, and flooding.
- Advantages of Approval: This project is preventative and targets pipes prone to failure and surcharging. Rehabilitation will reduce risks by addressing structural and capacity deficiencies.
- Additional Operating Cost in the Future: Stormwater Personnel will complete maintenance on a reoccurring schedule, including flushing, vacuuming, and inspection.

3. Infrastructure Rehabilitation: Annual Unplanned Pipe Rehabilitation and Drainage Projects

- ID: STDM05
- Description: An annual program that provides funding for the design and construction of unplanned pipe, drainage, and treatment projects.
- Alternatives Considered: Use of internal crews and equipment to complete work. Staff determined the workload required would reduce capacity applied towards critical services.
- Advantages of Approval: Unplanned funds allows staff to be responsive to essential needs, increasing customer service, improving system efficiency, and reducing City liability.
- Additional Operating Cost in the Future: Stormwater personnel will complete the maintenance of rehabilitated, repaired, or new infrastructure concurrently with existing public assets.

4. Infrastructure Rehabilitation: Downtown Stormwater Capacity

- ID: STDM19
- Description: Results of the stormwater facility plan in FY23 will recommend ways to increase capacity and improve water quality in the downtown area.
- Alternatives Considered: To be determined by facility plan update and future decisions on level of service
- Advantages of Approval: Better level of service, public safety and water quality depending on which technology is utilized. Infiltration-based BMPs will be targeted based on available space within the Bozeman Creek Watershed. These projects will treat a relatively small area for water quality compared to the mechanical separator projects, but will also help water quantity.

- Additional Operating Cost in the Future: Stormwater personnel will complete the maintenance of rehabilitated, repaired, or new infrastructure concurrently with existing public assets.

5. Utility Operations: Rate Model Study

- ID: STDM18
- Description: Rate model study will follow Facilities Plan completion. Any gap between level of service and other goals from current status will be covered by future rates
- Alternatives Considered: Rates fund the Stormwater Division. Delaying the funding of capital projects will increase of infrastructure failure and limit the ability of operations to perform work
- Advantages of Approval: Adequate rates will allow capital plan to keep up with growth, improve water quality, public safety and maintain compliance with permits
- Additional Operating Cost in the Future: This project will fund the division

6. Utility Operations: Stormwater Facility Plan Phase 2

- ID: STDM17
- Description: The first phase of the facility plan is under way for 2022. Results will better inform the scope of the second phase and complete a number of recommendations based on modeling and comparison to strategies and technologies used in other cities.
- Alternatives Considered: Status quo requires more staff input and less informed decision making
- Advantages of Approval: Direction for future capital projects, better model to determine capacity, and other results will lead to more efficient allocation of resources
- Additional Operating Cost in the Future: Costs are not directly tied to the results of the plan. Costs for plan recommendations will be addressed individually

7. Utility Operations: Street Sweeper

- ID: STOP05
- Description: Replacement of a mechanical street sweeper leased in 2015.
- Alternatives Considered: Use the existing street sweeper, potentially leading to increased downtown and maintenance. Industry guidance recommends replacing municipal sweepers every five years.
- Advantages of Approval: Street sweeping protects air and water quality and maintains permit standing for the MS4. The removal of sand reduces slip and skid hazards for motorists, bicyclists and pedestrians.
- Additional Operating Cost in the Future: The stormwater division will fund operation and maintenance costs. The sweeper supplements the cleaning programs led by the streets division.

8. Utility Operations: Administrative Vehicle #1

- ID: STOP03
- Description: Acquisition of addition administrative vehicle with growing division staff numbers.
- Alternatives Considered: The stormwater division as five administrative employees who share three vehicles. Logistics have become a hindrance to maintaining inspection and other travel needs.

- Advantages of Approval: Provides for a reliable and safe vehicle for staff to complete daily activities, such as pollution mitigation, equipment transport, flood response, and field inspections.
- Additional Operating Cost in the Future: The stormwater division will fund operation and maintenance costs.

9. Utility Operations: Pipe Inspection Van

- ID: STOP04
- Description: Replacement of the pipe inspection van purchased in 2001 and refurbished in 2015. The vehicle's chassis is heavily worn and the onboard computer system is aged.
- Alternatives Considered: Continue to use the existing vehicle, which could result in downtime and increasingly costly maintenance.
- Advantages of Approval: The vehicle facilitates the City's pipe inspection program, which identifies maintenance needs, locates structural deficiencies, and detects illegal connections.
- Additional Operating Cost in the Future: The Stormwater Division will fund operation and maintenance costs.

10. Utility Operations: Service Vehicle

- ID: STOP07
- Description: Replacement of staff's 2016 Ford F350 service vehicle.
- Alternatives Considered: Stormwater division has three operations employees that share one service vehicle. Delaying replacement would result in increased down time and maintenance costs.
- Advantages of Approval: Provides for a reliable and safe vehicle for staff to complete daily activities, such as infrastructure inspection and project management
- Additional Operating Cost in the Future: The stormwater division will fund operation and maintenance costs.

11. Utility Operations: Vacuum and Jetting Truck (#01)

- ID: STOP08
- Description: Replacement of the Division's vacuum and jetting truck purchased in 2015.
- Alternatives Considered: Continue using the existing vehicle, which will result in downtime and increasingly costly maintenance.
- Advantages of Approval: The vehicle facilitates infrastructure maintenance, pollution event cleanup, and vacuum excavation for pipe repairs.
- Additional Operating Cost in the Future: The Stormwater Division will fund operation and maintenance costs.

2.4 Ongoing and/or Completed Projects

The MS4 has or is in the process of completing the following projects:

1. Utility Operation Program: Stormwater Facilities Plan Update

- Purpose: Update the City's 2008 Stormwater Facilities Plan to provide modern policy, programmatic, and infrastructure recommendations for future implementation.
- Type: Planning document
- Treatment Efficiency: n/a
- Treatment Area: n/a

- Discharge Location: n/a
- Date of Completion: Mid-2022
- Co-Benefit(s): n/a

2. Pipe Rehabilitation Program: Downtown Trunk Line Rehabilitation

- Purpose: Rehabilitate a historical storm sewer trunk line (See Graphic 2.0.2, section cover)
- Type: CIPP liner 1,233'
- Treatment Efficiency: n/a
- Treatment Area: n/a
- Discharge Location: Bozeman Creek
- Date of Completion: Summer 2022
- Co-Benefit(s): Improved public safety

3. Pipe Rehabilitation Program: Manley Ditch Rehabilitation

- Purpose: Rehabilitate a historical irrigation drainage ditch and convey drainage from a 58-acre urban area to the Cherry Creek Fishing Access property.
- Type: Ditch rehabilitation, bio-retention treatment areas, and flood control weirs
- Treatment Efficiency: n/a
- Treatment Area: n/a
- Discharge Location: Cherry Creek
- Date of Completion: Ongoing; 2023
- Co-Benefit(s): Improved public safety, enhanced water quality

4. Pipe Rehabilitation Program: Pipe Lining (Cleveland and Tracy)

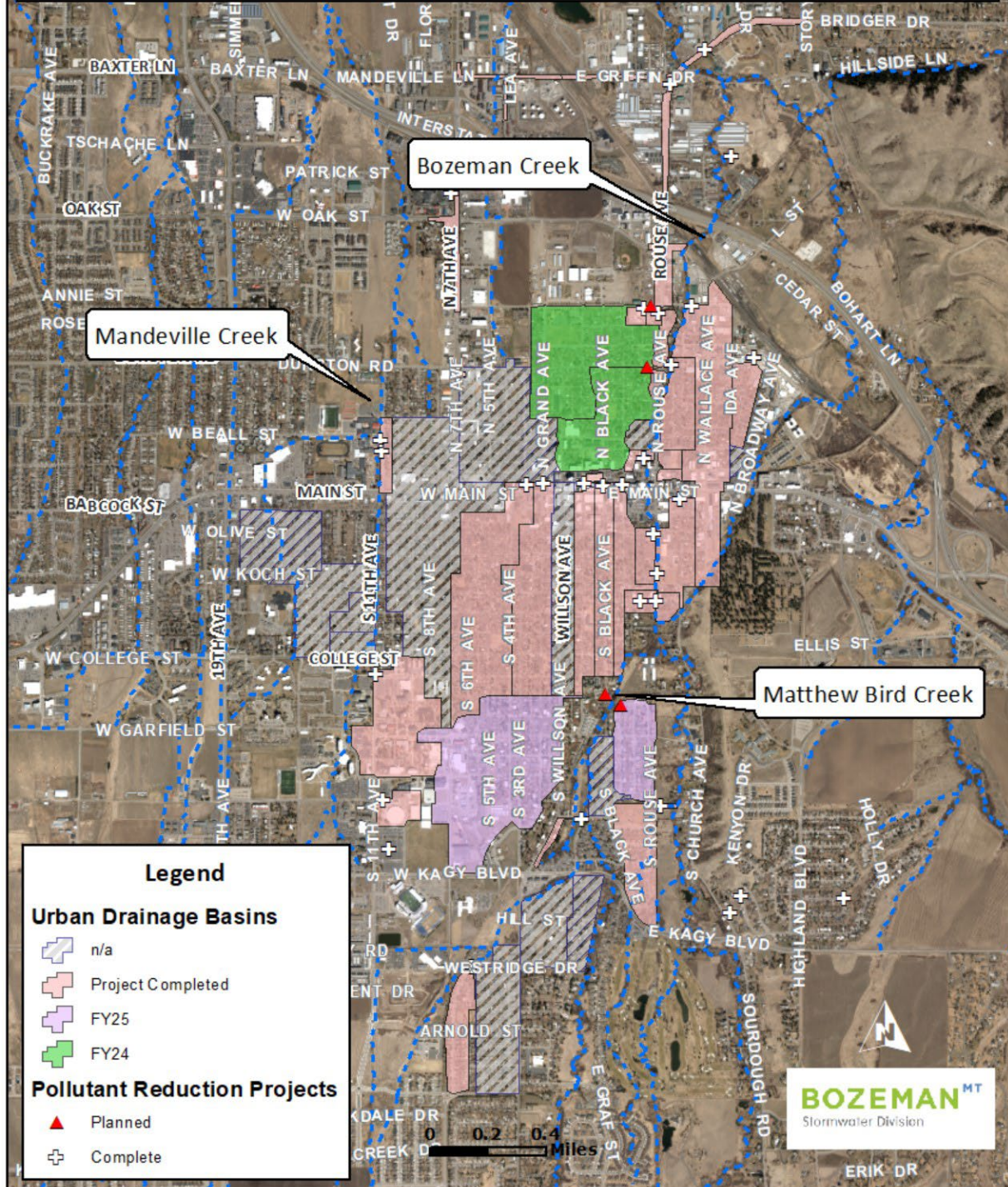
- Purpose: Critical Pipe Replacement
- Type: 18" HDPE
- Expected Treatment Efficiency: n/a
- Treatment Area: 20'
- Discharge Location: Matthew Bird Creek
- Date of Completion: Ongoing; completion 2023
- Co-Benefits: n/a

The MS4 targets and reduces discharge to impaired waterbodies via implementation of BMPs and through additional TMDL-related monitoring, but is not limited to impaired waterbodies without an approved TMDL. The maps below detail present and future locations of treatment units and pipe rehabilitation locations through FY25. Section 2.5 details the BMPs used to target and reduce discharges to impaired waterbodies, and quantifies reduction totals for treatment units by waterbody.

Pollutant Reduction Program

City of Bozeman Stormwater Division

Updated: January 25, 2023



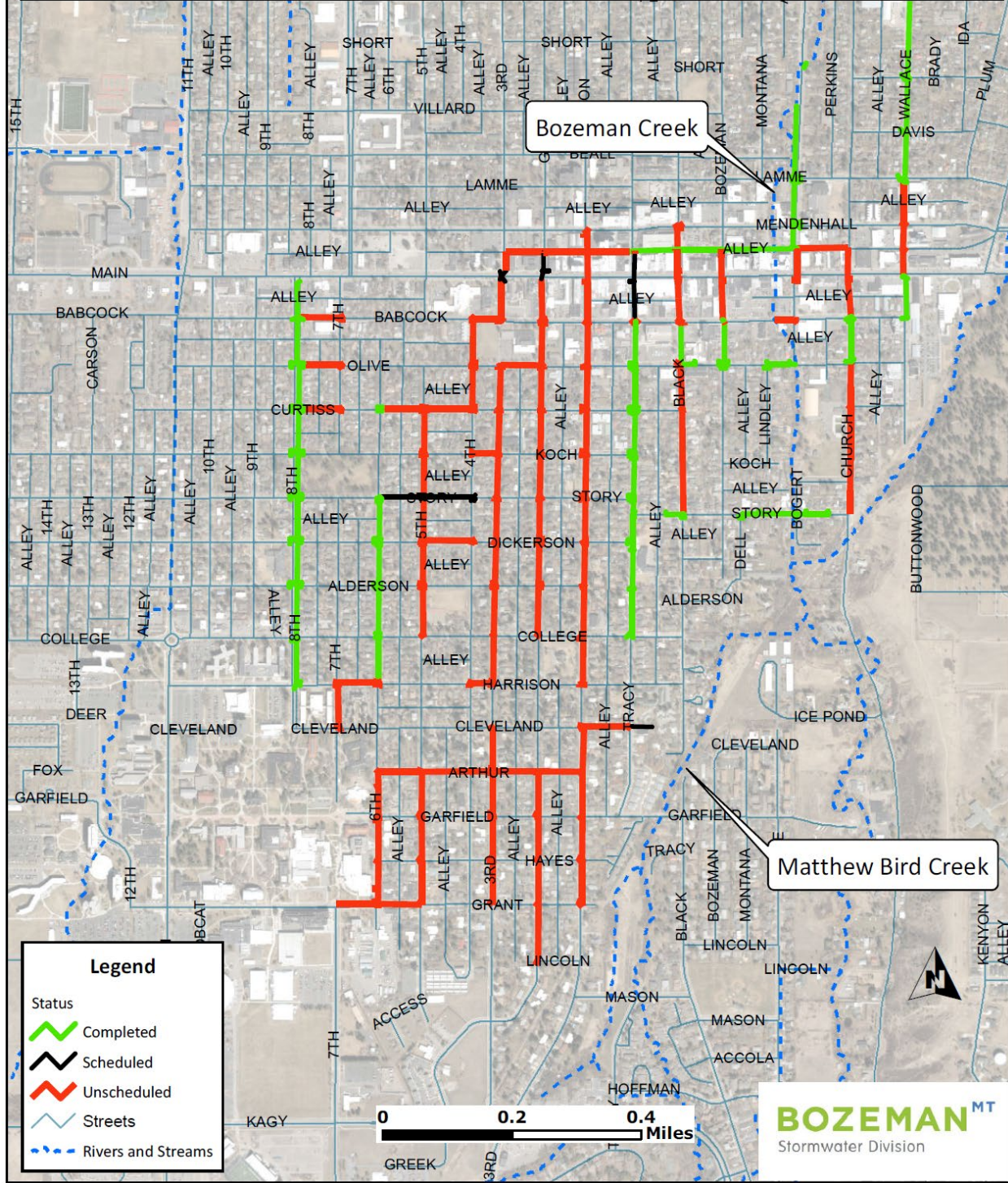
This map is intended for planning purposes only.

Graphic 2.4.1: Planned and completed pollutant reduction projects

Pipe Rehabilitation Program

City of Bozeman Stormwater Division

Updated: November 18, 2022



Graphic 2.4.2: Planned and completed pollutant reduction projects

2.5 Pollutant Reduction Totals

Based on the TMDL, the WLA and the Action Plan, goals for pollution reduction focus on total suspended solids (TSS) reduction, primarily through installation of mechanical separators, either retrofitted into existing storm systems, or specified during road reconstruction efforts. The MS4 tracks pollutant reduction totals using a variety of data tracking mechanisms:

- Total Suspended Solids
 - Treatment Unit Maintenance: The MS4 calculates tonnage totals by calculating debris volume within each unit before cleaning and converts the volume to tons by using an assumed sand weight ratio of .056 tons = 1 cubic foot of sand.

Table 2.5.1: Treatment Unit Maintenance Pollution Reduction Totals

Watershed	2020	2021	2022	2023	2024
Bozeman Creek	41 Tons	50 Tons	43 Tons	-	-
Mandeville Creek	8 Tons	6 Tons	6 Tons	-	-
East Gallatin River	6 Tons	7 Tons	7 Tons	-	-
Total:	55 Tons	65 Tons	56 Tons	-	-

Table 2.5.2: 2022 Treatment Unit Totals by Location

Location	Type	Acres	Tons	Tons/Acre	Comment
Bozeman Creek Drainage					
Main and N. 3rd	Mech. Sep.	93	3.85	0.04	50% treated
Main and N. Grand	Mech. Sep.	58	2.85	0.05	50% treated
Main and N. Tracy	Mech. Sep.	32	4.19	0.13	50% treated
City Shops 1	Mech. Sep.	1	0.84	0.84	50% treated
N. Wallace and E. Tamarack	Mech. Sep.	81	5.15	0.06	50% treated
S. Rouse and E. Lincoln	Mech. Sep.	32	2.11	0.07	50% treated
S. Rouse and E. Olive	Mech. Sep.	9	1.44	0.16	50% treated
Perkins and E. Peach	Mech. Sep.	23	2.90	0.13	50% treated
Main and N. Bozeman	Mech. Sep.	25	4.19	0.17	50% treated
Main and N. Black	Mech. Sep.	28	4.81	0.17	50% treated
Main and S. Church	Mech. Sep.	26	2.10	0.08	50% treated
Mason and Tracy	Infiltration	2	0.26	0.13	100% treated
N. Rouse and E. Mendenhall	Mech. Sep.	3	0.27	0.09	50% treated
N. Rouse and E. Lamme (E)	Mech. Sep.	3	0.04	0.01	50% treated
N. Rouse and E. Lamme (W)	Mech. Sep.	6	0.04	0.01	50% treated
N. Rouse and E. Peach	Mech. Sep.	3	1.27	0.42	50% treated
N. Rouse and E. Tamarack	Mech. Sep.	9	0.11	0.01	50% treated
N. Rouse and E. Birch	Mech. Sep.	9	1.35	0.15	50% treated
Westridge	Mech. Sep.	23	2.86	0.12	50% treated
City Shops 2	Infiltration	1	1.69	1.69	100% treated
Parking Garage Alley	Mech. Sep.	1	0.40	0.40	50% treated
Total:		468 acres	42.72 tons	0.09 tons/ac	

Mandeville Creek Drainage					
N. 11th and W. Lamme	Mech. Sep.	7	1.00	0.14	50% treated
University Field House	Mech. Sep.	6	0.56	0.09	50% treated
College and 11th	Mech. Sep.	58	4.78	0.08	50% treated
Total:		71 acres	6.34 tons	0.09 tons/ac	
East Gallatin River Drainage					
Bridger Center Dr (MDT)	Mech. Sep.	12	0.77	0.06	50% treated
Griffin Dr (MDT)	Mech. Sep.	14	2.64	0.19	50% treated
Manley and Gallatin Park	Mech. Sep.	3	0.24	0.08	50% treated
Plum and Avocado	Infiltration	14	1.78	0.13	100% treated
Griffin 7th	Mech. Sep.	4	0.36	0.09	
Total:		47 acres	5.79 tons	0.12 tons/ac	

- Storm Sewer Maintenance: The MS4 calculates tonnage totals by calculating the depth of debris vacuumed out of manholes and inlets before cleaning. The MS4 multiplies the area of each assets sump by an assumed 1/2 full depth measurement, multiplies the volume by the total assets maintained for that year, and converts the volume to tons by using an assumed sand weight ratio of .056 tons = 1 cubic foot.

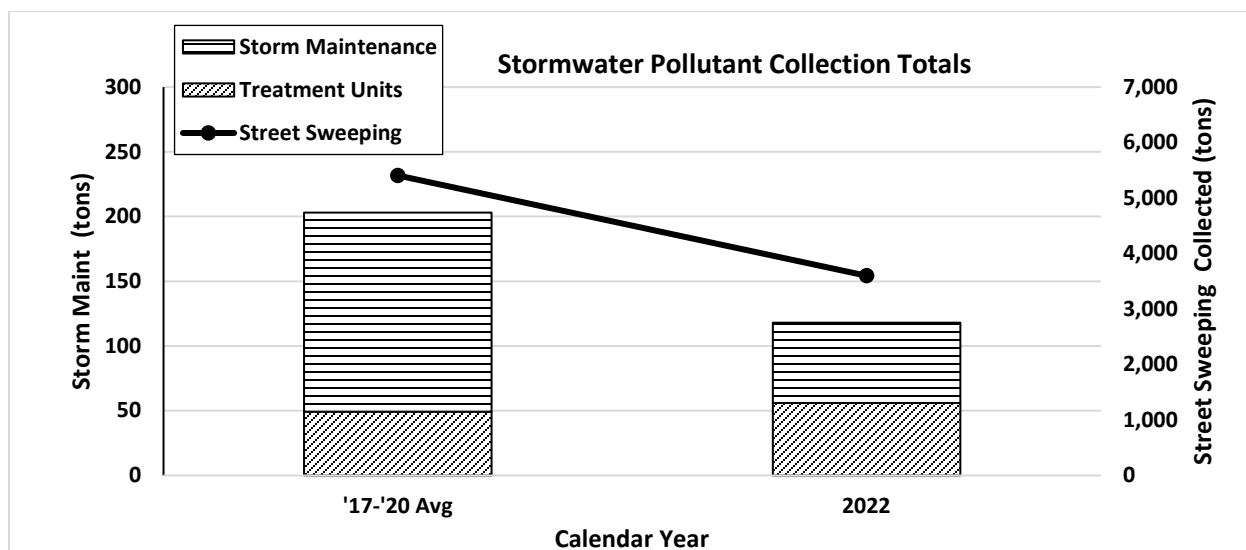
Table 2.5.3: Storm Sewer Maintenance Pollution Reduction Totals					
Entity	2020	2021	2022	2023	2024
City of Bozeman	131 tons	130 tons	118 tons	-	-
Montana State University	38 tons	48 tons	57 tons	-	-
Total:	169 tons	178 tons	175 tons	-	-

- Street Sweeping: The Streets Division tracks actual tons of sweepings, leaves, branches, and other debris. Trucks are weighed as they haul the material away.

Table 2.5.4: Street Sweeping Pollution Reduction Totals					
Entity	2020	2021	2022	2023	2024
City of Bozeman	5,127 tons	3,337 tons	2,672 tons	-	-
Montana State University	195 tons	195 tons	205 tons	-	-
Total:	5,322 tons	3,532 tons	2,877 tons	-	-

Currently, the Stormwater Division tracks tons of debris removed from the Bozeman Creek Watershed on a year-to-year basis. Variations in removal rates and yearly totals are affected by numerous factors. The efficacy of treatment units (mechanical separators) vary depending on precipitation patterns, traction sand application, timing of street sweeping and other factors.

In planning for future expenditures, we have planned years with no water quality treatment projects which allow the city to invest in updated pneumatic vacuums and sewer monitoring equipment. These off years also allow time to determine effectiveness of recently installed BMPs and determine location and design new mechanical separators in the Bozeman Creek watershed. Prior to the establishment of WLA, little or no quantification of sediment reduction possibilities occurred.



Graphic 2.5.5: Pollutant Reduction Totals Chart

2.6 Performance Measures

The MS4 utilizes performance measures to evaluate programmatic strategies with the goal of optimizing limited resources, increasing efficiencies, and balancing annual workloads.

1. Stormwater Report Card: Final Grade generated by the MS4 that provides a consistent and communicable method for tracking stream health improvement and permit compliance risk. The MS4's target level of service is to facilitate an upward trend annually, which is calculated using the methods described in SWMP Section 8.0. One portion of the 2022 letter grade is awaiting lab results. The most likely score is reported above and will be updated when final results are produced.

Table 2.6.1: Stormwater Report Card Score

Calendar Year	Score (%)	Score (Grade)
2018	61%	D
2019	54%	F
2020	65%	D
2021	63%	D
2022	60%	D

2. Community Safety and Urban Flood Risk: Tracking mechanism utilized by the MS4 that provides a consistent and communicable method for tracking community safety and urban flood risk. The MS4's target level of service is to have zero insurance claims filed annually as a result of public storm sewer deficiencies. There have been no flood-related claims between 2018 and 2022.

The MS4 maintains the following performance metrics to track Capital Project Program progress and identify future needs:

1. Pollutant Reduction Program: Comply with the MS4's stormwater permit and improve water quality by preventing the discharge of 81 tons per year of TSS into the Bozeman Creek watershed.

- Benefit: Reduced permit noncompliance risk, improved public safety, and a healthier environment.
- Driving Policy: Bronze Level of Service
- Risk: Permit requirements subject to change

Table 2.6.2: Pollutant Reduction Program Performance

Type	2020	2021	2022	2023	2024
TSS removed (% of 81 tons)	51%	61%	53%	-	-

2. Pipe Rehabilitation Program: Replace 13.9 miles of structurally deficient and undersized historical storm sewer infrastructure throughout the downtown core.

- Benefit: Reduced urban flooding and improved public safety
- Driving Policy: Bronze Level of Service
- Risk: Increasing construction costs

Table 2.6.3: Pipe Rehabilitation Program Performance

Type	Prior to 2021	2021	2022	2023	2024
Miles completed (total)	4.5	4.5	5.2	-	-

3. Utility Operation Program: Maintain 20% of City-owned storm sewer assets annually (excludes MSU). Totals include inlet maintenance, manhole maintenance, pipe maintenance, and pipe inspection.

- Benefit: Reduced urban flooding, extended infrastructure lifecycles, and improved environmental health.
- Driving Policy: Bronze Level of Service
- Risk: Rapid Growth changes the total required to be maintained. Less frequent maintenance could have impacts to water quality or level of service.

Table 2.6.4: Utility Operation Program Performance

Type	2018	2019	2020	2021	2022
Utility Operation	21%	17%	19%	18%	11%

Section 3.0

Public Education Program



Graphic 3.0.1: Construction field academy



Graphic 3.0.2: Dog waste station with educational signage

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3.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit through the education of the public by:

- Passively engaging residents through the consistent supply of educational information; and
- Actively engaging residents, providing them tools to take direct action.

SWMP Section 3.0 details the following components necessary to administer the MS4's Public Education Program, including:

- Education Protocol (3.2)
- Key Target Audiences (3.3)
- Ongoing Initiatives (3.4)
- Future and Deferred Opportunities (3.5)

3.2 Education Protocol

The MS4 educates audiences on stormwater-related issues to reduce the public's contribution of pollutants to waterbodies using the following strategies:

1. **Passive Engagement (Education):** Creation and distribution of educational messages, targeting pollutant-generating activities and behaviors distributed via the following platforms:
 - Website
 - Utility bill inserts
 - Social media
 - Brochures
 - Educational signage
 - Vehicle wraps
 - Surveys
2. **Active Engagement (Involvement and Enforcement):** Customized interpersonal interactions with various audiences, targeting pollutant-generating activities and behaviors distributed via the following activities:
 - Presentations/Meetings
 - Trainings
 - Tours
 - Activities
 - Clean-up Events
 - Penalties

3.3 Key Target Audiences

The MS4 targets key audiences since they conduct activities that result in stormwater pollution, including:

Table 3.3.1: Key Target Audiences					
Target Audience	Pollutant(s)	Activity	Rationale	Engagement	Initiatives
Residents	Nutrients, E. coli, TSS	Yard Maintenance	SWMP Sec. 8.9	Passive/Active	SWMP Sec. 3.4
Construction Industry	TSS	Construction	SWMP Sec. 5.6	Passive/Active	SWMP Sec. 3.4
Youth/MSU Students	Nutrients, E. coli, TSS	Education and class projects	Paradigm shift, trickle up impact	Active	SWMP Sec. 3.4
HOAs - Home Owner Associations	Nutrients, E. coli, TSS	Facility Maintenance	SWMP Sec. 6.8	Passive/Active	SWMP Sec. 3.4
Carpet Cleaning Firms	Wash Waste	Dumping	SWMP Sec. 4.4	Active	SWMP Sec. 3.5
Pet Owners	E.coli	Dog waste	SWMP Sec. 8.2	Active/Passive	SWMP Sec. 3.4

3.4 Ongoing Initiatives

The MS4 completes initiatives to engage, educate, and promote sustainable behavior of its key target audiences. Ongoing initiatives include:

1. Adopt-a-Drain: A program that actively engages watershed champions, and provides a tool to make a measurable difference in their neighborhoods by periodically cleaning debris from adopted storm sewer inlets. The program also passively engages residents by creating an environment where stormwater-related issues can be discussed and acted upon at a neighborhood level, rather than the City acting as the sole information provider.
 - Key Audience: Residents
 - Strategy: Active and Passive Engagement
 - Treatment Area: Citywide
 - Distribution Channels: Recruitment, training, troubleshooting, and engagement
 - Performance Measure: Total weight of debris collected annually

Table 3.4.1: Adopt a Storm Drain Program Summary

Year	Task	Task Outcome	Performance Measure	Notes
2019	Implement pilot program	Complete	773 lbs.	Time intensive but effective program, 11 Residents cared for 21 inlets.
2020	Implement program, retain majority of the recruited residents, explore expansion	Complete	1,362 lbs.	Covid-19 affected ability to engage residents, many participants started strong but tapered in their efforts mid-year, 14 residents cared for 30 inlets.
2021	Maintain online portal, retain majority of the recruited residents, develop expansion plan	Complete	90 lbs.	Online registration and debris collection portal resulted in a decrease of debris being reported. Increase staff engagement with participants in 2022.
2022	Maintain online portal, retain majority of the recruited residents, develop expansion plan	Complete	UNK	Residents are not reporting debris totals on the online portal. Increase advertising and switch to in-person pick-up in 2023.
2023	Maintain online portal, retain and recruit new members, implement in-person debris pick-ups.	-	-	-

2. Educational Stormwater Video: Seven-minute video that describes the MS4's Program, the context for why stormwater is important, and ways residents/property owners can make a difference. Residents view the video on the City's website.
 - Key Audience: Residents
 - Strategy: Passive Engagement
 - Treatment Area: Citywide
 - Distribution Channels: MS4 website and email signature attachment
 - Performance Measure: Maintain video on website and use in Staff awareness training.

Table 3.4.2: Educational Stormwater Video Summary

Year	Task	Task Outcome	Performance Measure	Notes
2017	Maintain video	Complete	179 Views	12 hours watch time, 4:02 average duration
2018	Maintain video	Complete	502 Views	31 hours watch time, 3:42 average view duration
2019	Maintain video, add to City Channel	Not Complete	214 Views	14.1 hours watch time, 3:57 average view duration. Video not added to City channel.
2020	Maintain video, add to City Channel, promote using Facebook	Not Complete	167 Views	Moved video to different viewing service in September, shifted training platform that no longer uses YouTube and results in views. Video not added to City channel.
2021	Maintain video, add to City Channel	Not Complete	Not Met	Video has not been added to City Channel.
2022	Maintain video on website	Complete	Met	Video is maintained on website and used for Staff awareness trainings.
2023	Maintain video on website. Use video for Staff awareness training.	-	-	-

3. Dog Waste Campaign: Campaign devoted to educating residents about the importance of dog waste collection and disposal. The campaign includes the deployment and maintenance of educational signage and dog waste stations in numerous parks and trail corridors.

- Key Audience: Residents
- Strategy: Passive and Active Engagement
- Treatment Area: Citywide
- Distribution Channels: Strategic signage and waste stations placed in high use areas.
- Performance Measure: Dog waste stations are maintained regularly by City crews, City contractors, and private contractors. The total number of stations in publicly accessible parks and open spaces is tracked annually.

Table 3.4.3: Dog Waste Campaign Summary

Year	Task	Task Outcome	Performance Measure	Notes
2022	Maintain Stations	Complete	192 stations	Includes all publicly accessible stations
2023				
2024				
2025				
2026				

4. Vehicle Decal Wraps: Educational signage installed on the MS4's Vector truck and street sweeper that visually displays the connection between urban areas and waterways.

- Key Audience: Residents
- Targeted Pollutant(s): E.coli, nutrients, oil, grease, floatables, and sediment
- Strategy: Passive Engagement
- Treatment Area: Citywide
- Distribution Channel: Vehicle use
- Performance Measure: Stormwater operator hours

Table 3.4.4: Vehicle Decal Wrap Summary

Year	Task	Task Outcome	Performance Measure	Notes
2017	Maintain decals	Complete	4,300 hours	-
2018	Maintain decals	Complete	5,400 hours	-
2019	Maintain decals	Complete	4,100 hours	Staffing shortages prevalent through 2019.
2020	Maintain decals	Complete	3,400 hours	Staffing shortages prevalent through 2020.
2021	Maintain decals	Complete	3,600 hours	Staffing shortages prevalent through 2021.
2022	Maintain decals	Complete	3,900 hours	
2023	Maintain decals	-	-	-

5. Website: Website that includes a variety of information, spanning from what stormwater is, how to report a pollution event, construction stormwater permits, rate model information, post-construction design standards, and more. Address:

www.bozeman.net/departments/utilities/stormwater

- Key Target Audience: Residents, Home Owner Associations, and Contractors
- Strategy: Passive Engagement
- Treatment Area: Citywide
- Distribution Channels: Available to the public via the internet
- Performance Measure: Total unique page views tracked by Google Analytics.

Table 3.4.5: Website Summary

Year	Task	Task Outcome	Performance Measure	Notes
2017	Maintain website	Complete	677 Views	
2018	Maintain website	Complete	1,225 Views	
2019	Maintain website	Complete	2,408 Views	Most Visitations: Homepage, Construction, and Contact Us
2020	Maintain website, update periodically	Complete	4,700 Views	Most Visitations: Homepage, Construction, and Contact Us
2021	Maintain website, update periodically	Complete	5,603 Views	Most Visitations: Homepage, Construction, and Contact Us
2022	Maintain website, update periodically	Complete	5157 Views	Most Visitations: Homepage, Construction, and Contact Us
2023	Maintain an update website with 2022 Annual Summary	-	-	-

6. General Outreach: Information developed by the MS4 and applied in various settings focused on providing general stormwater information and soliciting public participation.

- Key Audience: Residents
- Strategy: Active and Passive Engagement
- Treatment Area: Citywide
- Distribution Channels: Presentations, conferences, community events, and advertisements
- Performance Measure: Total events
 - 2017: 10 (Green Drinks Event, MSU Class Presentations, GLWQD Board Presentation, (2) MSAWWA Conference Presentation, SWMBIA Home Show Booth,

Environment Summit Community Event, Water Works Art Initiative, Gallatin Watershed Sourcebook, Breaking Ground Advertisement)

- 2018: 15 (Montana DNRC Water Summit Presentation, MDEQ Stormwater Conference Presentation, MDEQ Stormwater Conference Tour, Parade of Homes Garden Tour, Gallatin College Presentation, MSU Landscape School Presentation, Stream Team Training, City Commission Emergency Ordinance Presentation, City Commission Capital and Budget Presentation, Gallatin Watershed Sourcebook Creation and Distribution, Water and Society Class Presentation, Horticulture 201 Stormwater Design Project, (2) Student-Led Campus Cleanup Events: Loose Litter and Cigarettes, Campus Cleanup Event)
- 2019: 17 (City of Bozeman Planning Board Presentation, Lives and Landscapes Article, Raccoon Facebook Post, Arbor Day Event, Mountain Outlaw Article, S. Church Traffic Calming, MSU Teacher Tour, Water School Presentation, MSU EENG 341 Class Presentation, Active Aging Week Presentation, Eagle Scout Stenciling Project, Montana Stormwater Committee Webinar, Water and Society Class Presentation, Water Hydrology Class Presentation, Hort. 201 Stormwater Design Project, Health Advancement Butt Clean-Up Day, and Campus Clean Up Event)
- 2020: 12 (CATs Project #2, CATs Project #3, Grass Clippings Mailer, City of Bozeman Climate Action Plan, MSU HORT 440 Class Project Review, Commission Budget Presentation, City Clerk Training, Water and Society Class Presentation, Water Hydrology Class Presentation, Hort 201 Stormwater Design Project, Campus Clean-Up Event, Arbor Day Plantings along Mandeville Creek)
- 2021: 3 (Gallatin Local Water Quality District Board Presentation, Gallatin Watershed Council, and University of Montana Stormwater Management Team Permeable Pavers Presentation)
- 2022: Gallatin Watershed Council Presentation and 35th Annual Bozeman Earth Day Celebration.

7. Construction Training: Trainings that educate contractors on proper selection and use of best management practices (BMPs) and permit preparation. The MS4 holds training tailored to various education levels, construction activities, and inspection procedures. Further, the MS4 maintains a Construction Program that includes permits and materials for this group (SWMP Section 5.0).

- Key Audience: Contractors and Engineers
- Strategy: Active and Passive Engagement
- Treatment Area: Citywide
- Distribution Channels: BMP Manual, annual training, and lunch and learns
- Performance Measure: Number of industry professionals trained and annual construction-site audit earned score (see SWMP Section 5.4)

Table 3.4.6: Construction Training

Year	Task	Task Outcome	Performance Measure	Notes
2018	Hold trainings	Complete	84 Trained 33% Audit Score	Five construction training held.
2019	Hold trainings	Complete	70 Trained 28% Audit Score	Three construction training held.

2020	Hold trainings	Not Complete	N/A	Scheduled classes cancelled due to Covid-19 meeting regulations.
2021	Hold trainings	Not Complete	N/A	No trainings held due to Covid-19 meeting regulations.
2022	Hold training	Complete	26 Trained 69% Audit Score	Three online construction trainings held.
2023	Hold training	-	-	-

8. Project WET Curriculum: Class exercises taught by 5th-grade teachers in Bozeman School District (BSD) classrooms, educating students on stormwater-related issues, utilizing customized, and location-specific lesson plans and activities. The City's Park's Division also uses the lesson plans for their summer camps.

- Key Audience: Residents
- Strategy: Active Engagement
- Treatment Area: Entire MS4
- Distribution Channel: Trainings for teachers who then present lessons to students
- Performance Measure: Total student participants

Table 3.4.7: Project WET Curriculum Summary

Year	Task	Task Outcome	Performance Measure	Notes
2018	Coordinate Classroom Use	Complete	526 Students	-
2019	Coordinate Classroom and Camp Use	Not Complete	0	Spent year incorporating into the BSD curriculum.
2020	Coordinate Classroom and Camp Use	Not Complete	0	Program discontinued until Covid-19 regulations lift.
2021	Contract with Montana Outdoor Science School for program implementation	Not Complete	0	Plan to implement in 2022. Scope is on agenda for City Commission approval on 1/25/2022.
2022	Contract with Montana Outdoor Science School (MOSS) for program implementation	Complete	173 Students	Six classrooms at three schools participated resulting in 173 students educated.
2023	Continue program with MOSS	-	-	-

9. MSU Classes: Classes feature a project based on water quality, LID design, or construction stormwater management. Students receive instruction, then are given an outline for a project with practical application, and produce a deliverable by the end of the semester.

- Key Audience: MSU Students and Faculty
- Strategy: Active Engagement
- Treatment Area: MSU Campus
- Distribution Channel: Instruction and Project outline. Project deliverables, reports, presentations.
- Performance Measure: Total student participants. 2022: 36 students, 2 faculty.

Table 3.4.8: MSU Classes Summary

Year	Task	Task Outcome	Performance Measure	Notes
2022	MS4 staff assist in project identification and outline	Complete	46 Students, 2 Faculty	Two classes: EENV 436, EENV 499. One involved LID design, the other involved SWPPP development
2023	-	-	-	-

Post-Construction Stormwater Program: Tailored outreach that educates HOA Boards and management representatives on the proper function and maintenance of stormwater basins. The MS4 maintains a Post-Construction Program that includes processes and materials tailored to this group further described in SWMP Section 6.0.

- Key Audience: Home Owner Associations and Property Management Companies
- Strategy: Active and Passive Engagement
- Treatment Area: Citywide
- Distribution Channels: Participation in facility tours, board meetings, annual assemblies, and development of educational information
- Performance Measure: Number of HOAs educated and inspected and the Annual post-construction audit earned score (see SWMP Section 6.4)

Table 3.4.9: Post Construction Stormwater Program Summary

Year	Task	Task Outcome	Performance Measure	Notes
2022	Educated Post-Construction Facility Owners	Complete	4 HOAs 3 Private	34 Total Facilities Inspected
2023				

10. Lawn Care Targeted Outreach: Educate residents on best practices related to lawn mowing.

- Key Audience: Residents
- Strategy: Passive Engagement
- Treatment Area: Entire MS4
- Distribution Channels: Mailer sent with a monthly utility bill.
- Performance Measure: Send mailer to all utility accounts.

Table 3.4.10: Lawn Care Targeted Outreach Summary

Year	Task	Task Outcome	Performance Measure	Notes
2020	Distribute a mailer to residents	Complete	Sent Fall 2020	First year tracking this metric.
2021	Distribute a Mailer	Not Complete	Not Met	Mailers planned for distribution in 2022
2022	Distribute Mailer	Complete	16,000 Mailers	Partnered with Water Conservation Division and mailers were delivered to 16,000 utility accounts as a bill insert.
2023	Distribute Mailer	-	-	-

11. Adopt a Rain Garden: A program that actively engages watershed champions, and provides a tool to make a measurable difference in their neighborhoods by periodically cleaning debris and maintaining vegetation in adopted rain gardens. The program also passively engages residents by creating an environment where stormwater-related issues can be discussed and acted upon at a neighborhood level, rather than the City acting as the sole information provider.

- Key Audience: Residents and businesses
- Strategy: Active and Passive Engagement
- Treatment Area: Citywide
- Distribution Channels: Recruitment, training, troubleshooting, and engagement
- Performance Measure: Adopt all rain gardens

Table 3.4.11: Adopt a Rain Garden Targeted Outreach Summary

Year	Task	Task Outcome	Performance Measure	Notes
2021	Clean and dispose debris from adopted rain garden	Complete	1 Rain Garden Adopted	WGM Group employees adopted and cleaned the Mason and Tracy infiltration boulevard.
2022	Clean and dispose debris from adopted rain garden	Not Complete	1 Rain Garden Adopted	Rain garden is adopted but not maintained in 2022.
2023	Clean and dispose debris from adopted rain garden	-	-	-

3.5 Completed / Discontinued Initiatives

1. Carpet Cleaning Targeted Outreach: Educate local carpet cleaning and restoration companies on proper disposal methods and potential enforcement penalties for illicit discharges to the storm sewer system.

- Key Audience: Carpet Cleaning and Restoration Companies
- Strategy: Active Engagement
- Treatment Area: Entire MS4
- Distribution Channels: Written and verbal correspondence
- Performance Measure: Illicit discharge reports related to targeted activities

Table 3.5.1: Carpet Cleaning Targeted Outreach Summary

Year	Task	Task Outcome	Performance Measure	Notes
2018	n/a	n/a	1	1 carpet cleaning company discharge.
2019	Distribute a letter to owners	Complete	0	Increased engagement yielded a good result.
2020	N/A	Complete	0	-
2021	N/A	Complete	0	Successful. No discharges documented since 2019. Outreach will not continue unless a discharge is documented.

3.6 Future and Deferred Initiatives

The following items represent future initiatives for the MS4:

1. Restaurant oil and grease storage and disposal. One spill in 2022 resulted in the installation of more stable storage containers. A coordinated effort to reach the wider industry with Sewer staff is pending.
2. CATs Program: Collaborative program where MSU students complete projects in support of the City's goals. Projects typically span a semester and include a variety of activities. Several have been proposed and outlined that have not yet been executed.
3. Solid Waste Clean Up Bozeman: Existing program needs a tracking mechanism developed
4. Water Conservation: Irrigation assessment audits
5. Explore promotion of hazardous household waste disposal and oil/antifreeze disposal

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Section 4.0

Illicit Discharge Detection and Elimination Program



Graphic 4.0.1: Bentonite slurry spill



Graphic 4.0.2: Illicit connection confirmation

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4.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit through the identification and elimination of pollutant sources by:

- Completing dry weather screening of outfalls;
- Inspecting the storm sewer for illegal connections;
- Responding to and resolving pollution events; and
- Enforcing municipal ordinances prohibiting illegal dumping.

SWMP Section 4.0 details the following components necessary to administer the MS4's Illicit Discharge Detection and Elimination Program, including:

- Regulatory Framework (4.2)
- Illicit Discharge Detection and Corrective Action Plan (4.3)
- Enforcement Response Plan (4.4)
- Event Tracking (4.5)
- Non-Stormwater Discharge Evaluation (4.6)
- Outfall Reconnaissance Inventory (4.7)
- Storm Sewer Infrastructure Viewer (4.8)

4.2 Regulatory Framework

Pursuant to §40.04.200 Bozeman Municipal Code (BMC), it shall be unlawful to discharge or cause to be discharged into the MS4 any materials, including, but not limited to, 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. It shall be unlawful to store, handle, or apply any pollutant in a manner that will cause exposure to rainfall or runoff and discharge to the MS4 and to state waters or waters of the United States.

An interlocal agreement covers emergency response between MSU and the City. Hazardous materials response services are provided to MSU by the City from Fire Station No. 2.

4.3 Illicit Discharge Detection and Corrective Action Plan

The MS4 uses the following Corrective Action Plan (CAP) to determine event priority, formulate a response, and, if necessary, pursue enforcement:

1. Assign an Event Coordinator (EC).
2. Investigate to determine pollutant type and severity (site visit and correspondence). Methods for investigation include:
 - Field observation (in person, CCTV, ORI).
 - Sampling and analysis (grab sample, turbidimeter, multi-parameter probe (pH and temperature), and ammonia test strips).
 - Infrastructure analysis (GIS, plats, and record drawings).
 - Dye testing.
 - Correspondence with property owners.
3. Determine an event tier and response based on the following thresholds:

- Tier 1 Event: Minimal impact to public safety, infrastructure, and environment. Spills with a major dimension less than six feet and non-continuous. Outfalls and illicit connections deemed potential sources of pollution. Response includes:
 - Team: MS4 Staff and Code Compliance Officer
 - Timeline: Initiate response within five days
 - Resolution: MS4 Operations and/or contracted restoration firm.
 - Pollutant Disposal: Public, Sediment/Pollutant Disposal Facility. Private, Contracted Hauler.
 - Report: Internal
 - Examples: Leaking vehicles and dripping dumpsters.
 - Tier 2 Event: Moderate impact to public safety, infrastructure, and environment. Spills with a major dimension greater than six feet and non-continuous, or spills with a major dimension greater than six feet, continuous, and contained. Outfalls and illicit connections deemed suspect and obvious sources of pollution. Response includes:
 - Team: MS4 Staff and Code Compliance Officer
 - Timeline: Initiate response within 24 hours
 - Resolution: MS4 Operations and/or contracted restoration firm.
 - Pollutant Disposal: Public, Sediment/Pollutant Disposal Facility. Private, Contracted Hauler.
 - Report: Internal
 - Examples: Carpet cleaning process water discharge, sanitary overflow, camper waste disposal, homeless camp cleanup, floor drain, illicit sanitary connections, and non-hazardous chemical spills.
 - Tier 3 Event: Immediate threat to human health, infrastructure, and environment. Spills with a major dimension greater than 6', continuous, and not contained.
 - Team: MS4 Staff, Code Compliance Office, and Emergency Services
 - Timeline: Immediate
 - Resolution: Fire, MS4 Operations, and/or contracted restoration firm.
 - Pollutant Disposal: Public, Sediment/Pollutant Disposal Facility. Private, Contracted Hauler.
 - Reporting: Internal and MDEQ Notification
 - Example: Hazardous spills
4. Eliminate discharge through various mitigation measures depending on event severity. Options include:

➤ Absorbent ➤ Vacuum and disposal ➤ Pipe plugs or seals	➤ Decontamination ➤ Enforcement ➤ Infrastructure retrofit
---	---
 5. If applicable, notify appropriate state and federal agencies.
 6. Complete an Event Report

4.4 Enforcement Response Plan

Pursuant to §40.04.860 and §40.04.890 BMC, the MS4 has the authority to implement the following Enforcement Response Plan (ERP) and use the following enforcement protocols for violations of BMC, including:

1. Informal Response: Warning issued via email notification or verbal notice used for cases when the responsible party unknowingly commits a violation of BMC. If not dealt with in an agreed upon timeframe, or an agreement does not occur, the MS4 escalates to a Formal Response. The MS4 handles most Tier 1 events under this category.
2. Formal Response: Notice of Violation and Cease and Desist Order using a set compliance timeline and monetary penalties and/or remediation costs. The MS4 uses this approach in cases when the responsible party knowingly violates BMC or has a record of non-compliance. The MS4 handles most Tier 2 and 3 events under this category.
3. Judicial Response: Civil penalties, injunctive relief, or criminal penalties using the Bozeman Police Department, City Attorney, and Municipal Court. The MS4 uses this approach in cases where the responsible party repeatedly and knowingly commits violations of BMC and fails to remedy issues under a Formal Response.
4. Additional ERP Information:
 - City staff with enforcement authority: Stormwater Program Technician, Stormwater Program Specialist, Stormwater Program Manager, Stormwater Project Coordinator have the authority to investigate events as an EC; however, the the Stormwater Program Manager is the authorized Enforcement Agent and makes determinations regarding penalties.
 - MSU Staff with enforcement authority: Project Managers specific to the project, Stormwater Leads, have the authority to investigate events as an EC; however, the Primary Stormwater Lead (Director, Facilities Services) is the authorized Enforcement Agent and makes determinations regarding penalties.

4.5 Event Tracking

1. 2019 Events: 4
 - Tier 2 Event: Sobo Lofts Fire
 - Event ID: 201901
 - Location: See map 4.5.2
 - Pollutant: Ash, construction debris/chemicals, traction sand, and chlorinated water
 - Local Control: Emergency fire operation and system cleaning
 - Significant: Yes, 1.5 million gallons of water sprayed on the fire. The majority did not discharge to Mandeville Creek due to a degraded historical irrigation conveyance that ponded the flows until infiltration occurred.
 - Tier 1 Event: Durston Oil Spill
 - Event ID: 201902
 - Location: See map 4.5.2
 - Pollutant: Motor oil
 - Local Control: BMC Section 40.04.200
 - Significant: No, immediate response and mitigation by MS4 Staff.
 - Tier 2 Event: Bogert Pool Filter Backflush
 - Event ID: 201903
 - Location: See map 4.5.2
 - Pollutant: Chlorinated water, Celatom Diatomite Filter Media, and filter debris
 - Local Control: BMC Section 40.04.200

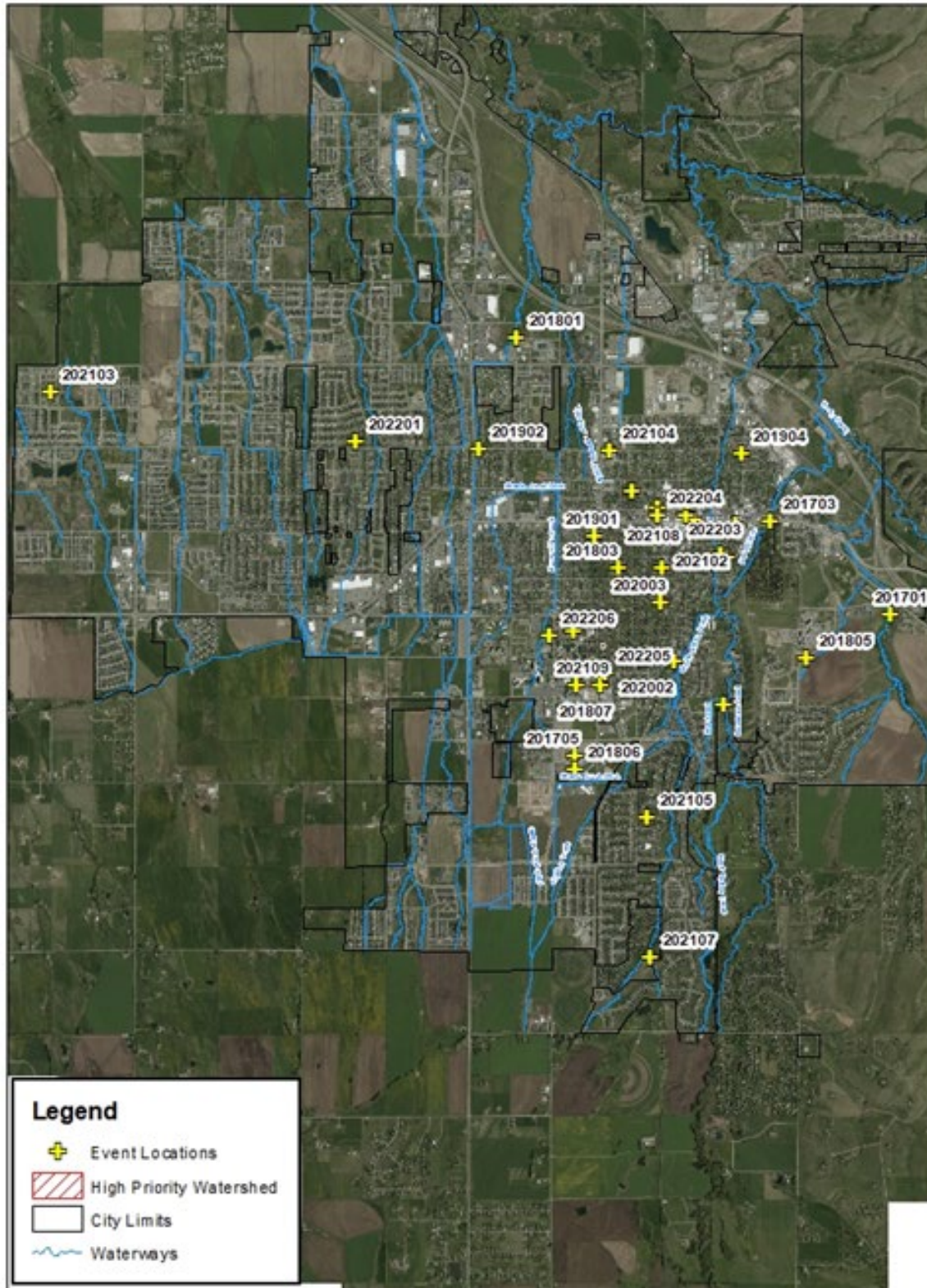
- Significant: No, immediate response and implementation of operational controls, plugged connection soon after eliminating the chance of future discharges.
 - Tier 1 Event: Karst Stage Oil Spill
 - Event ID: 201904
 - Location: See map 4.5.2
 - Pollutant: Motor oil
 - Local Control: BMC Section 40.04.200
 - Significant: No, immediate response and mitigation by Karst stage staff.
2. 2020 Events: 3
- Tier 1 Event: Bogert Pavilion
 - Event ID: 202001
 - Location: See map 4.5.2
 - Pollutant: Chlorinated wash-water
 - Significant: No, implementation of operational controls and plugged the connection eliminating the chance of future discharges.
 - Tier 1 Event: Vehicle Oil Leak
 - Event ID: 202002
 - Location: See map 4.5.2
 - Pollutant: Diesel Fuel
 - Significant: No, vehicle towed and spill cleaned.
 - Tier 1 Event: Willson Ave. Paint Spill
 - Event ID: 202003
 - Location: See map 4.5.2
 - Pollutant: Paint
 - Significant: No, immediate response by the Bozeman Fire Department and Streets Division.
3. 2021 Events: 8
- Tier 2 Event: Tire-Rama
 - Event ID: 202101
 - Location: See map 4.5.2
 - Pollutant: Zep Heavy-Duty Powdered Concrete Cleaner
 - Significant: No, implementation of operational controls and rapid response by Bozeman Fire Department prevented the spill from entering the storm sewer.
 - Tier 2 Event: Hot Tub Discharge
 - Event ID: 202102
 - Location: See map 4.5.2
 - Pollutant: Chlorinated Water
 - Significant: Yes, over 5-gallons, confirmed discharge to the storm sewer.
 - Tier 1 Event: Glenellen Dr. Oil Leak
 - Event ID: 202103
 - Location: See map 4.5.2

- Pollutant: Automotive fluids
- Significant: No, no documented discharge to the storm sewer system.
- Tier 1 Event: RSVP Motel Mural Painting
 - Event ID: 202104
 - Location: See map 4.5.2
 - Pollutant: Paint
 - Significant: No, less than 5-gallon, confirmed discharged to the storm sewer.
- Tier 1 Event: Westridge Rock Washing
 - Event ID: 202105
 - Location: See map 4.5.2
 - Pollutant: Sediment
 - Significant: Yes, over 5-gallons, confirmed discharged to the storm sewer.
- Tier 1 Event: Sweet Chili Kitchen Equipment Cleaning
 - Event ID: 202106
 - Location: See map 4.5.2
 - Pollutant: Oils & Grease
 - Significant: Yes, over 5-gallons, confirmed discharged to the storm sewer.
- Tier 1 Event: SWWW_00012 Oil Sheen
 - Event ID: 202107
 - Location: See map 4.5.2
 - Pollutant: Oils & Grease
 - Significant: No, source of discharge never confirmed, no environmental impacts.
- Tier 1 Event: O'Reilly Auto Parts
 - Event ID: 202108
 - Location: See map 4.5.2
 - Pollutant: Oils & Grease
 - Significant: No, less than 5-gallons, no discharged to SWWW_00034.
- Tier 1 Event: Romney Hall Construction Fuel Spill
 - Event ID: 202109
 - Location: See map 4.5.2
 - Pollutant: Diesel Fuel
 - Significant: No, less than 5-gallons, no discharged to the storm sewer.
- 4. 2022 Events: 6
 - Tier 1 Event: Oliver St. Diesel Spill
 - Event ID: 202201
 - Location: See map 4.5.2
 - Pollutant: Diesel fuel
 - Significant: No, implementation of operational controls and rapid response by staff and resident prevented the spill from entering the storm sewer.
 - Tier 2 Event: Yellowstone Pavement Solution

- Event ID: 202202
 - Location: See map 4.5.2
 - Pollutant: Diesel fuel
 - Significant: Yes, undetermined amount of diesel fuel discharged to Mathew Bird Creek. Oil sheen documented in Mathew Bird Creek. MDEQ notified.
- Tier 1 Event: Tom's Alignment Center
- Event ID: 202203
 - Location: See map 4.5.2
 - Pollutant: Soaps, oils, greases, metals
 - Significant: No, implementation of operational controls and rapid response by staff prevented a discharge to Bozeman Creek.
- Tier 2 Event: Whistle Pig Korean
- Event ID: 202204
 - Location: See map 4.5.2
 - Pollutant: Used cooking oil
 - Significant: No, implementation of operational controls and rapid response by staff prevented a discharge to Bozeman Creek.
- Tier 1 Event: Barnard Hall Temporary Chiller Glycol Spill (MSU)
- Event ID: 202205
 - Location: See map 4.5.2
 - Pollutant: Glycol, less than 5 gallons
 - Significant: No, implementation of operational controls and rapid response by staff prevented a discharge.
- Tier 2 Event: Plant Bioscience Building Flood (MSU)
- Event ID: 202206
 - Location: See map 4.5.2
 - Pollutant: Sediment, grease, hydraulic fluid
 - Significant: Yes, flow was significant enough to all bypass the downstream mechanical separator in South 11th Ave. Undetermined amount of pollutants discharged into City of Bozeman storm sewer via inlets located at College St. and 11th Ave.

Table 4.5.1: Illicit Discharge Events

Event Tier	2017	2018	2019	2020	2021	2022	2023	2024	2025	2024
Tier 1	4	6	2	3	8	3	-	-	-	-
Tier 2	1	1	2	0	1	3	-	-	-	-
Tier 3	0	0	0	0	0	0	-	-	-	-
Total:	5	7	4	3	9	6	-	-	-	-



Graphic 4.5.2: Event Locations

4.6 2022 Non-Stormwater Discharge Evaluation

The MS4 evaluates the following non-stormwater discharges to identify if they pose a waterway threat:

1. Water Line Flushing
 - Description: Chlorinated water resulting from Bac-T testing and cleaning of new water lines
 - Associated Pollutant(s): Chlorine
 - Local Control(s): Construction specifications requiring contractors to contain flush water
 - Risk: Medium, managed as Tier 2 illicit discharge
 - Illicit Discharges Reported: 0
2. Landscape Irrigation, Irrigation, Lawn Watering, and Potable Water
 - Description: Intermittent over-watering or faulty sprinklers
 - Associated Pollutant(s): Varied depending on the source (well, surface water, or potable supply)
 - Local Control(s): Water Conservation landscaping audits, design standards, and outreach initiatives
 - Risk: Low, not managed as an illicit discharge
 - Illicit Discharges Reported: 0
3. Rising Groundwater, Springs, and Flows from Riparian Habitats
 - Description: Flows that enter the storm sewer system when ground and surface water levels rise above the bottom elevation of the storm drain or conveyance.
 - Associated Pollutant(s): None
 - Local Control(s): Prohibition of new sump drains that discharge to a street or other public right-of-way, a sanitary sewer line, or onto neighboring properties
 - Risk: Low, not managed as an illicit discharge
 - Illicit Discharges Reported: 0
4. Uncontaminated Groundwater Infiltration
 - Description: Water other than wastewater that enters a storm sewer system from the ground through such means as defective pipes, pipe joints, connections, or utility holes
 - Associated Pollutant(s): None
 - Local Control(s): Inspection of storm sewer pipe annually, and defective pipe repair
 - Risk: Low, not managed as an illicit discharge
 - Illicit Discharges Reported: 0
5. Uncontaminated Pumped Groundwater
 - Description: Groundwater pumped into the storm sewer system for lowering subsurface levels, particularly for construction
 - Associated Pollutant(s): None
 - Local Control(s): Discharge must originate from a well located in an undisturbed area, initial turbid first flush contained on site
 - Risk: Low, not managed as an illicit discharge
 - Illicit Discharges Reported: 0
6. Foundation Drains, Crawl Space Pumps, and Footing Drains
 - Description: Groundwater pumped or diverted from building foundations to the MS4.
 - Associated Pollutant(s): None

- Local Control(s): Prohibition of new sump drains that discharge to a street or other public right-of-way, a sanitary sewer line, or onto neighboring properties
- Risk: Low, not managed as an illicit discharge
- Illicit Discharges Reported: 0

7. Air Conditioning Condensation

- Description: HVAC and refrigeration condensation discharged to the MS4
- Associated Pollutant(s): None
- Local Control(s): Allowed
- Risk: Low, not managed as an illicit discharge
- Illicit Discharges Reported: 0

8. Swimming Pool and Hot Tub Drain Water

- Description: Dumping of swimming pool and hot tub drain water into the MS4
- Associated Pollutant(s): Chlorine
- Local Control(s): Infiltration, discharge to sanitary sewer, or dechlorination
- Risk: Medium, managed as Tier 2 illicit discharge
- Illicit Discharges Reported: 1

9. Fire Hydrant Flushing

- Description: Discharges resulting from regular fire hydrant flushing by MS4 operators
- Associated Pollutant(s): Chlorine
- Local Control(s): Water and Sewer Division fire hydrant flushing process and/or dechlorination
- Risk: Low, not managed as an illicit discharge
- Illicit Discharges Reported: 0

10. Non-Commercial, Individual Residential, and Charity Carwashes

- Description: Wash-waters resulting from vehicle washing
- Associated Pollutant(s): Soaps, oils, greases, metals, and sediment
- Local Control(s): The City requires a public assembly permit for non-commercial and charity car washes on public property. If deemed appropriate, the MS4 can utilize this process to require specific controls.
- Risk: Low, not managed as an illicit discharge
- Illicit Discharges Reported: 0

11. Street Wash Waters

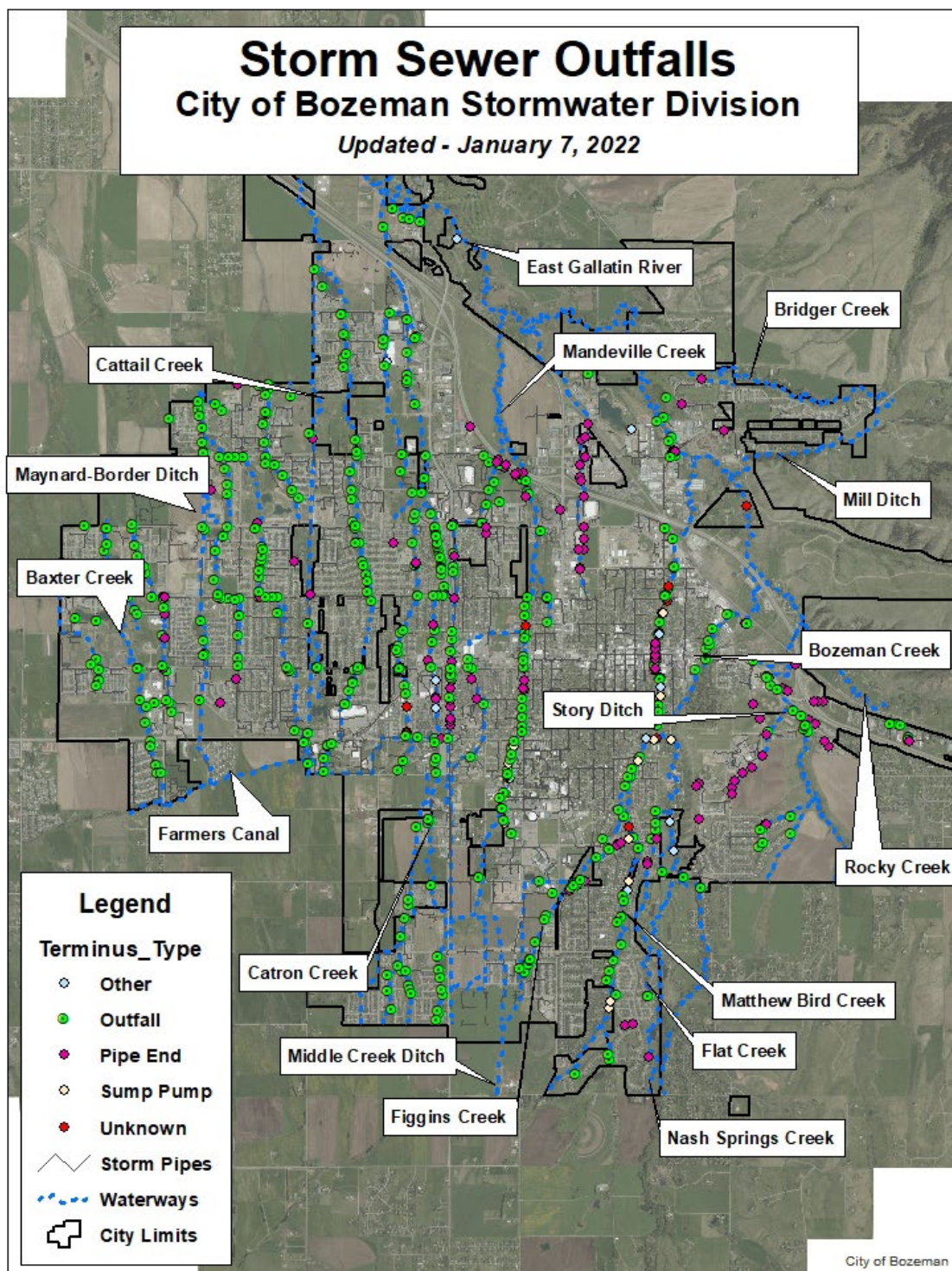
- Description: Water used to wash sidewalks, streets, parking lots, and buildings
- Associated Pollutant(s): Sediment, oils, greases, and metals
- Local Control(s): Allowed
- Risk: Low, not managed as an illicit discharge
- Illicit Discharges Reported: 0

4.7 Outfall Reconnaissance Inventory (ORI)

The MS4 has hundreds of storm sewer outfalls that discharge into numerous waterways and irrigation ditches within its boundary. Staff uses the Draft 2016 Integrated Report available at the MDEQ's Clean Water Act Information Center, TMDL, and City GIS databases (250' buffer with "outfall" terminus type) to compile the following information:

Table 4.7.1: Receiving Waterways

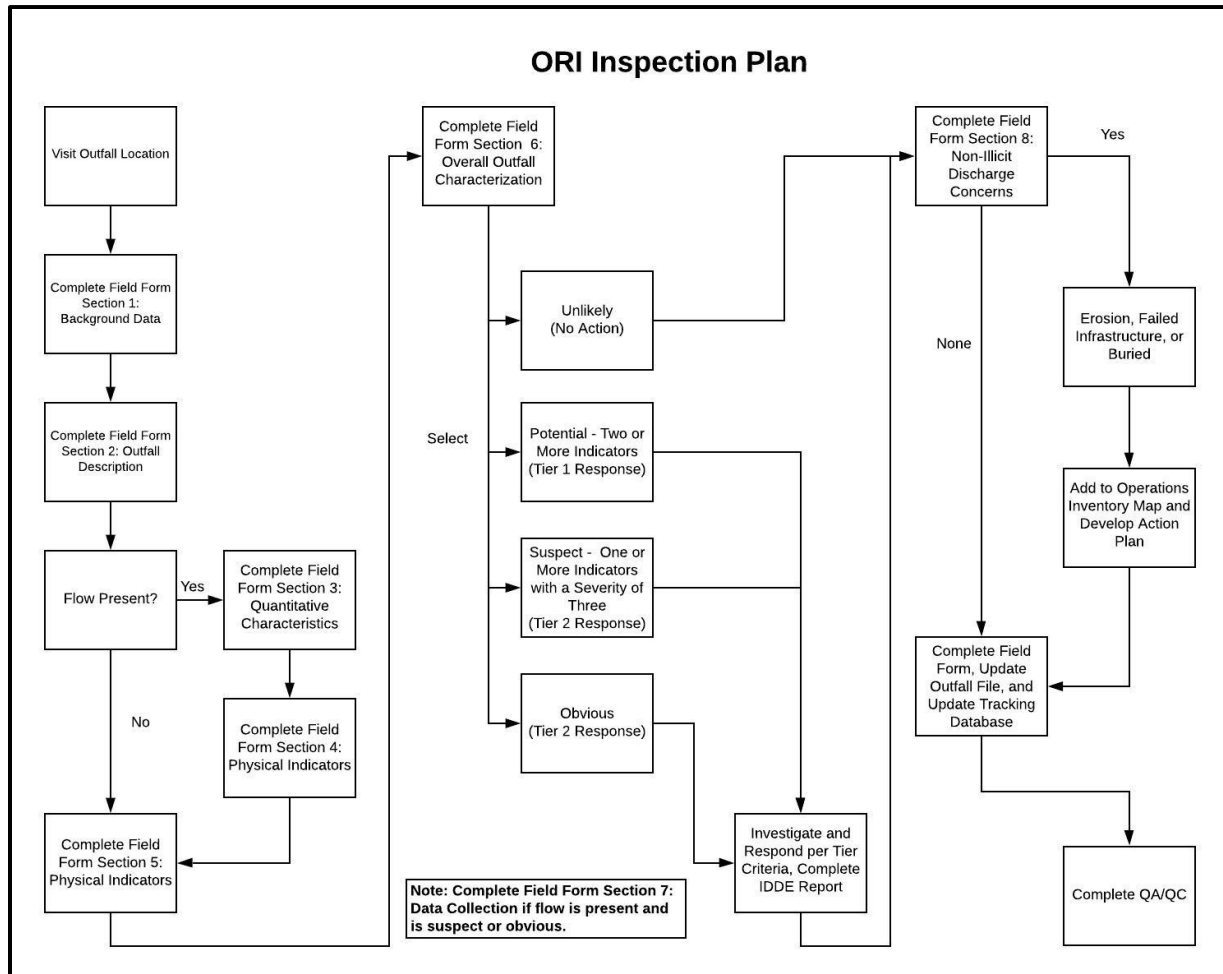
#	Waterway Name	2019 Outfalls	2020 Outfalls	2021 Outfalls	2022 Outfalls	TMDL	Impairments	MS4 Waste Load Allocation
1	Baxter Creek	18	17	17	17	No	None	None
2	Bozeman Creek	63	20	19	17	Yes	E. Coli, Nitrogen, Sediment, Chlorophyll-a, alteration in streamside cover	Sediment: 81 tons/year
3	Bridger Creek	1	0	0	0	Yes	Chlorophyll-a and Nitrate/Nitrite (Nitrite + Nitrate as N)	None
4	Catron Creek	83	72	67	70	No	None	None
5	Cattail Creek	44	43	43	44	No	None	None
6	East Gallatin River	22	10	12	12	Yes	Total Nitrogen, Total Phosphorous	None
7	Farmers Canal	51	40	22	24	No	None	None
8	Figgins Creek	22	22	19	20	No	None	None
9	Flat Creek	11	5	5	7	No	None	None
10	Mandeville Creek	53	50	33	34	Yes	Total Nitrogen, Total Phosphorous	None
11	Matthew Bird Creek	31	19	19	19	No	None	None
12	Maynard-Border Ditch	13	14	13	13	No	None	None
13	Middle Creek Ditch	25	35	20	22	No	None	None
14	Mill Ditch	0	0	0	0	No	None	None
15	Nash Spring Creek	1	2	0	0	No	None	None
16	Rocky Creek	3	0	0	0	Yes	Alteration in Streamside Cover, Anthropogenic Substrate Alterations, Physical Substrate Alterations, Sediment	None
17	Story Ditch	10	12	10	10	No	None	None
18	W. Gallatin Canal	30	32	39	26	No	None	None
19	Unnamed	153	70	111	131	No	None	None
Totals		-	-	449	466	-	-	-



Graphic 4.7.2: Stormwater outfall map

The MS4 prioritizes and inspect outfalls once during each MS4 Permit term using the Center for Watershed Protection protocol, including:

- **Outfall Inventory:** Desktop analysis to update existing and add new outfalls to the MS4's databases. Coordination occurs between the Stormwater and Strategic Services Divisions.
- **Field Preparation:** Staff utilizes waders, high visibility vest, measuring tape, multi-parameter sensor (temp and pH), ammonia test strips, turbidimeter, sample bottles, field forms, clipboard, camera, flashlight, legal pad, marker, pen, outfall maps, and nitrile gloves.
- **Develop Inspection Plan:** The MS4 has five maintenance districts that contain approximately 20% of the MS4's outfalls. Staff inspects one maintenance district per year, or all within a five-year permit cycle. Planning includes using GIS software to identify clusters of outfalls, property ownership, safety concerns, and accessibility to plan inspection routes.
- **ORI Inspection:** The MS4 visits individual outfalls and completes the following workflow:



Graphic 4.7.3: ORI Inspection Plan

- **If applicable, implement Corrective Action Plan:** The MS4 initiates a response as defined in SWMP Section 4.3 for any outfall classified as potential, suspect, or obvious pollution source.
- **Outfall Attribute Update:** Staff collects and updates the following outfall spatial attribute information:
 - Ownership: City of Bozeman, MSU, MDT, Private, or Bozeman School District
 - Pipe Diameter
 - Pipe Material
 - Flow: No, Trickle, Moderate, or Substantial

- Discharge Type: Direct or Indirect
- Inspection Date
- Terminus Type: Outfall, Pipe End, Sump Pump, Unknown, or Other
- Outfall Characterization/Determination: Unlikely, Potential, Suspect, or Obvious

The MS4 inspects outfalls deemed a high-priority annually. The MS4 considers an outfall to be high-priority if it meets the following criteria:

- 18" or more in diameter.
- Drains an urban watershed area of 25 acres or more.
- Dumps stormwater directly into an impaired receiving water (i.e., no stormwater basin).
- Obvious or suspect outfalls classified through previous years' ORI.

High-priority outfalls include:

1. Outfall ID: OF.G08.00035

- Discharge Location: Overbrook Dr. and Langhor Ave.
- Receiving Waterway: Figgins Creek
- Size and Material: 30" RCP

Table 4.7.4: OF.G08.00035

Inspection Year	Date	Flow	Characterization
2019	February 1, 2019	Yes, Trickle	Unlikely, No Indicators
2020	October 7, 2020	Yes, Trickle	Unlikely, No Indicators
2021	October 6, 2021	Yes, Trickle	Unlikely, No Indicators
2022	August 13, 2022	Yes, Trickle	Unlikely, One Indicator

2. Outfall ID: OF.F06.00090

- Discharge Location: S. Bozeman Ave. and E. Cleveland St.
- Receiving Waterway: Matthew Bird Creek
- Size and Material: 20" Steel

Table 4.7.5: OF.F06.00090

Inspection Year	Date	Flow	Characterization
2019	July 19, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 2, 2021	No	Unlikely, No Indicators
2022	July 20, 2022	No	Unlikely, No Indicators

3. Outfall ID: OF.F06.00089

- Discharge Location: S. Black Ave. and W. Cleveland St.
- Receiving Waterway: Matthew Bird Creek
- Size and Material: 19" RCP

Table 4.7.6: OF.F06.00089

Inspection Year	Date	Flow	Characterization
2019	July 19, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 2, 2021	No	Unlikely, No Indicators
2022	July 20, 2022	No	Unlikely, No Indicators

4. Outfall ID: OF.H05.00370

- Discharge Location: N. 11th Ave. and W. College St.
- Receiving Waterway: Mandeville Creek
- Size and Material: 18" RCP

Table 4.7.7: OF.H05.00370

Inspection Year	Date	Flow	Characterization
2019	July 19, 2019	Yes, Moderate	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 8, 2021	Yes, Substantial	Unlikely, No Indicators
2022	November 21, 2022	Yes, Substantial	Unlikely, No Indicators

5. Outfall ID: OF.H05.00384

- Discharge Location: N. 11th Ave. and W. Koch St.
- Receiving Waterway: Mandeville Creek
- Size and Material: 12" RCP

Table 4.7.8: OF.H05.00384

Inspection Year	Date	Flow	Characterization
2019	January 31, 2019	No	Unlikely, No Indicators
2020	July 8, 2020	No	Unlikely, No Indicators
2021	September 8, 2021	No	Unlikely, No Indicators
2022	November 21, 2022	No	Unlikely, No Indicators

6. Outfall ID: OF.F04.00441

- Discharge Location: N. Rouse Ave. and E. Villard St.
- Receiving Waterway: Bozeman Creek
- Size and Material: 42" RCP (42" CMP replaced during Rouse Reconstruction in 2020)

Table 4.7.9: OF.F04.00441

Inspection Year	Date	Flow	Characterization
2019	August 8, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 2, 2021	No	Unlikely, No Indicators
2022	June 24, 2022	No	Unlikely, No Indicators

7. Outfall ID: OF.G04.00398

- Discharge Location: N. 9th Ave. and W. Villard St.
- Receiving Waterway: Tributary SWWW_00053
- Size and Material: 24" RCP

Table 4.7.10: OF.G04.00398

Inspection Year	Date	Flow	Characterization
2019	January 19, 2019	No	Unlikely, No Indicators
2020	July 8, 2020	No	Unlikely, One Indicator
2021	September 2, 2021	No	Unlikely, No Indicators
2022	August 3, 2022	No	Unlikely, No Indicators

8. Outfall ID: OF.F03.00446

- Discharge Location: N. Rouse Ave. and E. Peach St.
- Receiving Waterway: Bozeman Creek
- Size and Material: 43" RCP (Pipe upgraded from 27" RCP during Rouse Reconstruction)

Table 4.7.11: OF.F03.00446

Inspection Year	Date	Flow	Characterization
2019	January 31, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 2, 2021	Yes, Moderate	Unlikely, No Indicators
2022	August 3, 2022	Yes, Moderate	Unlikely, No Indicators

9. Outfall ID: OF.G03.00399

- Discharge Location: N. 4th Ave. and W. Peach St.
- Receiving Waterway: Tributary SWWW_00034
- Size and Material: 30" RCP
- Note: Outfall removed in 2020 because of BMX Bike Park project. New outfall location is the jurisdictional boundary of SWWW_00034 (Manley Ditch) and the Cherry Creek Fishing Access.

Table 4.7.12: OF.G03.00399

Inspection Year	Date	Flow	Characterization
2019	January 31, 2019	No	Potential, Two+ Indicators
2020	-	-	-
2021	-	-	-

10. Outfall ID: OF.E03.00450

- Discharge Location: N. Rouse Ave. and E. Tamarack St.
- Receiving Waterway: Bozeman Creek
- Size and Material: 36" RCP

Table 4.7.13: OF.G03.00450

Inspection Year	Date	Flow	Characterization
2019	January 31, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, One Indicator
2021	September 2, 2021	No	Unlikely, One Indicator
2022	August 3, 2022	No	Unlikely, One Indicator

11. Outfall ID: OF.E03.00454

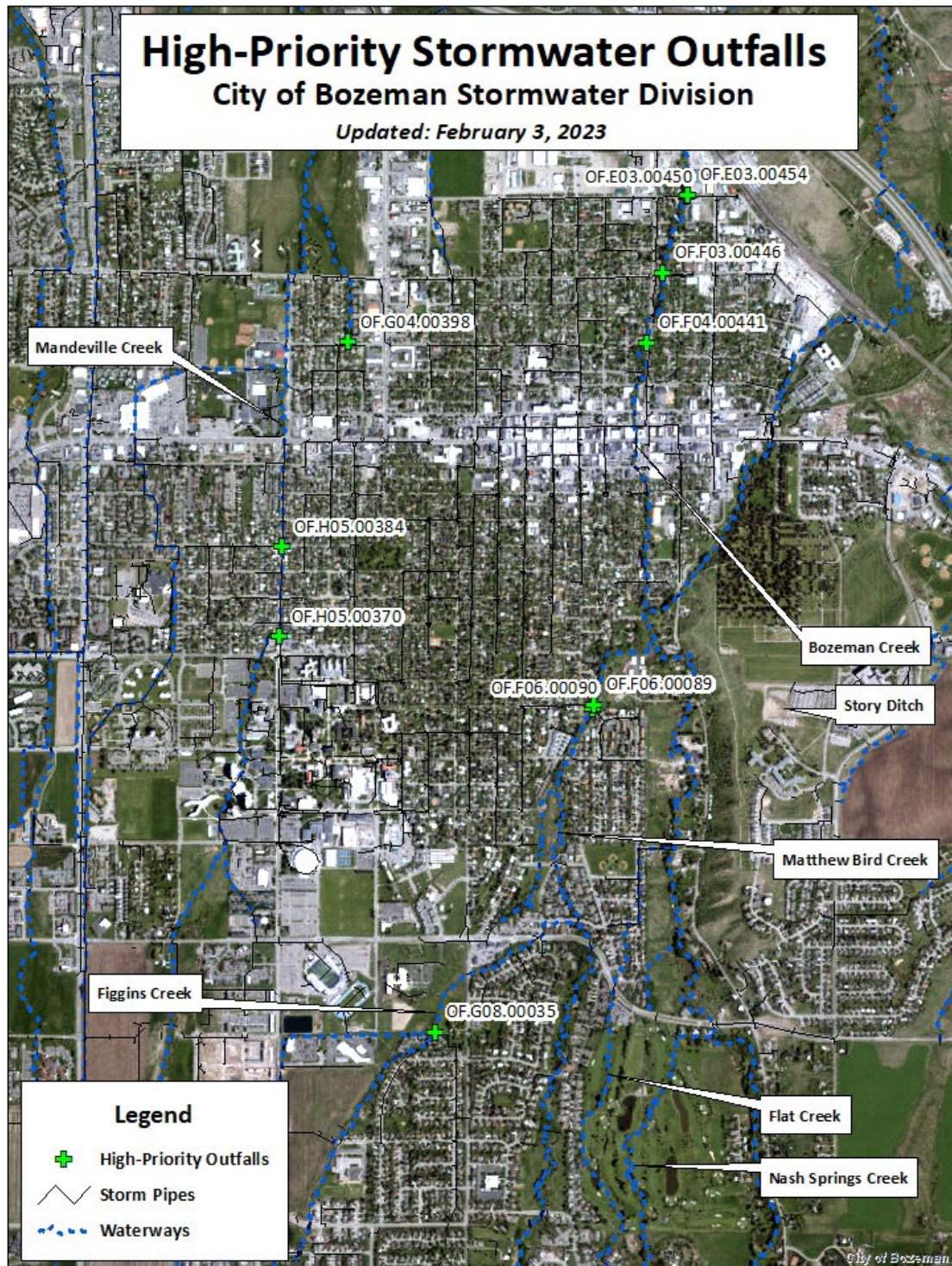
- Discharge Location: N. Rouse Ave. and E. Tamarack St.
- Receiving Waterway: Bozeman Creek
- Size and Material: 30" RCP

Table 4.7.14: OF.E03.00454

Inspection Year	Date	Flow	Characterization
2019	January 31, 2019	No	Unlikely, No Indicators
2020	July 7, 2020	No	Unlikely, No Indicators
2021	September 2, 2021	No	Unlikely, No Indicators
2022	August 3, 2022	No	Unlikely, No Indicators

The MS4 completed the following outfall inspections:

Table 4.7.15: Outfall Inspection Summary				
ORI Year	Outfalls	Outfalls Inspected	High-Priority Outfalls	High-Priority Outfalls Inspected
2019	634	108 Flow: 99 No, 1 Trickle, 6 Moderate, 2 Unknown Pollution Charecterization: 104 Unlikely, 1 Potential, 1 Suspect, 2 Unknown	11	11 Flow: 9 No, 1 Trickle, 1 Moderate Pollution Charecterization: 10 Unlikley, 1 Potential
2020	463	113 Flow: 104 No, 6 Trickle, 3 Moderate Pollution Charecterization: 113 Unlikely	10	10 Flow: 8 No, 2 Trickle Pollution Charecterization: 10 Unlikley
2021	463	329 Flow: 287 No, 15 Trickle, 10 Moderate, 2 Substantial, 2 Unkown. Pollution Characterization: 319 Unlikely	10	10 Flow: 7 No, 1 Trickle, 1 Moderate, 1 Substantial Pollution Characterization: 10 Unlikley
2022	466	180 Flow: 167 No, 8 Trickle, 4 Moderate, 1 Substantial. Pollution Characterization: 180 Unlikely.	10	10 Flow: 7 No, 1 Trickle, 1 Moderate, 1 Substantial Pollution Characterization: 10 Unlikely



Graphic 4.7.16: High-Priority Outfalls

4.8 Storm Sewer Infrastructure Viewer

The MS4 collects and continually updates its storm sewer infrastructure map. When inaccuracies are found on the MS4's Infrastructure Viewer or observed in the field, staff documents, field verifies, and then sends to the GIS Department for correction. The public can view the MS4's storm sewer system at: <https://gisweb.bozeman.net/Html5Viewer/?viewer=infrastructure>.

Section 5.0

Construction Site Management Program

Graphic 5.0.1: Recently constructed and stabilized stormwater pond



Graphic 5.0.2: Inlet sump clogged with construction debris



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5.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit through the regulation of construction sites by:

1. Providing educational opportunities;
2. Administering a permitting program;
3. Conducting site inspections; and
4. Enforcing municipal and state regulations.

SWMP Section 5.0 details the following components necessary to administer the MS4's Construction Site Management Program, including:

- Regulatory Framework (5.2)
- Construction Site Permitting Program (5.3)
- Construction Site Enforcement Response Plan (5.4)
- Construction Site Inventory (5.5)
- Performance Tracking (5.6)
- Program Documents (5.7)

5.2 Regulatory Framework

Pursuant to §40.04.350 Bozeman Municipal Code (BMC), the MS4 requires owners/operators of construction sites to comply with the following regulations:

1. Article 4 Chapter 40 Bozeman Municipal Code (BMC);
2. 75-5-101 Montana Code Annotated (MCA); and
3. 17.30.1101, 17.30.1301 et seq., and 17.30.601 et seq. Administrative Rules of Montana (ARM).

5.3 Construction Site Permitting Program

Pursuant to §40.04.350 BMC, the MS4 requires owners/operators of construction sites to submit Stormwater Pollution Prevention Plans (SWPPPs) before receiving a Building Permit or Infrastructure Project Notice to Proceed. Three permit application types exist, including:

1. MDEQ General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit): The MS4 requires owners/operators to submit a permit for construction sites that meet the Eligibility Requirements of the most current Construction General Permit. The MS4 completes one permit review for compliance with the most current Construction General Permit. The MS4 provides the owner/operator a Permit Review Checklist and Review Confirmation Letter. The MS4 does not confirm the owner/operator has corrected deficiencies through multiple reviews. Instead, the MS4 reviews for compliance onsite during Compliance Evaluation Inspections (CEI).
2. Construction Stormwater Permit: Sites Less than One (1) Acre: The MS4 requires owners/operators to submit for construction sites with land disturbance less than one acre and greater than 10,000 square feet. The MS4 completes numerous completeness and adequacy reviews of the owner/operator's application and map, and provides a Review Confirmation Letter once deemed compliant with BMC.
3. Construction Stormwater Permit: Single-Family Residential Projects: The MS4 requires this permit for individual single-family and multi-family construction sites which disturb less than 10,000 square feet. The MS4 completes numerous completeness and adequacy reviews of the

owner/operator's application and provides a Review Confirmation Letter once deemed compliant with BMC.

5.4 Enforcement Response Plan

The MS4 implements the following Construction Site Enforcement Response Plan (ERP) to ensure compliant construction sites within its jurisdiction:

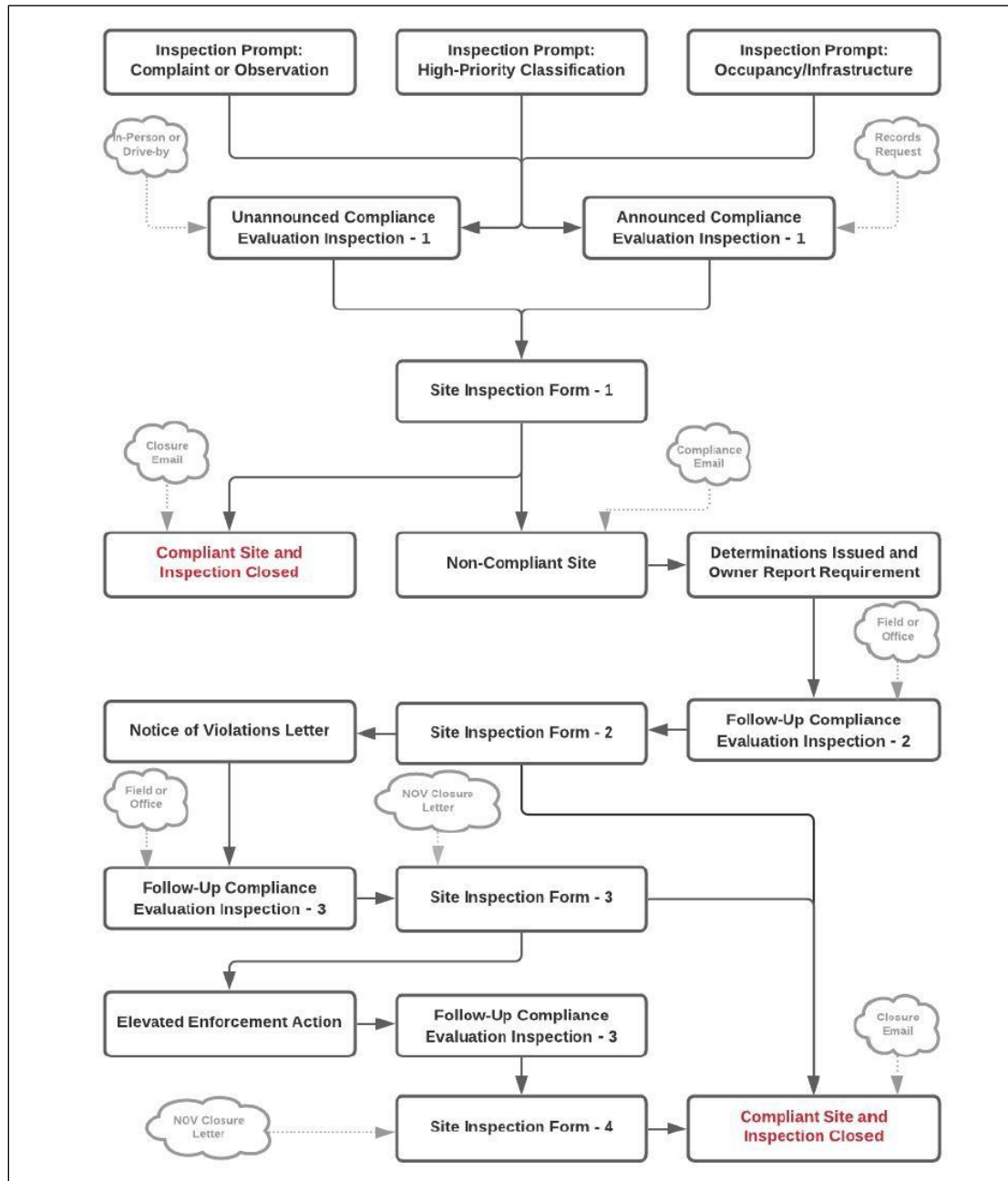


Image 5.4.1: ERP workflow

1. Inspection Type: Pursuant to §40.04.850.D BMC, the MS4 has the authority to complete CEIs at construction sites to ensure compliance with BMC and the Construction General Permit. Inspections may include: (1) Document review, including the site's NOI, SWPPP, BMP

specifications, site maps, self-inspection records, and (2) Site tour identifying pollutant sources, inspection of implemented BMPs, and compliance determinations with the BMC and Construction General Permit. Inspection types include:

- Unannounced: CEI resulting from a complaint or field observation. See SWMP Section 5.4.2.
 - Announced: CEI resulting from reoccurring inspection efforts, which the MS4 prioritizes based on site prioritization and complaints. See SWMP Section 5.4.2.
2. Compliance Determination: Pursuant to §40.04.860 BMC, the MS4 has the authority to make BMC and Construction General Permit non-compliance determinations, including:
- Permit and/or Site is Complaint: No permit nor site non-compliance determinations issued. Inspection closed.
 - Permit and/or Site is Not Complaint: Permit and/or site non-compliance determinations issued. See SWMP Section 5.4.3.
3. Enforcement Response: The MS4's enforcement response options, including:
- Verbal Warning: An informal response used when the MS4 determines the BMC and Construction General Permit non-compliance determinations are low-risk, and there are reasonable grounds that the owner/operator will correct the issues. Verbal warnings take the form of phone calls, emails, or in-person meetings. Inspection closed.
 - Site Inspection Form: An informal response by the MS4 to document BMC and Construction General Permit non-compliance determinations. The MS4 emails or delivers the Site Inspection Form to the site owner/operator. See SWMP Section 5.4.4.
4. Enforcement Action: Pursuant to §40.04.860 and §40.04.890 BMC, the MS4 has the authority to require the owner/operator to comply with BMC and/or the Construction General Permit using the following actions:
- Follow-Up CEI: An informal action completed to ensure the site owner/operator corrects the non-compliance determinations issued in the Site Inspection Form. A Follow-Up CEI can take the form of a site visit, a conversation, or a review of submitted information. If so, inspection closed. If not, See SWMP Section 5.4.4 – Notice of Violations.
 - Notice of Violations (NOV): A formal enforcement action taken when the site owner/operator does not resolve the non-compliance determinations. An NOV includes written violations of the BMC and the Construction General Permit, a Cease and Desist Order, and Stop Work Order. Both Orders apply to the site activities resulting in the issued violations and associated non-compliance determinations. NOV's require the site owner/operator to submit a written response within a set timeframe, documenting that they have resolved the violations and associated non-compliance determinations. Upon the MS4's review and approval of the written response, the inspection is closed. If existing non-compliance determinations remain or additional areas of non-compliance are identified, see SWMP Section 5.4.4 - Enforcement. In severe cases, the MS4 bypasses the Follow-Up CEI and immediately issues an NOV.
 - Enforcement: A variety of formal enforcement penalties used by the MS4 when the site owner/operator does not comply with the NOV's requirements, including:
 - Building Permit Stop Work Order: Pursuant to §10.02.010.D, BMC, a Building Official may issue an order requiring any site owner/operator to immediately stop all work of any kind related to site's Building Permit. Any person who continues work after having been served with a Stop Work Order, except such work as that person is directed by the

City to perform to remove a violation or unsafe condition, shall be subject to the misdemeanor penalty provision of §10.02.100 BMC. The issuance of a Stop Work Order cancels any pending inspections.

- Withholding Issuance of a Certificate of Occupancy: Pursuant to §10.02.010.C, BMC, a Building Official of the City may withhold the issuance of a certificate of occupancy when the available evidence shows the structure and associated development does not conform with the standards of Chapter 40 BMC, a permit issued pursuant to Chapter 40 BMC, or has failed to pay costs of the abatement of stormwater violations as may be ordered by the City.
- Misdemeanor Criminal Charge and Prosecution (Judicial): Pursuant to §40.04.910 BMC, any person, firm or corporation, their agents or servants who violate any provision or requirement of Chapter 40 BMC or of a permit issued shall be guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine not exceeding \$500.00 and in addition shall pay all costs and expenses of the case. A separate offense shall be deemed committed upon each day during or on which a violation occurs or continues.

5. Additional ERP Information:

- Elimination and Abatement of Illegal Construction Discharges: The MS4 uses the ERP to identify and resolve violations of BMC and/or the Construction General Permit.
- Staff with Enforcement Authority: Stormwater Program Technician, Stormwater Program Specialist, Stormwater Program Project Coordinator, Stormwater Program Manager have the authority to issue non-compliance determinations. The Stormwater Manager is the authorized Enforcement Agent and makes determinations regarding enforcement penalties.
- Enforcement Action Available, Escalation Process, and Schedule: The MS4's ERP is flexible and includes escalation protocols based on a owner/operator's response, while also providing options for immediate action when the Enforcement Agent identifies severe violations of BMC and/or the Construction General Permit. The MS4's ERP schedule is based on the Enforcement Agent's determination of risk (weather, capacity, waterway proximity, site size, pollutant source scale and severity, owner/operator compliance history, etc.). ERP implementation ranges from immediate action to a timeframe extending a week or more. A typical Follow-Up CEI occurs within five days. An NOV standard response timeframe is 10 days.
- Abate Damages and Prevent Reoccurrences: Upon the conclusion of the NOV via the Closure Letter issuance, the MS4 maintains the authority to enact immediate enforcement action, as detailed in SWMP Section 5.4.4 - Enforcement upon the identification of any repeat violations.

6. Site Prioritization and Inspection Frequency Protocol:

The MS4 uses the following Construction Site Scoring Matrix to determine a site's priority level.

Table 5.4.2: Construction Site Scoring Matrix			
Criteria	3-Points	2-Points	1-Point
Site Size (Acres)	> 10-Acres	5 - 10 Acres	< 5-Acre
Proximity to Waterbody	< 1,000 ft	> 1,000 or < 2,000 ft	> 2,000 ft
Site Steepness per SWPPP	Yes	-	No
Bozeman Creek Watershed	Yes	-	No
Permit Review Checklist Score	> 50	25 - 50	< 25

Once priority is determined, the MS4 completes inspections per the frequencies outlined below.

- High-Priority Construction Sites (Over 10 Points):
 - Once at construction commencement.
 - After every .25" rain event. The MS4 interprets this standard to mean any continuous rain event that occurs within a 24-hour timeframe and uses the Bozeman International Airport NOAA Rain Gage.
 - After every snow melt event resulting in visible erosion.
 - Once at the conclusion of the project.
- Medium-Priority Construction Sites (5 - 10 Points):
 - As needed basis per complaints and field observations.
- Low-Priority Construction Sites (Below 5 Points):
 - As needed basis per complaints and field observations.
 - Less than One Acre Construction Sites.
 - Single-Family Residential Construction Sites.

5.5 Construction Site Inventory

The following tables contain an inventory of construction site permits and inspection:

Table 5.5.1: Permit Type Inventory				
Permit Type	2019	2020	2021	2022
City Single-Family Residential Total	292	272	185	161
City Less than One Acre Total	63	34	30	29
City Greater than One Acre Total	29	36	30	35
MSU Greater than One Acre Total	1	1	1	3

Table 5.5.2: Inspection Type Inventory * Totals represent new permits/year and do not include return visits or final occupancy inspections. High priority inspections count as one inspection.				
Inspection Type	2019	2020	2021	2022
City Single-Family Residential Total	19	1	9	10
City Single-Family Residential Percentage (%)	7%	.4%	9%	6%
City Less than One Acre Total	16	5	0	3
City Less than One Acre Percentage (%)	25%	14%	0%	10%
City Greater than One Acre Total	6	15	9	27
City Greater than One Acre Percentage (%)	21%	42%	30%	77%
MSU Greater than One Acre Total	3	2	5	6
MSU Greater than One Acre Percentage (%)	>100%	>100%	>100%	>100%

High-Priority Construction Sites:

1. OAC19-0001 16 Willson Residential Development: One acre site within the Bozeman Creek watershed. The site includes the demolition of existing structures and construction of numerous row houses.
 - Permit Confirmation: January 8, 2019
 - Initial Inspection: n/a
 - Precipitation Triggered Inspections:
 - Inspection 1: May 28, 2019
 - Inspection 2: June 10, 2019

- Inspection 3: June 21, 2019
 - Inspection 4: July 9, 2019
 - Inspection 5: July 16, 2019
 - Inspection 6: September 9, 2019
 - Inspection 7: September 23, 2019
 - Inspection 8: June 8, 2020
 - Inspection 9: June 16-17, 2020
 - Inspection 10: July 23, 2020
 - Inspection 11: September 7, 2020
 - Inspection 12: April 26, 2021
 - Inspection 13: May 10, 2021
 - Inspection 14: May 27, 2021
 - Inspection 15: August 9, 2021
 - Inspection 16: August 20, 2021
 - Inspection 17: October 9, 2021
 - Inspection 18: April 22, 2022
 - Inspection 19: June 1, 2022
 - Inspection 20: June 21, 2022
 - Final Inspection: June 29, 2022
2. OAC19-0026 Bozeman Public Safety Center: Eight acre site within the Bozeman Creek watershed. The site includes the demolition of existing structures and construction of commercial building.
- Permit Confirmation: August 27, 2019
 - Initial Inspection: n/a
 - Precipitation Triggered Inspections:
 - Inspection 1: August 27, 2019
 - Inspection 2: September 23, 2019
 - Inspection 3: January 8, 2020
 - Inspection 4: June 8, 2020
 - Inspection 5: June 16-17, 2020
 - Inspection 6: July 23, 2020
 - Inspection 7: September 7, 2020
 - Inspection 8: April 26, 2021
 - Inspection 9: May 10, 2021
 - Inspection 10: May 27, 2021
 - Inspection 11: August 9, 2021
 - Inspection 12: August 20, 2021
 - Inspection 13: October 9, 2021
 - Inspection 14: October 26, 2021
 - Inspection 15: April 25, 2022
 - Inspection 16: May 3, 2022
 - Inspection 17: May 9, 2022
 - Inspection 18: May 12, 2022
 - Inspection 19: May 17, 2022
 - Inspection 20: June 1, 2022
 - Inspection 21: June 22, 2022

- Inspection 22: July 7, 2022
 - Inspection 23: July 23, 2022
 - Final Inspection: August 25, 2022
3. OAC20-0017 Front Street Interceptor Project: Three acre site within the Bozeman Creek watershed. The site includes the installation of a trunk sewer line.
- Permit Confirmation: August 12, 2020
 - Initial Inspection: August 8, 2020
 - Precipitation Triggered Inspections:
 - Inspection 1: September 7, 2020
 - Inspection 2: April 26, 2021
 - Inspection 3: May 10, 2021
 - Inspection 4: May 27, 2021
 - Inspection 5: August 9, 2021
 - Inspection 6: August 20, 2021
 - Inspection 6: October 9, 2021
 - Inspection 6: October 26, 2021
 - Final Inspection: Not conducted
4. OAC20-0042 Allision Subdivision: Forty-eight acre site within the Bozeman Creek watershed. The site includes the installation of a subdivision, including utilities, roads, and structures.
- Points: 12
 - Permit Confirmation: December 17, 2020
 - Initial Inspection: January 12, 2021
 - Precipitation Triggered Inspections:
 - Inspection 1: March 19, 2021
 - Inspection 2: April 26, 2021
 - Inspection 3: May 10, 2021
 - Inspection 4: May 27, 2021
 - Inspection 5: June 10, 2021
 - Inspection 6: May 10, 2021
 - Inspection 7: August 9, 2021
 - Inspection 8: October 9, 2021
 - Inspection 9: October 26, 2021
 - Inspection 10: April 20, 2022
 - Inspection 11: May 19, 2022
 - Inspection 12: May 31, 2022
 - Inspection 13: June 21, 2022
 - Inspection 14: September 19, 2022
 - Inspection 15: October 25, 2022
 - Final Inspection: TBD
5. OAC21-021 Blackwood Groves: Twenty seven acre site within the Bozeman Creek watershed. The site includes the installation of a subdivision, including utilities, roads, and structures.
- Points: 12
 - Permit Confirmation: July 20, 2021

- Initial Inspection: August 9, 2021
 - Precipitation Triggered Inspections:
 - Inspection 1: August 24, 2021
 - Inspection 2: October 9, 2021
 - Inspection 3: October 26, 2021
 - Inspection 4: April 25, 2022
 - Inspection 5: June 21, 2022
 - Inspection 6: July 4, 2022
 - Inspection 7: September 19, 2022
 - Inspection 8: October 25, 2022
 - Final Inspection: TBD
6. OAC21-035 North Park Development: Fifteen acre site within the Mandeville Creek watershed. The site includes the installation of a subdivision, including utilities, roads, and structures.
- Points: 11
 - Permit Confirmation: December 20, 2021
 - Initial Inspection: May 19, 2021
 - Precipitation Triggered Inspections:
 - Inspection 1: May 31, 2022
 - Inspection 2: June 21, 2022
 - Inspection 3: July 7, 2022
 - Inspection 4: September 20, 2022
 - Inspection 5: September 26, 2022
 - Inspection 6: October 25, 2022
 - Final Inspection: TBD
7. OAC22-015 North Park – MRL Right of Way: Thirty six acre site within the Mandeville Creek watershed. The site includes the installation of a new railroad track infrastructure.
- Points: 11
 - Permit Confirmation: May 18, 2022
 - Initial Inspection: June 23, 2022
 - Precipitation Triggered Inspections:
 - Inspection 1: July 7, 2022
 - Inspection 2: June 21, 2022
 - Inspection 3: September 20, 2022
 - Inspection 4: September 26, 2022
 - Inspection 5: October 26, 2022
 - Final Inspection: TBD

5.6 Performance Tracking

The MS4 completes a Construction Site Compliance Audit in the fall, evaluating 50 random construction sites to determine their compliance with the BMC and Construction General Permit. The MS4 evaluates each construction site using the following criteria:

1. Implementation: BMPs present or absent.
2. Adequacy: Appropriate type and scale of BMPs for site conditions.
3. Installation: Adequate BMP installation per industry standard specifications.
4. Maintenance: Sufficient maintenance so that BMPs are in good working order.

After evaluation, the MS4 grades each construction site using one of the following categories:

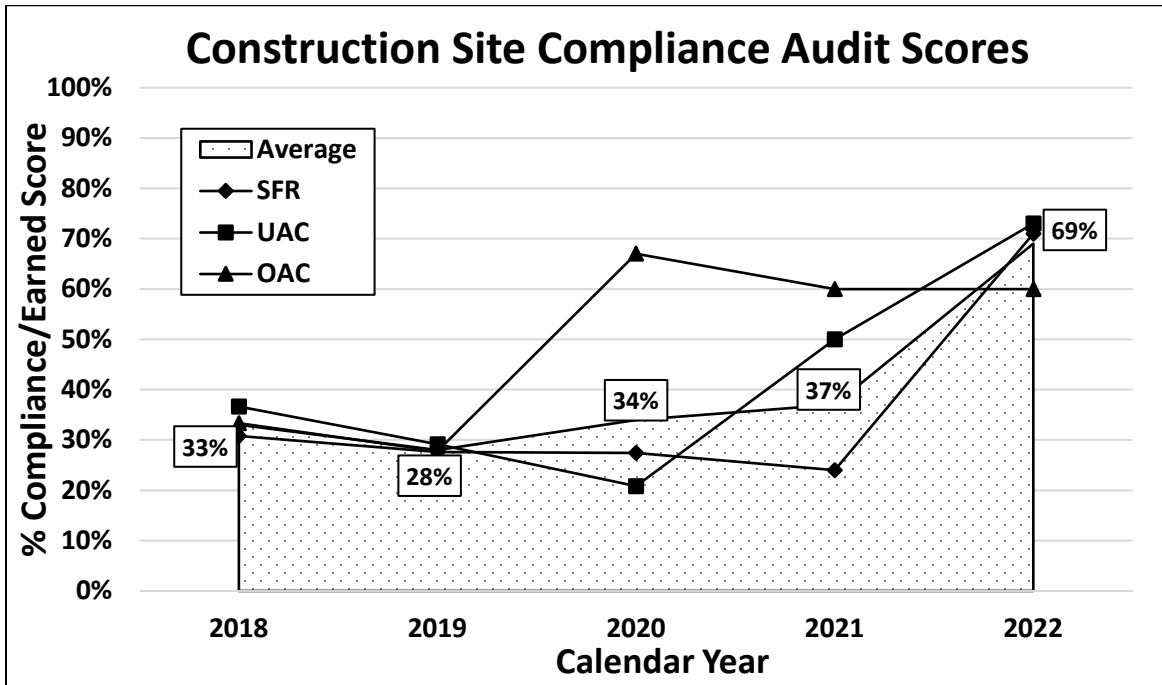
1. 0-Points: Not compliant with permit, high risk to infrastructure, public, and environment
2. 1-Point: Partially compliant with permit, moderate risk to infrastructure, public, and environment
3. 2-Points: Compliant with permit, low risk to infrastructure, public, and environment

The MS4 compiles the collected data and updates the following:

Audit Year	Audit Dates	Compliance Trend	Total Points	Earned Score	OAC Average	UAC Average	SFR Average
2018	October 24 - 26	n/a	33/100	33%	33%	37%	31%
2019	October 14 - 16	Decreasing	28/100	28%	28%	29%	28%
2020	November 6 - 13	Increasing	34/100	34%	67%	21%	27%
2021	November 19 – 22	Increasing	37/100	38%	65%	50%	24%
2022	October 4, 5, 13, 12	Increasing	69/100	69%	60%	73%	71%

1. 2018 Discussion:
 - Increased BMP use but many not adequately maintained.
 - Noncompliance was mostly contained within private sites.
 - Increased inspection frequency is effective at increasing compliance rates.
2. 2019 Discussion:
 - Compliance degrades back to pre-inspection levels after inspections.
 - Permit applicant does not always communicate the requirements to onsite workers.
 - 64% of commercial and infrastructure sites yielded a score with moderate or low risk.
 - 44% of residential sites yielded a score with moderate or low risk.
 - Only three sites fully complied with regulations.
 - Increase inspection frequency to ensure compliance throughout project life.
 - Inspect sites proportional to ratios (i.e. residential/commercial/infrastructure).
 - Apply more emphasis on installation, maintenance, and records during inspections.
3. 2020 Discussion:
 - Multiple SWPPP reviews for a respective project do not result in elevated onsite compliance.
 - Inspection time and constant presence equates to improved compliance onsite.
 - The City's consulting engineer should create SWPPPs for public projects, not the contractor.
 - More emphasis required on installation, maintenance, and records during inspections.
4. 2021 Discussion:
 - Single review for a respective OAC permit did not result in a decrease of onsite compliance.
 - Recently inspected sites had higher instances of onsite compliance.
 - OAC site inspection emphasis resulted in a similar compliance score from the previous year.
 - Low SFR inspection rate resulted in similar compliance score from previous year.
5. 2022 Discussion:

- All three permit types showed large increases in compliance scores.
- Increased inspection rates results in increased compliance scores.
- OAC site inspection emphasis resulted in a higher compliance score from the previous year.



Graphic 5.6.2: Construction Compliance Audit Scores

5.7 Program Documents

1. Single-Family Residential Sites:

- Construction Stormwater Permit: Single-Family Residential Projects
- SFR Permit Review Checklist
- Construction Stormwater Permit Confirmation
- SFR and UAC Site Inspection Form
- Notice of Violations/Cease and Desist Order
- Stop Work Order

2. Less than One Acre Sites:

- Construction Stormwater Permit: Sites Less than One Acre
- UAC Permit Review Checklist
- Construction Stormwater Permit Confirmation
- SFR and UAC Site Inspection Form
- Notice of Violations/Cease and Desist Order
- Stop Work Order

3. Greater than One Acre Sites:

- MDEQ Construction General Permit
- MDEQ Construction General Permit Notice of Intent (NOI)
- MDEQ Construction Stormwater Pollution Prevention Plan (SWPPP)
- MDEQ Construction Stormwater Permit Notice of Termination
- MDEQ Construction Stormwater Permit Transfer Notification

- OAC Permit Review Checklist
- OAC Site Inspection Form
- Notice of Violations/Cease and Desist Order
- Stop Work Order

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Section 6.0

Post-Construction Program



Image 6.0.1 Overgrown stormwater basin



Image 6.0.2 Stormwater basin restoration

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6.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit through the regulation and oversight of existing and new structural Best Management Practices (BMP) in the following ways:

1. Enforcement of water quality and flood control standards on new and redevelopment projects;
2. Inspections of structural BMPs

SWMP Section 6.0 details the components necessary to administer the MS4's Post-Construction Management Program, including:

- Regulatory Framework and Applicable Documents (6.2)
- Development Review (6.3)
- Structural BMP Inventory (6.4)
- Inspection Program (6.5)
- High-Priority Structural BMPs (6.6)
- Enforcement Response Plan (6.7)
- Performance Tracking (6.8)
- Ongoing and Future Initiatives (6.9)

6.2 Regulatory Framework and Applicable Documents

Runoff generated from the first half-inch of rainfall (first flush) contains the majority of pollutants deposited on impervious areas during dry periods. Structural BMPs mitigate pollutants from entering waterways by capturing the first flush. Using BMPs, the MS4 requires new and redevelopment projects over one acre to capture the first half-inch of rainfall.

Developers must implement structural BMPs, which can include surface detention and retention facilities, permeable pavers, and underground infiltration facilities. In Bozeman, structural BMPs must also be designed to limit runoff to the predevelopment level during a 10-year, 2-hour storm. This reduces peak runoff and helps protect waterways, property and human health.

The MS4 also requires developers to implement non-structural BMPs that promote waterway health, including zoning and land planning, wetland regulations, waterway setbacks, and open space standards. Various governing documents contain standards, policies and regulations related to structural and non-structural BMPs for new and redevelopment, including:

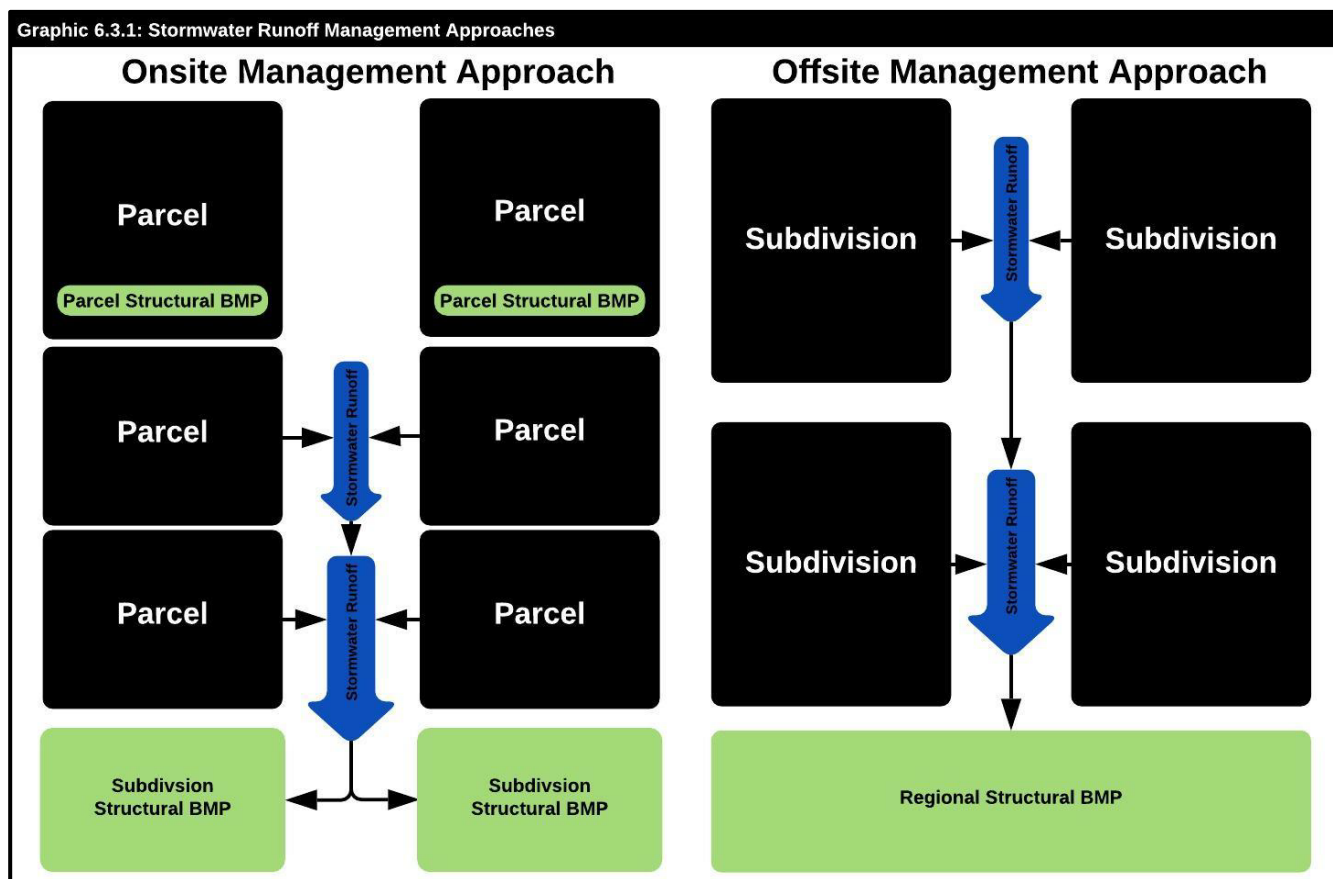
- City of Bozeman Design Standards and Specification Policy - 2020
- City of Bozeman Modifications to Montana Public Works Standard Specifications - 6th Edition
- Montana Public Works Standard Specifications - 6th Edition
- Bozeman Municipal Code
- Montana Post-Construction Storm Water BMP Design Guidance Manual - 2017
- City of Bozeman Stormwater Facilities Plan - 2008

6.3 Development Review

The MS4 completes development reviews related to structural BMPs as developers submit new and redevelopment project proposals. Projects triggering the regulatory threshold covered in SWMP Section 6.2 include commercial, multi-family, and subdivision developments. In most cases, developers utilize structural BMPs through an onsite management approach, which the MS4 defines at the parcel or

subdivision scale. The onsite management approach's primary benefits are the decentralized siting of structural BMPs, promotion of green space, and better integration of structural BMPs into the landscape. The disadvantage of this approach is the challenges of tracking the increasing number of structural BMPs throughout the MS4 as well as assigning financial responsibility for long-term maintenance responsibilities.

An alternative to the onsite management approach is the use of an offsite management approach such as regional treatment facilities. This approach results in structural BMPs located at the bottom of watersheds that contain numerous subdivisions. This approach's primary benefit is the reduction of individual BMPs and instead focuses on the efficiency of inspecting and maintaining fewer regional facilities. The disadvantages of this approach are that it requires significant planning, upfront MS4 investment, and an extensive payback financing mechanism. The MS4 does not utilize an offsite management approach; however, is exploring future opportunities. Graphic 6.3.1 provides a conceptual view of the varying management approaches.

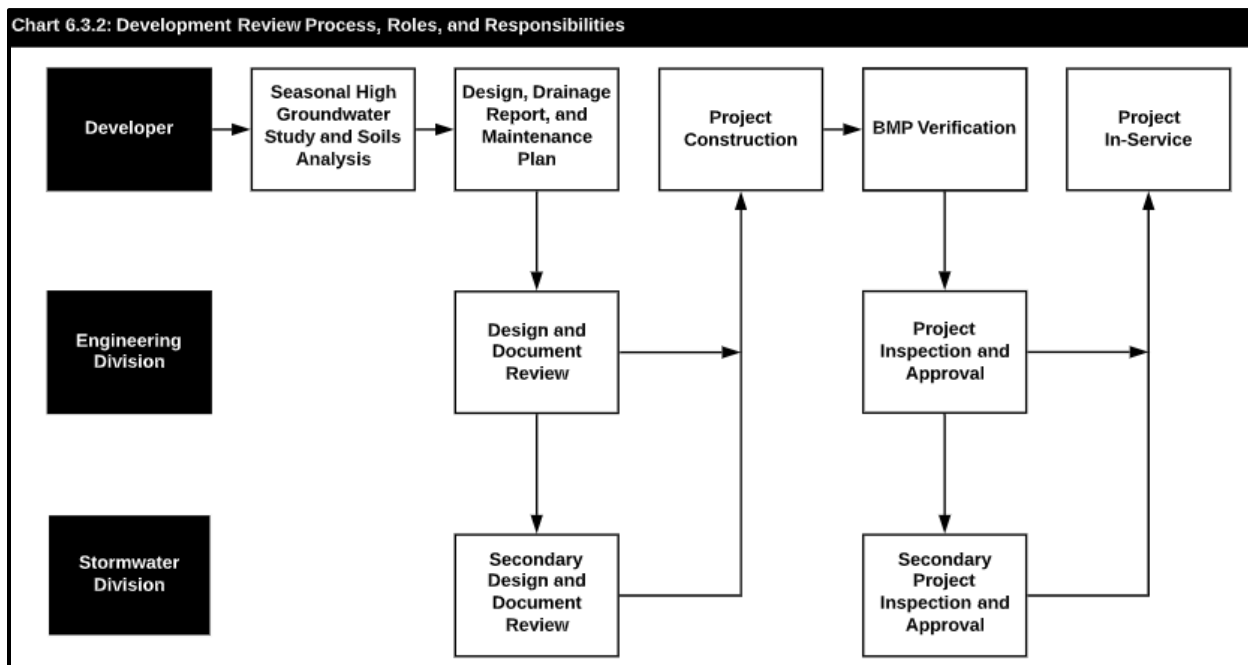


Graphic 6.3.1: Onsite and Offsite Management Approach Comparison

The following information and Chart 6.3.2 describe the MS4's typical structural BMP review process:

1. The developer selects a structural BMP based on site conditions, completes a design, and submits documents for review which includes drawings, drainage reports, and a maintenance plan.

2. The Engineering Division reviews the documents, ensures compliance with standards and policies, and provides written comments to the developer. This step repeats as necessary until the proposed design fully complies with design requirements. The Stormwater Division offers review support, primarily focusing on the maintenance-related aspects of the structural BMP.
3. The developer constructs the project and associated structural BMPs after receiving City approval. In some cases, modifications may occur at this stage in response to unforeseen site conditions.
4. Once complete, the Engineering and Stormwater Divisions complete an inspection to verify the developer installed the BMP as approved. In addition, the Stormwater Division provides a secondary inspection focused on stabilization. Results from the Stormwater Division's inspection are stored in the Site Inspection Form and shared with the developer. This step can repeat numerous times until the constructed BMP fully complies with the approved documents and Bozeman Municipal Code. The Stormwater Division confirms that the geographic information system (GIS) database contains the structural BMP.
5. The BMP goes into service and is indefinitely managed by the owner.



Graphic 6.3.2: Development Review Flow Chart

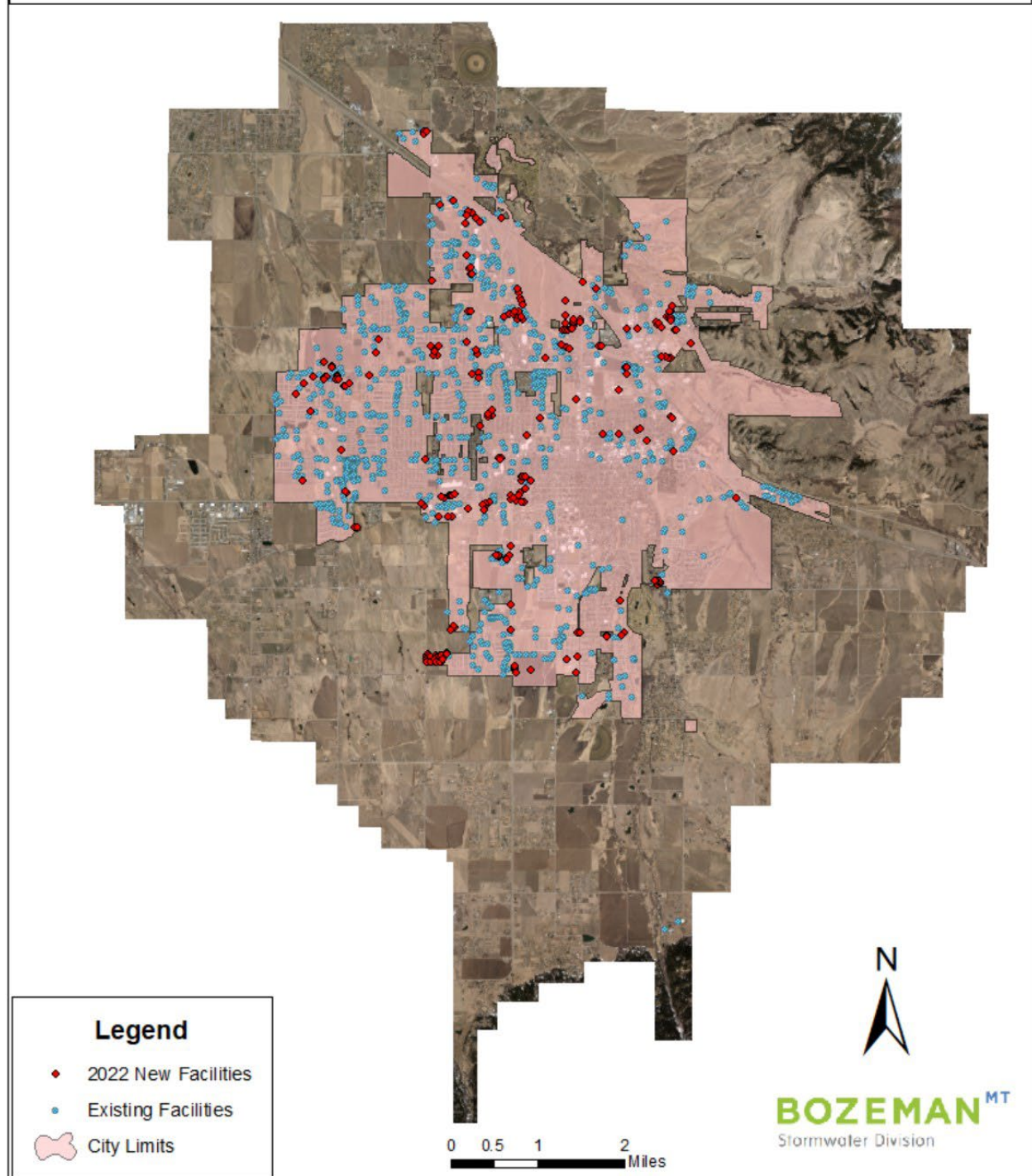
6.4 Structural BMP Inventory

The MS4 maintains an inventory of structural BMPs as development progresses. The process typically includes a combination of GIS map digitization and field verification. Tables 6.4.1 – 6.4.5 breakdown the structural stormwater BMPs based on four ownership categories, including:

1. Public: Contains structural BMPs located on public land, including the City and MSU.
2. Private: Contains structural BMPs located on private property.
3. Open Space/Parkland: Contains structural BMPs located on homeowner association (HOA) open space or parkland.
4. Unknown: Contains structural BMPs without known ownership.

Stormwater Program - Facility Inventory

City of Bozeman Stormwater Division



Graphic 6.4.1: Post-Construction Facility Inventory Map

The MS4 also categorizes and tracks the type of structural BMPs:

1. Surface Detention Facility: Regulated discharge to receiving waterway via an outlet structure
2. Underground Detention Facility: Regulated discharge to waterway via an outlet structure
3. Surface Retention Facility: No discharge to a waterway
4. Underground Retention Facility: No discharge to a waterway

The MS4 updates the inventory annually, with variations occurring as ownership determinations arise.

Table 6.4.2 Public Structural BMPs			
Type	2020	2021	2022
Surface Detention Facility	26	38	45
Underground Detention Facility	2	3	3
Surface Retention Facility	12	19	39
Underground Retention Facility	1	10	10
Total:	41	70	97

Table 6.4.3 Private Structural BMPs			
Type	2020	2021	2022
Surface Detention Facility	133	142	190
Underground Detention Facility	12	18	26
Surface Retention Facility	137	211	304
Underground Retention Facility	40	74	91
Total:	322	445	611

Table 6.4.4 Home/Property Owners Association			
Type	2020	2021	2022
Surface Detention Facility	247	253	251
Underground Detention Facility	32	32	32
Surface Retention Facility	88	121	129
Underground Retention Facility	7	11	11
Total:	374	417	423

Table 6.4.5 Unknown Owner Structural BMPs			
Type	2020	2021	2022
Surface Detention Facility	18	12	8
Underground Detention Facility	-	-	-
Surface Retention Facility	14	5	5
Underground Retention Facility	-	1	-
Total:	32	18	13

Table 6.4.6 Summary			
Land Classification	2020	2021	2022
Public	41	70	97
Private	322	445	611
HOA	374	417	423
Unknown	32	18	13
Total:	769	950	1,144

The MS4 also completes an annual analysis to identify high-priority structural BMPs. To complete the analysis, the MS4 completes a risk assessment in GIS using the following criteria:

- Size: Structural BMPs larger than 1,076 square feet, analyzed using geometric data in GIS
- Proximity: Within 500 feet of an impaired waterbody, analyzed using a 500' buffer in GIS
- Type: Surface detention or underground detention facility, analyzed using GIS data

The MS4 deems structural BMPs that meet all criteria as high-priority and manages them per the protocol detailed in SWMP Section 6.5. Table 6.4.6 includes totals, and Table 6.6.1 includes specific structural BMP information.

Table 6.4.7 High Priority Structural BMP Ownership			
Land Classification	2020	2021	2022
Public	13	13	12
Private	3	4	2
HOA	3	1	1
Unknown	1	1	0
Total:	20	19	15

6.5 Inspection Program

The MS4 completes inspections of typical and high-priority structural BMPs using qualitative and quantitative data collection practices. Inspection frequencies for the two types include:

- Typical: Complaint-based, field observation, or as needed; no reoccurring return intervals are established at this time.
- High-Priority: Annual inspection per the requirements detailed in the MS4 Permit.

The MS4 receives permission from the underlying property owner to access the structural BMP. Once granted, a typical inspection involves the review of the physical characteristics, flow path, maintenance needs, and facility geometry. The MS4 documents facility conditions using the Stormwater Facility Inspection Form, and then assigns each facility a maintenance priority level:

- Low: Structural BMP appears to be functioning as designed.
- Medium: Structural BMP requires minor to moderate sediment and vegetation maintenance to mitigate the risk of flooding, waterway pollution, and infrastructure failure.
- High: Structural BMP requires significant sediment dredging, vegetation removal, and/or infrastructure repairs to restore function.

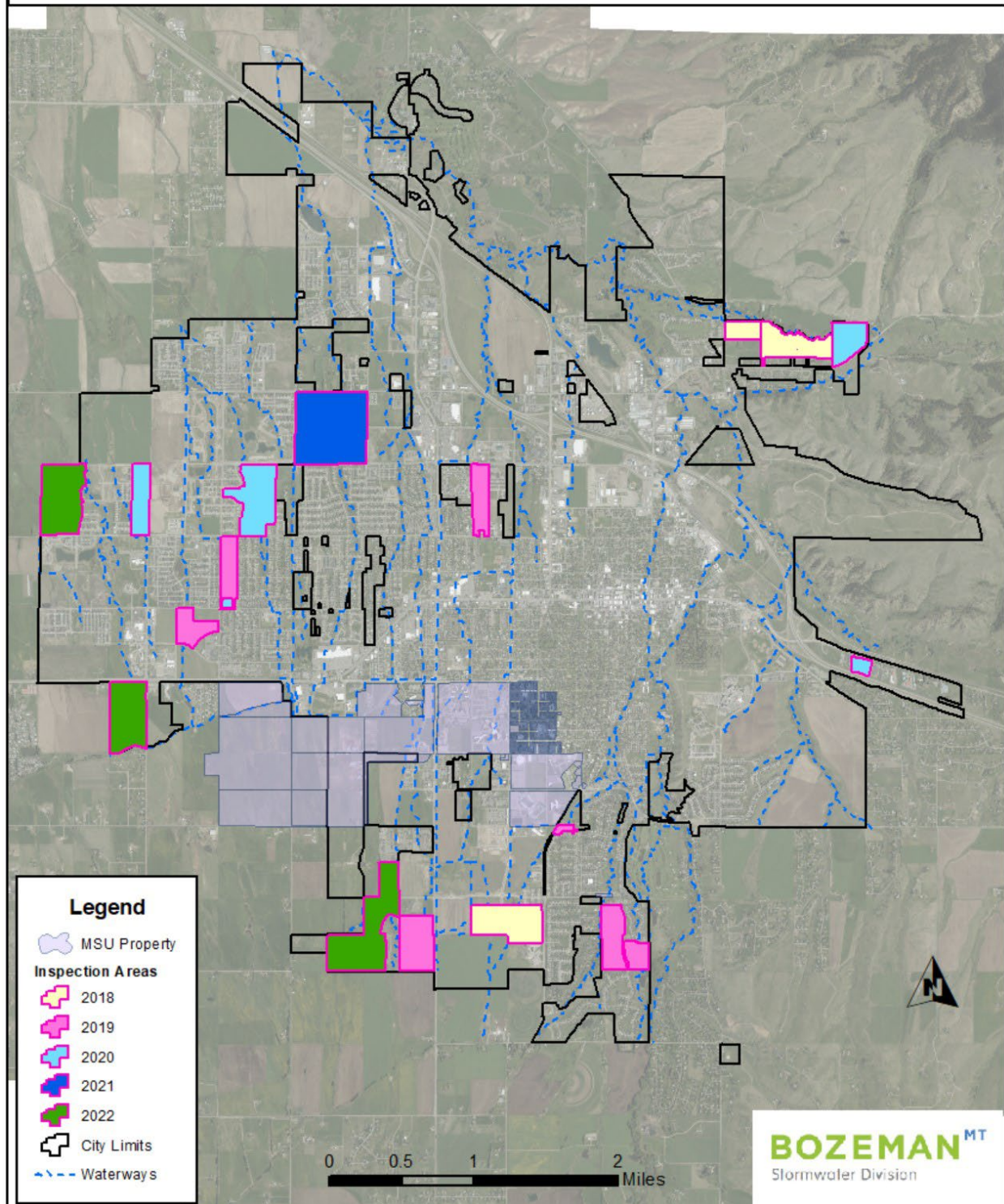
The MS4 typically sends the owner a letter, inspection form, map, and maintenance guide, and requests they submit a plan to complete necessary maintenance and resolve the identified issues.

The MS4 has completed the following inspections of structural BMPs (including high-priority):

Table 6.5.1 Post Construction Facility Inspections						
Land Type	2020		2021		2022	
	# Inspected	% of Total	# Inspected	% of Total	# Inspected	% of Total
Public	13	-	18	-	12	-
Private	4	-	10	-	4	-
HOA	30	-	8	-	18	-
Unknown	1	-	0	-	0	-
Total:	48	6%	36	4%	34	3%

Stormwater Facility Inspection Program

Updated - January 16, 2023



Graphic 6.5.2 Post-Construction Inspection Program Map

6.6 High-Priority Structural BMPs

The MS4 manages the following structural BMPs as high-priority:

#	Facility ID	Owner	Area (ft ²)	Receiving Waterbody	2020 Rating	2021 Rating	2022 Rating
1	DP.H06.00026	MSU Facility 1	3,185	Mandeville Creek	Low	Low	Low
2	DP.H06.00400	MSU Facility 2	7,591	Mandeville Creek	Low	Low	Low
3	DP.H06.00024	MSU Facility 3	11,829	Mandeville Creek	Low	Low	Low
4	DP.H06.00023	MSU Facility 4	4,667	Mandeville Creek	Medium	Low	Low
5	DP.H06.00028	MSU Facility 5	1,294	Mandeville Creek	Low	Low	Low
6	DP.H06.00025	MSU Facility 6	7,231	Mandeville Creek	Low	Low	Low
7	DP.I51.00073	City WRF 1	10,744	East Gallatin River	Low	Low	Low
8	DP.I51.00075	City WRF 2	1,355	East Gallatin River	Low	Low	Low
9	DP.I51.00074	City WRF 3	10,314	East Gallatin River	Low	Low	Low
10	DP.E02.00006	City Vehicle Maintenance	5,577	East Gallatin River	Medium	Low	Low
11	DP.H04.00006	Bozeman School District 1	7,188	Mandeville Creek	Low	Low	Low
12	DP.G02.00017	Tange's Addition	2,245	Mandeville Creek	Medium	High	High
13	DP.F01.00026	SID 674	7,354	East Gallatin River	High	High	Med
14	DP.H07.00022	South University District 1	14,775	Mandeville Creek	Low	Low	Low
15	DP.H07.00023	South University District 2	26,987	Mandeville Creek	Low	Low	Low
16	DP.G03.00050	Headwaters Academy	1959	Mandeville Creek	-	Low	Low

The following summarizes the inspection activity for each high-priority structural BMP:

1-6. MSU Facilities 1-6

- 2020: All facilities inspected and reports submitted to MSU Facilities Director other than MSU Facility 6, which was under construction.
- 2021: All facilities inspected and reports submitted to MSU Facilities Director
- 2022: All facilities inspected and reports submitted to MSU Facilities Director

7-9. City WRF 1-3

- 2020: All facilities inspected and reports submitted to the WRF Superintendent.
- 2021: All facilities inspected and reports submitted to the WRF Superintendent.
- 2022: All inspected and reports submitted to the WRF Superintendent.

10. City Vehicle Maintenance

- 2020: All facilities were inspected and the report was submitted to the Streets Superintendent; the detention pond was rehabilitated.
- 2021: Inspected and report submitted to the Streets Superintendent.
- 2022: Inspected and report submitted to the Streets Superintendent

11. Bozeman School District #1

- 2020: BSD #1 Inspected and report submitted to Facilities Director.
 - 2021: BSD #1 Inspected and report submitted to Facilities Director.
 - 2022: BSD #1 Inspected
12. Tanges Addition
- 2020: Inspected and report compiled; however, not sent due to legal/policy issues.
 - 2021: Inspected and report compiled; sent to the owner
 - 2022: Inspected. The owner is planning further analysis with neighboring site development.
13. SID 674
- 2020: Inspected and report compiled; however, not sent due to legal/policy issues.
 - 2021: Inspected and determined to be City-owned.
 - 2022: Inspected and maintenance to inlet and portion of pond completed.
- 14-15. South University District 1-2
- 2020: Inspected and compiled report; however, not sent due to legal/policy issues.
 - 2021: Inspected and determined to be City-owned.
 - 2022: Inspected
16. Headwaters Academy
- 2022: Inspected and report compiled.

6.7 Enforcement Response Plan

This section outlines the MS4's Enforcement Response Plan (ERP), which provides strategies and authority to ensure owners install, operate, and maintain structural BMPs.

1. Design: SWMP Section 6.2 references documents containing regulations and legal requirements regarding structural BMP design. If a developer does not fully comply with regulations, the MS4's formal response is to deny the site plan, making it impossible to acquire a building permit. If a developer begins construction without a building permit, a Community Development Code Compliance offer issues a Stop Work Order per BMC Sec. 38.200.040.
2. Installation: SWMP Section 6.3 details the MS4's structural BMP review process. During this stage, the MS4 uses the following enforcement protocols:
 - Informal, Formal, and Judicial: When a pollutant control issue is identified, the MS4 submits a written notification to the owner and uses the protocol in SWMP Section 5.3. The Construction ERP is the regulatory authority until the site reaches final site stabilization. Bozeman Municipal Code Section 40.04.350 outlines the permission protocols to enter the property for inspection.
 - Formal: If an engineering-related issue (groundwater, site plan deviation, utility conflict) occurs, the owner is required to coordinate with the Engineering Division to find a solution. The MS4 will withhold occupancy on the project and not accept infrastructure until the owner resolves the identified issues.
3. Operation and Maintenance: SWMP Section 6.5 outlines the MS4s structural BMP inspection program. Upon sending the documents, the MS4 uses the following enforcement protocol:

- Informal: The MS4 communicates with the owner and shares the results of the facility inspection. A six-month timeline is set, which requires the owner to submit a maintenance plan to the MS4 describing how the identified issues will be resolved.
- Formal and Judicial: The MS4 does not have a formal policy or process at this time. The Engineering Design Standards Update and the Stormwater Facilities Plan Update will ultimately determine this portion of MS4's ERP. The MS4 plans to present policy recommendations from these efforts to the City Commission for decision as soon as they are complete.

6.8 Performance Tracking

The MS4 completes a Structural BMP Compliance Audit annually, evaluating 50 randomly chosen structural BMPs to determine their condition, based on the following criteria:

1. Vegetation Management: Evidence of reoccurring cattail, grass, and woody shrub removal
2. Flow path: As designed, blocked by vegetation and/or sediment, and channelization
3. Sediment accumulation, stagnant water, or accumulation of vegetation which reduces volume and infiltration rate

After evaluation, the MS4 grades each structural BMP using one of the following categories:

1. 0-Points: Structural BMP requires sediment dredging, vegetation removal, or infrastructure repairs to restore function
2. 1-Point: Structural BMP requires minor to moderate sediment and vegetation maintenance to maintain function
3. 2-Points: Structural BMP appears to be well-maintained and functioning as designed

The MS4 compiles the collected data and is summarized in Table 6.8.1:

Audit Year	Audit Dates	Trend	Total Points	Earned Score
2018	October 17 - 26	-	25/100	25%
2019	November 14 - 15	Increasing	32/100	32%
2020	November 2 - 6	Increasing	56/100	56%
2021	October 18 - 19	Increasing	74/100	74%
2022	October 25-27	Decreasing	67/100	67%

1. 2018 Summary:

- Wal-Mart, Safeway, and other private entities maintain their structural BMPs more frequently, yielding an average score six times greater than HOAs.
- Structural BMPs integrated into landscapes are in better condition than those hidden.
- The overwhelming majority of HOAs are unaware of their responsibilities and do not complete maintenance regardless of previous engagement by the City.
- Current design standards allow for the construction of inadequate systems.

2. 2019 Summary:

- Structural BMPs integrated into landscapes are in better condition than those hidden.
- The overwhelming majority of HOAs are ignorant of their maintenance responsibilities.
- Current design standards allow for the construction of inadequate systems.
- Legal private property access is an issue that requires consideration and resolution
- Average Scores: Private = 1.0 and HOA = 0.3

3. 2020 Summary:

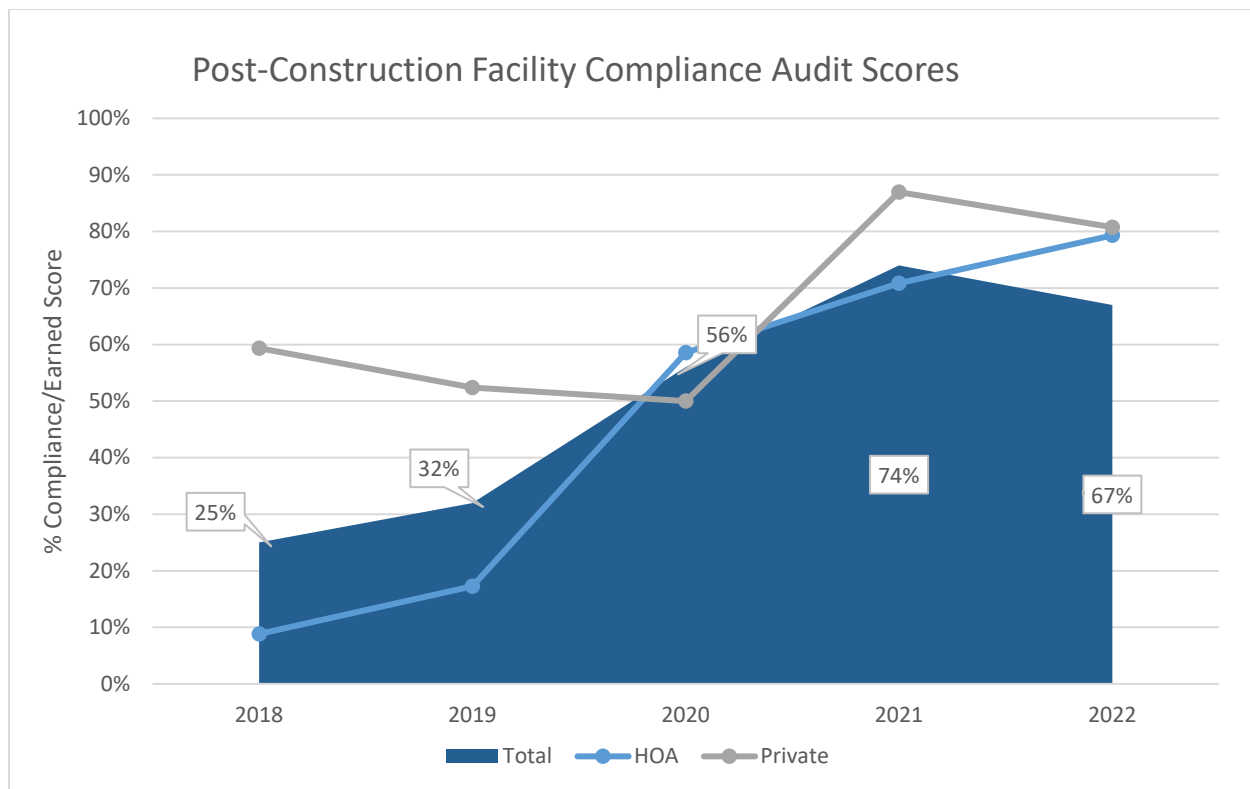
- New structural BMPs rate high and were a disproportionate majority, elevating the score.
- HOA scores are improving mainly resulting from the addition of new structural BMPs.
- Older private structural BMPs declined in performance.
- Many structural BMPs are located on parkland property and may be the responsibility of the MS4 due to the recently approved Parks and Trails District.
- Average Scores: Private = 1.0 and HOA = 1.2

4. 2021 Summary:

- New structural BMPs as related to the rate of development growth in the MS4, score higher as a result of their disproportionate majority, effectively elevating the audit score
- HOA scores are improving as a result of new developments in the MS4
- Many structural BMPs are located on parkland property and rarely are the responsibility of the MS4
- Older structural BMPs in HOAs have become a focal point for maintenance inspections and association communications
- Average Scores: Private = 1.7 and HOA = 1.4

5. 2022 Summary:

- HOA scores are improving as a result of new developments in the MS4
- Randomized selection resulted in a lowest number of private sites compared to prior reporting periods.
- Older structural BMPs in HOAs have become a focal point for maintenance inspections and association communications
- Average Scores: Private = 1.6 and HOA = 1.6



Graphic 6.8.2 Facility Inspection Compliance Scores 2018-2022

6.9 Ongoing and Future Initiatives

The following initiatives are planned or ongoing to facilitate improved plans, policies, and ordinances related to the MS4's Post-Construction Program:

1. **2021 Engineering Design Standards Update:** A project that includes reviewing and updating MS4's Engineering Standards. Improvements will consist of better incorporating the MS4 Permit's water quality requirements, integrating the Montana Post-Construction BMP Guidance Manual, and standardizing forms, such as drainage reports and maintenance agreements.
2. **Stormwater Facility Plan Update:** The MS4's Facility Plan has not received an update since 2008. The project will include reviewing and developing policy recommendations related to deficient or previously unexplored program components.
3. **Center for Watershed Protection Code and Ordinance Worksheet:** In 2020, the MS4 met with the Parks, Planning, and Engineering Divisions and completed the worksheet to determine barriers to implementing stormwater and land-use structural and non-structural BMPs. The worksheet was helpful for barrier identification and internal discussion.

The MS4 found that some of the recommendations were not applicable or practicable due to various local conditions. Further, the MS4 confirmed it already has aggressive and protective environmental regulations in place such as; watercourse setbacks, open space requirements, a

suite of structural BMP options, strategic land use planning, and impervious area maximums. In summary, the MS4 identified the following items for potential improvement:

- Recommendation: Allow for alternative sidewalk and driveway materials.
 - Current Status: The MS4 has seen a variety of permeable concrete paver surfaces installed in the last few years, which current design standards do not explicitly cover.
 - Future Opportunity: Consider modifying codes as a part of the Standards Update.
- Recommendation: Secure permanent funding arrangements for the long-term management and maintenance of open space.
 - Current Status: The City requires the establishment of HOAs at the time of subdivision development; however, it does not require financial guarantees regarding the maintenance of open space, which often includes stormwater facilities and natural resource areas. This issue spans numerous policies but focuses on the lack of assurance that HOAs are viably maintained and funded in perpetuity. Often HOAs dissolve due to a lack of volunteers, representation, or ability to raise money.
 - Future Opportunity: Review policy options as a part of the Facility Plan Update.
- Recommendation: Long-term management plans that conserve natural systems for all open space areas.
 - Current Status: Maintenance plans and open space agreements are typically not specific and fail to address all needs adequately.
 - Future Opportunity: Consider reviewing policies during the City of Bozeman's Parks, Recreation, Open Space, Trails (PROST) Plan update.
- Recommendation: Require limits of disturbance to be shown on construction plans and physically marked at the site.
 - Current Status: The Montana Construction General Permit does not require
 - Future Opportunity: Coordinate with the Montana Department of Environmental Quality (DEQ) during the next permit issuance.
- Recommendation: Provide a reference to clear, understandable, and local or regionally based design guidance or stormwater manual.
 - Current Status: The Montana Post-Construction BMP Design Guidance Manual exists; however, it is not referenced nor codified in the MS4's Engineering Standards.
 - Future Opportunity: Consider modifying codes as a part of the Standards Update.
- Recommendation: Mandate performance bonds and periodic inspections to ensure proper installation of stormwater practices based on the approved plans.
 - Current Status: No requirements exist.
 - Future Opportunity: Review policy options as a part of the Facility Plan Update.
- Recommendation: Include provisions for runoff reduction practice easements, inspector right-of-entry, maintenance agreements, and post-construction inspections.
 - Current Status: The listed items either do not exist or require improvement.
 - Future Opportunity: Consider modifying codes as a part of the Standards Update.

- Recommendation: Require some percentage of treatment on-site if off-site stormwater compliance is authorized.
 - Current Status: The MS4 does not allow offsite stormwater management.
 - Future Opportunity: Review policy options as a part of the Facility Plan Update.

Section 7.0

Good Housekeeping Program

Graphic 7.0.1: Street sweeping debris pile



Graphic 7.0.2: Sediment management facility

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7.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit through the responsible management of its storm sewer system, facilities, and daily work activities by:

1. Inspecting, maintaining, and repairing storm sewer system assets;
2. Mitigating stormwater pollutants through the development and implementation of Facility and Activity Stormwater Pollution Prevention Plans; and
3. Maintaining an environmentally conscious workforce through training.

SWMP Section 7.0 details the following components necessary to administer the MS4's Good Housekeeping Program, including:

- Infrastructure Operations (7.2)
- Stormwater Management Team Training (7.3)
- Facility Stormwater Pollution Prevention Program (FSWPPP) (7.4)
- Activity Stormwater Pollution Program (ASWPPP) (7.5)
- Activity and Facility Stormwater Pollution Prevention Plan Training (7.6)

7.2 Infrastructure Operation

The City inspects, maintains, and repairs its storm sewer system on an annual basis. MSU maintains infrastructure within its boundary. The following Divisions are responsible for conducting infrastructure operations:

Table 7.2.1: Infrastructure Operations			
Operation	Goal	Season	Operational Area
Stormwater Division Operations			
Storm Sewer Inspection (CCTV)	20% per year	Year-round	Citywide
Storm Sewer Cleaning	20% per year	Above freezing	Citywide
Storm Sewer Repair	As Required	Spring, Summer, Fall	Citywide
Treatment Unit Maintenance	Annually	Fall	Individual Locations
Infiltration Facility Maintenance	As needed	Fall	Individual Locations
Debris Hauling	Annually	Varies	Sediment Facility
Streets Division Operations			
Spring Cleanup	Annually	Spring	Citywide
Fall Cleanup	Annually	Fall	Citywide
Street Sweeping	Annually	Year-round	Citywide
Sweepings Hauling	Annually	Varies	East Gallatin Area

The MS4 uses the following metrics to track performance. The performance data comes from the MS4's Operation's Dashboard, and infrastructure totals from SWMP Section 4.8. The metrics include:

1. Inlets and Manholes Cleaned: Storm sewer inlets and manholes serve two purposes: (1) mitigate flood risk by collecting runoff from streets, parking lots, alleyways, and other hard surfaces, and (2) treat stormwater by capturing sediment, trash, and other pollutants in their sumps.
 - Performance Goal: Clean 20% of public inlets and manholes annually
 - Calculation Type: Total assets (includes duplicate effort)

Table 7.2.2: Inlet and Manholes Totals

Year	City/MDT Maintained	City/MDT Total	% Complete	MSU Maintained	MSU Total	% Complete
2018	742	3,778	20%	256	362	71%
2019	809	4,216	19%	263	362	73%
2020	909	4,188	22%	207	365	57%
2021	894	4,098	22%	244	365	67%
2022	405	4,311	9%	304	381	80%

2. Storm Sewer Cleaned: Storm sewers serve two purposes: (1) convey stormwater collected by inlets to their point of discharge, and (2) capture sediment, trash, and other pollutants that fall out of suspension, requiring reoccurring maintenance to remain functional.

- Performance Measure: Clean 20% of pipes annually
- Calculation Type: Total assets (mains and laterals, includes duplicate effort)

Table 7.2.3: Storm Sewer Totals

Year	City/MDT Maintained	City/MDT Total	% Complete	MSU Maintained	MSU Total	% Complete
2018	17 miles	71 miles	24%	.1 miles	8 miles	1%
2019	14 miles	77 miles	18%	.1 miles	8 miles	1%
2020	17 miles	78 miles	19%	.1 miles	8 miles	1%
2021	17 miles	76 miles	21%	.2 miles	8 miles	2.5%
2022	8.5 miles	82 miles	10%	0 miles	0 miles	0%

3. Infrastructure Repairs: Infrastructure repairs or “spot repairs” serve two purposes: (1) fix known pipe failures and restrictions to ensure the adequate flow of stormwater, and (2) repair open sections of pipe where scouring of subgrade soils occur, mitigating the chance of a road failure and sediment load contribution.

- Performance Measure: Pipe integrity indicator
- Calculation Type: Total repairs

Table 7.2.4: Infrastructure Repair Totals

Year	City Total	MSU Total
2018	16 Repairs	2 Repairs
2019	10 Repairs	0 Repairs
2020	3 Repairs	1 Repair
2021	5 Repairs	1 Repair
2022	2 Repairs	3 Repairs

4. Television Inspections (CCTV): Storm sewer inspections serve two purposes: (1) identification and prioritization of structural and maintenance needs for underground infrastructure and (2) identifies illicit discharges, cross-connections, or illegal pipe connections.

- Performance Measure: Inspect 20% of storm sewer mains annually
- Calculation Type: Total assets (mains and laterals, includes duplicate effort), likely underreported, due to inspecting pipes before they are accepted into City infrastructure. Assets, length, and work orders can't be aligned until they are accepted.

Table 7.2.5: Television Inspection Totals

Year	City/MDT Maintained	City/MDT Total	% Complete	MSU Maintained	MSU Total	% Complete
2018	14 miles	71 miles	20%	.4 miles	8 miles	5%
2019	11 miles	77 miles	14%	.02 miles	8 miles	.2%
2020	9 miles	78 miles	12%	.5 miles	8 miles	6%
2021	10 miles	76 miles	13%	.6 miles	8 miles	7.5%
2022	9 miles	82 miles	11%	0 miles	0 miles	0%

7.3 Stormwater Management Team Training

The MS4 completes trainings per MS4 Permit II.B.1-4 as identified in the sections below. Training materials and certifications are stored electronically on the MS4's server and updated annually to address new MS4 Permit requirements, stay up-to-date on SWMP changes, and the implementation of new BMPs.

1. Stormwater Management Team (SWMT)
 - Stormwater Program Manager, Program Specialist, Project Coordinator, and Technicians complete a comprehensive training of MS4 Permit requirements and implementation responsibilities. An annual work plan is developed outlining BMPs, implementation responsibility, and estimated work load. Additionally, permit responsibilities are regularly assigned via a weekly work task meeting involving all SWMT members. New SWMT members receive awareness training within 90 days of employment.
2. Construction Site Personnel
 - Stormwater Program Specialist and Technicians receive numerous Construction Site Stormwater Pollution Prevention Plan (SWPPP) trainings, including Stormwater Management and Erosion Control During Construction, SWPPP Preparer/Administrator, and Compliance Evaluation Inspector. Specifically, Staff are trained how to review SWPPPs and conduct compliance evaluation inspections - using the MS4's plan review and site inspection checklists - for compliance with requirements contained in the Technology Base Effluent Limitations of the most current Construction General Permit. Additional trainings include Dewatering Operations During Construction and a BMP Field Academy.
3. Post-Construction Personnel
 - Stormwater Program Manager, Project Coordinator, and Development Review Engineers receive plan review training. Development Review Engineers utilize a plan review checklist to ensure consistent review and document compliance with with state and local post-construction requirements. Project Coordinator conducts stormwater facility inspection trainings with Technicians as outlined in SWMP Sections 6.5, 6.6, and 6.7.
4. Field and Facility Personnel
 - Field and Facility personnel whose work activities have the potential to impact stormwater quality receive training during the 1st and 4th years of the MS4 Permit term. Applicable Facilities and Activities in which Staff receive training are outlined in SWMP Sections 7.4, 7.5, and 7.6. Trainings include an overview of requirements

contained in the most current MS4 Permit and applicable FSWPPPs and/or ASWPPPs, including SOG's, required BMP's to mitigate stormwater pollutants generated from municipal facilities and activities, and spill response procedures.

5. Conferences and Miscellaneous Trainings

- SWMT members attend various conferences and miscellaneous trainings. Conferences attended include the Montana Stormwater Conference, Water Environment Federation Technical Conference, International Erosion Control Association Annual Conference, StormCon, and Montana Section AWWA Conference. Miscellaneous trainings completed include Virtual Designing Successful Stormwater Facilities with Maintenance and Enforcement in Mind, Virtual ADS/Baysaver BMP Design and Maintenance Workshop, WQM 130 Stormwater Management for Industrial Operations, CI200B: QCIS – Qualified Compliance Inspection of Stormwater, and Hazardous Waste Training.

7.4 Facility Stormwater Pollution Prevention Program

The purpose of the MS4's Facility Stormwater Pollution Prevention Program (FSWPPP) is to mitigate stormwater pollutants generated on municipal facilities. The MS4 works to ensure all municipal facilities meet or exceed the following Facility Minimum Standards (FMS):

- Connect interior wash bays and interior floor drains to the sanitary sewer.
- Store chemicals under cover and/or within secondary containment.
- Prevent tracking at facility entries, exits, and within parking areas.
- Stock spill kits with instructions, disposable bags, PPE, and absorbent products.
- Perform preventative maintenance on vehicles and equipment.
- Wash vehicles and equipment in designated locations.
- Contain fuel tanks with secondary containment.
- Implement BMPs for identified pollutants.
- Maintain stormwater facilities per the following frequencies: (1) Stormwater basins, annual vegetation and debris clearing, 10-15 year dredging; (2) Mechanical separators, annual vacuuming; (3) Infiltration facilities, annual flushing; (4) Parking and drive surfaces, as required; and (5) Inlets, manholes, and pipes, five-year flushing, vacuuming, and inspection cycle.
- Stabilize disturbed areas within 14 days.

The MS4 uses the following FSWPPP inspection protocol:

1. If applicable, collect stormwater runoff sample to characterize facility pollutant concentrations.
2. Inspect facility for compliance with FMSs.
3. Review existing documents, such as existing Standard Operating Guides (SOGs), safety data sheets, spill documentation, and stormwater facility record drawings.
4. Coordinate with applicable leadership and develop FSWPPP that includes:
 - Overview
 - Stormwater Team
 - Site Description
 - Impaired Waterbodies
 - Sampling
 - Pollution Identification
 - Site Assessment
 - Spill Response Plan
 - Training
 - Inspections
 - Infrastructure Improvements
 - Record Keeping and Reporting
 - Site Map

5. Implement FSWPPP.
6. Train applicable field staff.
7. Re-inspect and update the FSWPPP annually.

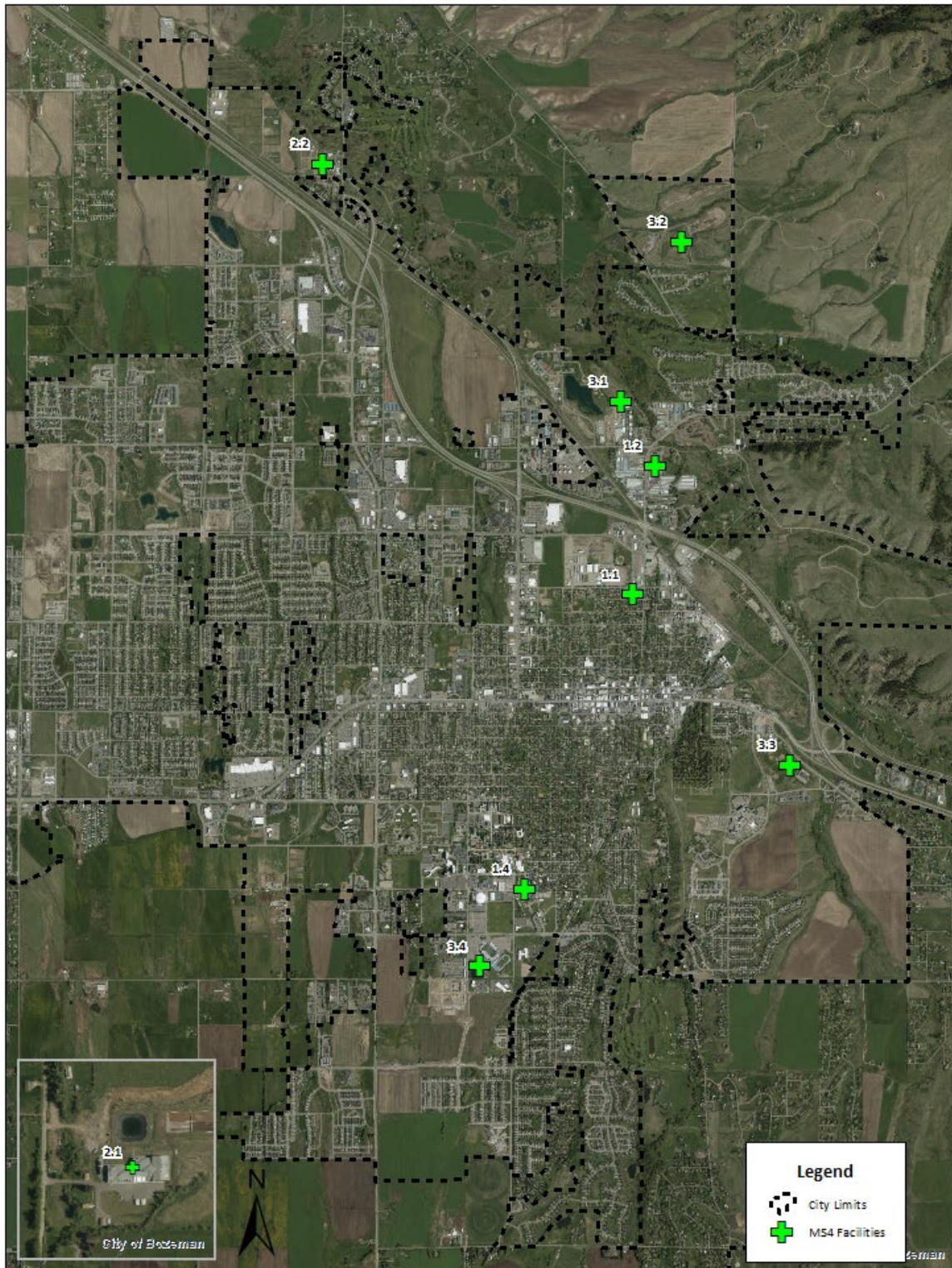
The following facilities are subject to the FSWPPP protocol:

Table 7.4.1: MS4 Facilities Inventory					
Facility ID	Facility Name	Facility Classification	Initial Inspection	FSWPPP Development	FSWPPP Updates
1.1	City Shops Complex	Operations and Storage Area	2019	2019	2020, 2021, 2022
1.2	Vehicle Maintenance Facility	Operations and Storage Area	2019	2019	2020, 2021, 2022
2.1	Water Treatment Plant	Treatment Works	2020	2020	2021, 2022
2.2	Water Reclamation Facility	Treatment Works	2019	2019	2020, 2021, 2022
3.1	East Gallatin Storage Area	Material Storage Area	2020	2020	2021, 2022
3.2	Solid Waste Landfill	Material Storage Area	2019	2019	2020, 2021, 2022
3.3	Snow Storage Area	Material Storage Area	2019	2019	2020, 2021, 2022

The MS4 removed the following facilities from the 2022 FSWPPP Inventory.

1. Laurel Glen Operations Facility
2. Cemetery Shops Complex
3. Bozeman Public Safety Center
4. City Hall
5. Fire Stations 1 – 3.

Inspections of the Facilities determined that they do not contribute contaminants to the MS4 beyond what is found at other similar buildings in town. Post-construction features and infrastructure at these Facilities are maintained at the regular interval. Staff conducted inspections of each Facility using the standard form and inspection protocol. During Facility inspections, Staff documented that all operations and material storage at these Facilities occurs indoors. Inspection reports documenting the no negative impacts findings are stored electronically by the Stormwater Division.



Graphic 7.4.3: MS4 facilities

Table 7.4.2: MSU Facilities

Facility ID	Facility Name	Facility Classification	Initial Inspection	FSWPPP Development	FSWPPP Update
1.4	University Shops Facility	Operations and Storage Area	2019	2021	2022
3.4	MSU Material Storage Area	Material Storage Area	2020	2021	2022

7.5 Activity Stormwater Pollution Prevention Program

The purpose of the MS4's Activity Stormwater Pollution Prevention Program (ASWPPP) is to mitigate stormwater pollutants generated from municipal operations. The MS4 works to ensure all operations meet or exceed the following Activity Minimum Standards (AMS):

- Protect street surfaces and inlets by deploying controls that capture, contain, and allow for the collection and disposal of generated pollutants.
- Cover or contain material stockpiles and control run-on.
- Stabilize disturbed areas within 14 days of activities.
- Prevent tracking and the off-site migration of debris.
- Capture and dispose concrete waste.
- Manage dewatering flows to remove sediment to the maximum extent practicable before entering the storm sewer system or waterways.

The MS4 uses the following ASWPPP inspection protocol:

1. Review activity and establish baseline compliance with AMSs.
2. Coordinate with applicable leadership and develop ASWPPP that includes:
 - Overview
 - Stormwater Team
 - Activity Description
 - Pollutant Identification
 - Standards Assessment and SOGs
 - Training
 - Record Keeping
3. Implement ASWPPP.
4. Train applicable field staff.

The following activities are subject to the ASWPPP protocol:

Table 7.5.1: MS4 Activities

Activity Name	Division	Responsible Entity	Inspection Year	ASWPPP Development	ASWPPP Evaluation
Trenching and Excavation	Water and Sewer	City	2020	2020	2022
Sidewalk and Curb Construction	Water, Sewer, and Streets	City	2021	2021	2022
Concrete Cutting	Water, Sewer, and Streets	City	2021	2021	2022

Table 7.5.1: MS4 Activities

Activity Name	Division	Responsible Entity	Inspection Year	ASWPPP Development	ASWPPP Evaluation
Roadway Traction Sand Application	Streets	City	2020	2020	2022
Solid Waste Collection	Solid Waste	City	2020	2020	2022
Parks Mowing	Parks and Rec	City	2021	2021	2022
Tree Planting, Pruning, Removal	Forestry	City	2021	2021	2022
Parking Lot & Garage Maintenance	Streets	City	2021	2022	2022

Table 7.5.2: MSU Activities

Activity Name	Division	Responsible Entity	Inspection Year	ASWPPP Development	ASWPPP Evaluation
Emergency Water Main Breaks	Water/Sewer/Storm	City/MSU	2019	2019	2022
Sanitary Sewer Overflows	Water/Sewer/Storm	City/MSU	2019	2019	2022
Parking Lot & Garage Maintenance	MSU Facilities	MSU	2021	2022	2022
Arena Construction	MSU Facilities	MSU	2021	2021	2022
Roadway Traction Sand Application	MSU Facilities	MSU	2021	2021	2022
Solid Waste Operations	MSU Facilities	MSU	2021	2021	2022
Stadium Events	MSU Facilities	MSU	2021	2021	2022
Rodeo	MSU Facilities	MSU	2021	2021	2022
Tree Planting, Pruning, Removal	MSU Facilities	MSU	2021	2021	2022
Turf Fertilization and Weed Control	MSU Facilities	MSU	2021	2021	2022
Turf Mowing	MSU Facilities	MSU	2021	2021	2022

7.6 Activity and Facility SWPPP Training

Upon completion of FSWPPPs and ASWPPs, the MS4 trains applicable field Staff to increase awareness and reduce and mitigate stormwater pollutants generated from specific activities and facilities.

Employees receive training during the 1st and 4th year of the permit term. Training content includes:

- General stormwater awareness,
- Overview of the contents of the most current MS4 Permit,
- Contents of applicable FSWPPPs/ASWPPPs, and
- Standard Operating Guidelines and BMPs implemented to minimize generated pollutants.

Table 7.6.1: Awareness Training Content

Division	Stormwater In Bozeman Video	Rain Check Chapter 1: Intro	Rain Check Chapter 2: Housekeeping	Rain Check Chapter 3: Spill control	Rain Check Chapter 4: Fueling	Rain Check Chapter 5: Vehicle Maintenance	Rain Check Chapter 6: Vehicle Washing	Rain Check Chapter 7: Materials Management	Rain Check Chapter 8: Waste Management	Rain Check Chapter 9: Facility Maintenance	Rain Check Chapter 12: Landscaping
Water/Sewer/Storm	X	X	X	X	X	X	X	X	X	-	X
Forestry	X	X	X	X	X	X	X	X	X	-	X
Parks and Cemetery	X	X	X	X	X	X	X	X	X	-	X
Streets	X	X	X	X	X	X	X	X	X	-	X
Solid Waste	X	X	X	X	X	X	X	X	X	X	-
Water Treatment Plant	X	X	X	X	X	X	X	X	X	X	-
Water Rec. Facility	X	X	X	X	X	X	X	X	X	X	-
MSU Operations	X	X	X	X	X	X	X	X	X	X	X

Table 7.6.2: ASWPPP Training Content

Division	Water Main Breaks	Sanitary Sewer Overflows	Trenching and Excavation	Sidewalk and Curb Construction	Curb Cutting	Traction Sand Application	Solid Waste Collection	Arena Construction	Parks Mowing	Tree Planting
Water/Sewer/Storm	X	X	X	X	X	-	-	-	-	-
Facilities	-	-	-	-	-	-	-	-	-	-
Forestry	-	-	-	-	-	-	-	-	-	X
Parks and Cemetery	-	-	-	-	-	-	-	-	X	X
Streets	-	-	-	X	X	X	-	-	-	-
Solid Waste	-	-	-	-	-	-	X	-	-	-
MSU Operations	X	X	-	-	-	X	X	X	X	X

Table 7.6.3: FSWPPP Training Content

Division	MSU Shops Facility	City Shops Complex	Vehicle Maintenance Facility	Laurel Glen Operations Facility	East Gallatin Storage Area	Closed Landfill	Snow Storage Area	MSU Material Storage Area	Water Treatment Plant	Water Reclamation Facility	Public Parking Garage and Lots	MSU Parking Garage and Lots	Bozeman Public Safety Facility	Fire Stations #1-3	Parks and Recreation
Water/Sewer/Storm	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-
Forestry	-	-	X	-	X	-	-	-	-	-	-	-	-	-	X
Parks and Cemetery	-	X	-	-	X	-	-	-	-	-	-	-	-	-	X
Streets	-	X	X	-	X	-	X	-	-	-	-	-	-	-	-
Solid Waste	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
Water Treatment Plant	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
Water Rec. Facility	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
MSU Operations	X	-	-	-	-	-	-	X	-	-	-	X	-	-	-

Table 7.6.4: Training Program Summary

Division	2018		2019		2020		2021		2022	
	Awareness Training	FSWPPP and ASWPPP Training	Awareness Training	FSWPPP and ASWPPP Training	Awareness Training	FSWPPP and ASWPPP Training	Awareness Training	FSWPPP and ASWPPP Training	Awareness Training	FSWPPP and ASWPPP Training
Water/Sewer/Storm	7	-	2	-	21	21	19	19	23	23
Forestry	19	-	9	-	24	24	-	-	5	5
Parks and Cemetery	17	17	16	16	19	19	18	18	4	4
Streets	15	15	14	14	14	14	11	11	16	16
Solid Waste	17	17	16	16	23	23	16	16	18	18
Water Treatment Plant	7	-	2	-	21	21	19	19	9	9
Water Rec. Facility	9	9	14	14	14	14	11	11	*	
MSU Operations	0	-	14	-	17	17	0	0	5	5

*: Facility receives annual awareness and FSWPPP/ ASWPPP training per Industrial Stormwater Permit.

Section 8.0

Sampling and Evaluation Program

Graphic: 8.0.1: In-stream sampling equipment



Graphic 8.0.2: Installing in-stream sampling equipment



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8.1 Introduction

The MS4 strives to improve waterway health, protect public safety, and comply with its MS4 Permit by performing sampling, testing, and reporting of stormwater discharges by completing the following protocols:

- Impaired Waterbody Identification,
- Storm Event Monitoring,
- Impaired Waterbody Body Monitoring, and
- BMP Effectiveness Monitoring.

Data gathered from sampling protocols is used to advise policy, capital, and operational decisions, and provides a data-driven performance metric communicated to the public.

8.2 Impaired Waterbodies Identification

There are four named impaired waterbodies which receive stormwater discharges from the MS4; Bozeman Creek, a.k.a. Sourdough Creek, Mandeville Creek, Bridger Creek and the East Gallatin River. The most recent impairment information is obtained from Montana DEQ's Clean Water Act Information Center (<http://cwaic.mt.gov/>). Table 8.2.1 provides a summary of impairments for each waterbody. SWMP Section 4.7 contains an inventory of outfalls discharging to impaired waterbodies.

Table 8.2.1: MS4 Waterbody TMDL Impairments

	Total Suspended Solids (TSS)	Total Nitrogen (TN)	Total Phosphorus (TP)	E. coli	Chlorophyll-a	Alteration in stream-side or littoral vegetative cover
Bozeman Creek	X	X		X	X	X
Mandeville Creek		X	X			
Bridger Creek		X			X	
East Gallatin River		X	X			

Montana DEQ completed TMDL assessments on the above waterbodies to determine pollutant impairments and MS4 Waste Load Allocations (WLA). Bozeman Creek is the only identified waterbody with an MS4 WLA, that being for TSS. The MS4 is not assigned a WLA for total nitrogen, total phosphorus, E. coli, chlorophyll-a, or alterations in stream-side or littoral vegetative cover. As a result the MS4 prioritizes sediment reduction BMPs which are describe in SWMP Sections 2.0, 3.0, 4.0, 5.0, 6.0, and 7.0.

8.3 Regulatory Requirements

The MS4 General Permit requires the MS4 to perform sampling, testing, and reporting of stormwater discharges, semi-annually, during storm events resulting in a measurable amount of discharge. The MS4 implements sampling protocols that document stormwater discharge quality, quantify impacts to impaired waterbodies, evaluate BMP effectiveness, and track long-term trends in aquatic life. Sampling protocols include;

1. Monitor stormwater discharges based on residential and commercial/industrial land-use types
 - See SWMP Section 8.4 Storm Event Monitoring
2. Impaired Waterbody/TMDL Related Monitoring: Bozeman and Mandeville Creeks

- See SWMP Section 8.5 In-Stream Wet-Weather Monitoring, SWMP Section 2.2 TMDL Action Plan, and SWMP Section 2.5 Pollution Reduction Totals.
- 3. BMP Effectiveness Monitoring for BMPs implemented to reduce pollutant loading from the MS4 to impaired waters.
 - See SWMP Section 8.6 Sediment Reduction Monitoring and SWMP Section 2.5 Pollution Reduction Totals.
- 4. Impaired Waterbody Monitoring
 - See SWMP Section 8.7 Long-Term Trend Monitoring

For Storm Event and In-Stream Wet-Weather monitoring, the MS4 conducts sampling, testing, and reporting of the following parameters:

- | | |
|---------------------------------------|---------------------------|
| 1. Total Suspended Solids (TSS), mg/L | 7. Zinc (Zn), mg/L |
| 2. Chemical Oxygen Demand (COD), mg/L | 8. Oils and Greases, mg/L |
| 3. Total Nitrogen (TN), mg/L | 9. pH, standard units |
| 4. Total Phosphorus (TP), mg/L | 10. Estimated Flow, gpm |
| 5. Copper (Cu), mg/L | 11. E. coli* |
| 6. Lead (Pb), mg/L | |

*The MS4 plans to sample Bozeman Creek for E. coli beginning in 2023.

SWMP Sections 8.6 and 8.7 describe parameters measured and data collected for Sediment Reduction and Long-Term Trend Monitoring.

8.4 Storm Event Monitoring

Introduction: The MS4 collects semi-annual Storm Event samples from representative watersheds to characterize pollutant loading occurring from both residential and commercial/industrial land-use types before system treatment, such as stormwater basins, sumps, infiltration galleries, and mechanical separation.

Locations: The MS4 has a network of four Storm Event monitoring locations: two within residential drainage basins and two within commercial/industrial drainage basins, including:

1. Site: RES_01
 - Location: Near the intersection of S. Bozeman Ave. and E. Garfield St.
 - Land-use: Residential
 - Drainage Basin: Seven acres
 - Inlet ID: I.F06.00082
 - Latitude, Longitude: 45.667143
 - Inlet ID: I.F06.00083
 - Latitude, Longitude: 45.667143, -111.034724
2. Site: IND_01
 - Location: Near Commercial Dr. cul-de-sac (west)
 - Land-use: Commercial and Industrial
 - Drainage Basin: 10 acres
 - Inlet ID: I.E01.00184
 - Latitude, Longitude: 45.703061, -111.030112
 - Inlet ID: I.E01.00185

- o Latitude, Longitude: 45.703164, -111.030428
- 3. Site: RES_02
 - Location: MSU Campus near the intersection of S. 12th Ave. and W. Garfield St.
 - Land-use: Residential
 - Drainage Basin: Four acres
 - Inlet ID: I.H06.00329
 - o Latitude, Longitude: 45.666911, -111.054301
 - Inlet ID: I.H06.00259
 - o Latitude, Longitude: 45.666970, -111.054226
- 4. Site: IND_02
 - Location: MSU Campus near the intersection of S. 6th Ave. and W. Garfield St.
 - Land-use: Industrial
 - Drainage Basin: Two acres
 - Inlet ID: I.G06.00603
 - o Latitude, Longitude: 45.664409, -111.044957
 - Inlet ID: I.G06.00630
 - o Latitude, Longitude: 45.664409, -111.044942

Methods: The MS4 collects Storm Event samples from storm sewer inlets at each site using Thermo-Scientific Nalgene Samplers (Samplers). Before runoff events, Staff installs each Sampler at the selected inlet grate and positions it to collect the first flush of urban runoff. Once full, the Sampler closes itself prohibiting additional collection or dilution of the original sample.

Analysis: The MS4 collects, composites, and ships samples to a certified laboratory, which analyzes the parameters identified in SWMP Section 8.3.

The MS4 estimates flow, in gallons per minute (gpm), using the Rational Formula where:

$$Q = CiA$$

1. Q: Peak runoff rate (cfs converted to gpm)
2. C: Runoff coefficient (C-Factor, Bozeman Engineering Standards)
3. i: Rainfall intensity (in./hr.)
4. A : Drainage area (acres)

Table 8.4.1: Sampling Location Runoff Coefficients (C Factors)		
Location Name	Primary Land Use	Runoff Coefficient (C-Factor)
RES_01	Low to Medium Density Residential	0.35
RES_02	Dense Residential	0.50
IND_01	Industrial	0.80
IND_02	Industrial	0.80

Table 8.4.2: Storm Event Monitoring Results * Reporting Limit (RL)

Site	TSS mg/L	Oil & Grease mg/L	Total Nitro. mg/L	Phosp. mg/L	Zinc mg/L	Lead mg/L	Cu mg/L	COD mg/L	pH	Flow gpm
RES_01: 2017 (1)	203	2.00	6.20	0.908	0.1160	0.0052	0.0220	251.00	6.7	N/A
RES_01: 2017 (2)	368	5.10 RL	12.00	1.230	0.1790	0.0073	0.0300	175.00	7.0	N/A
RES_01: 2018 (1)	460	4.00	14.00	1.920	0.2720	0.0092	0.0290	708.00	6.4	55.0
RES_01: 2018 (2)	113	1.00 RL	2.30	0.544	0.1220	0.0033	0.0130	129.00	6.5	22.0
RES_01: 2019 (1)	5890	6.00	28.80	8.400	2.0200	0.1750	0.3380	3330.00	7.4	49.5
RES_01: 2019 (2)	206	1.00 RL	5.50	0.680	0.2100	0.0060	0.0240	258.00	6.9	14.3
RES_01: 2020 (1)	2300	3.00	21.50	4.400	0.6200	0.0530	0.0760	1340.00	6.7	110.0
RES_01: 2020 (2)	109	1.00 RL	3.40	0.6400	0.1400	0.0040	0.0200	363.00	6.3	49.5
RES_01: 2021 (1)	419	3.00	13.40	1.5100	0.2100	0.0100	0.0410	559.00	6.9	-
RES_01: 2021 (2)	154.0	1.00 RL	13.10	1.3800	0.3500	0.0100	0.0460	729.00	6.2	23.5
RES_01: 2022 (1)	300.0	2.00	7.10	1.2600	0.2200	0.0110	0.0400	287	6.8	48.8
RES_01: 2022 (2)	963.0	1.00	14.20	3.5100	1.0700	0.0460	0.1200	1140	6.6	121.0
RES_01: 2023 (1)	-	-	-	-	-	-	-	-	-	-
RES_01: 2023 (2)	-	-	-	-	-	-	-	-	-	-
RES_01: 2024 (1)	-	-	-	-	-	-	-	-	-	-
RES_01: 2024 (2)	-	-	-	-	-	-	-	-	-	-
RES_01: 2025 (1)	-	-	-	-	-	-	-	-	-	-
RES_01: 2025 (2)	-	-	-	-	-	-	-	-	-	-
RES_01: 2026 (1)	-	-	-	-	-	-	-	-	-	-
RES_01: 2026 (2)	-	-	-	-	-	-	-	-	-	-
RES_01 Median	334.0	2.00	12.55	1.3200	0.2150	0.0096	0.0350	461.00	6.7	68.7
RES_02: 2017 (1)	-	-	-	-	-	-	-	-	-	-
RES_02: 2017 (2)	-	-	-	-	-	-	-	-	-	-
RES_02: 2018 (1)	1430	15.00	8.40	2.030	0.6520	0.0367	0.0840	605.00	7.0	18.0
RES_02: 2018 (2)	199	3.00	3.40	0.457	0.2610	0.0081	0.0220	234.00	6.8	18.0
RES_02: 2019 (1)	806	9.00	8.60	1.930	0.5000	0.0410	0.0820	579.00	7.5	40.39
RES_02: 2019 (2)	568	8.00	17.50	2.060	0.7500	0.0220	0.0810	1100.00	6.8	11.7
RES_02: 2020 (1)	1490	3.00	9.80	2.220	0.5100	0.0300	0.0490	487.00	6.8	89.76
RES_02: 2020 (2)	176	3.00	7.40	0.800	0.2900	0.0070	0.0260	382.00	6.4	40.4
RES_02: 2021 (1)	701	2.00	11.20	1.52	0.4200	0.0180	0.0490	601.00	6.8	-
RES_02: 2021 (2)	334	4.00	13.90	1.360	0.9200	0.0230	0.0710	835.00	6.3	19.21
RES_02: 2022 (1)	613	3.00	7.40	1.420	0.4000	0.0200	0.0480	613.00	7.9	39.6
RES_02: 2022 (2)	1780	5.00	6.90	2.520	1.2400	0.0840	0.1130	379.00	6.8	98.75
RES_02: 2023 (1)	-	-	-	-	-	-	-	-	-	-
RES_02: 2023 (2)	-	-	-	-	-	-	-	-	-	-
RES_02: 2024 (1)	-	-	-	-	-	-	-	-	-	-
RES_02: 2024 (2)	-	-	-	-	-	-	-	-	-	-
RES_02: 2025 (1)	-	-	-	-	-	-	-	-	-	-
RES_02: 2025 (2)	-	-	-	-	-	-	-	-	-	-
RES_02: 2026 (1)	-	-	-	-	-	-	-	-	-	-
RES_02: 2026 (2)	-	-	-	-	-	-	-	-	-	-
RES_02 Median	657.0	3.50	8.50	1.725	0.5050	0.0225	0.0600	590.00	6.8	56.1
IND_01: 2017 (1)	149	4.00	17.30	1.380	0.5780	0.0160	0.0440	292.00	7.0	-
IND_01: 2017 (2)	1820	5.10 RL	11.68	1.320	33.3500	0.0371	0.0867	151.00	6.9	-
IND_01: 2018 (1)	602	15.00	8.50	1.890	4.7100	0.0371	0.0620	606.00	7.3	179.5
IND_01: 2018 (2)	293	4.00	3.40	0.588	0.1910	0.0081	0.0270	195.00	7.0	71.8

Table 8.4.2: Storm Event Monitoring Results * Reporting Limit (RL)

Site	TSS mg/L	Oil & Grease mg/L	Total Nitro. mg/L	Phosp. mg/L	Zinc mg/L	Lead mg/L	Cu mg/L	COD mg/L	pH	Flow gpm
IND_01: 2019 (1)	1470	4.00	4.90	1.960	1.5600	0.1020	0.1620	647.00	7.6	161.6
IND_01: 2019 (2)	333	2.00	10.70	0.940	0.8800	0.0250	0.0700	651.00	7.2	46.7
IND_01: 2020 (1)	2880	2.00	17.10	6.800	2.7200	0.1070	0.2450	1240.00	6.7	359.1
IND_01: 2020 (2)	347	2.00	4.80	0.880	1.7600	0.0280	0.0540	347.00	7.2	161.6
IND_01: 2021 (1)	655	2.000	9.20	2.380	2.4100	0.0350	0.080	602.00	7.1	-
IND_01: 2021 (2)	438.0	9.00	12.30	1.470	0.7700	0.0200	0.0830	806.00	6.3	15.4
IND_01: 2022 (1)	170.0	2.00	4.70	0.580	0.6800	0.0570	0.1240	289.00	8.0	158.4
IND_01: 2022 (2)	657.0	2.00	8.50	1.840	3.3800	0.0440	0.1180	399.00	7.2	395.0
IND_01: 2023 (1)	-	-	-	-	-	-	-	-	-	-
IND_01: 2023 (2)	-	-	-	-	-	-	-	-	-	-
IND_01: 2024 (1)	-	-	-	-	-	-	-	-	-	-
IND_01: 2024 (2)	-	-	-	-	-	-	-	-	-	-
IND_01: 2025 (1)	-	-	-	-	-	-	-	-	-	-
IND_01: 2025 (2)	-	-	-	-	-	-	-	-	-	-
IND_01: 2026 (1)	-	-	-	-	-	-	-	-	-	-
IND_01: 2026 (2)	-	-	-	-	-	-	-	-	-	-
IND_01 Median	522.0	2.50	8.85	1.470	2.0850	0.0371	0.0844	500.50	7.2	224.4
IND_02: 2017 (1)	-	-	-	-	-	-	-	-	-	-
IND_02: 2017 (2)	-	-	-	-	-	-	-	-	-	-
IND_02: 2018 (1)	899	4.00	8.80	1.600	0.5600	0.0158	0.0570	592.00	6.7	14.4
IND_02: 2018 (2)	380	5.00	4.40	0.737	0.2450	0.0099	0.0320	271.00	3.4	14.4
IND_02: 2019 (1)	2570	10.00	2.00	4.440	1.3500	0.0780	0.1760	1420.00	7.6	32.3
IND_02: 2019 (2)	301	3.00	10.20	1.440	0.8200	0.0260	0.1000	634.00	6.8	9.3
IND_02: 2020 (1)	1040	3.00	5.20	1.410	0.6200	0.0230	0.0590	730.00	7.0	71.8
IND_02: 2020 (2)	225	2.00	4.00	0.810	0.3000	0.0080	0.0300	248.00	6.2	32.3
IND_02: 2021 (1)	508	4.00	9.90	1.230	0.4000	0.0170	0.0560	713.00	6.6	-
IND_02: 2021 (2)	438	9.00	12.30	1.470	0.7700	0.0200	0.0830	806.00	6.3	15.4
IND_02: 2022 (1)	270	1.00	3.70	0.630	0.1900	0.0060	0.0280	320.00	7.1	31.7
IND_02: 2022 (2)	1650	9.00	7.40	3.250	1.3100	0.0610	0.1290	539.00	6.6	79.0
IND_02: 2023 (1)	-	-	-	-	-	-	-	-	-	-
IND_02: 2023 (2)	-	-	-	-	-	-	-	-	-	-
IND_02: 2024 (1)	-	-	-	-	-	-	-	-	-	-
IND_02: 2024 (2)	-	-	-	-	-	-	-	-	-	-
IND_02: 2025 (1)	-	-	-	-	-	-	-	-	-	-
IND_02: 2025 (2)	-	-	-	-	-	-	-	-	-	-
IND_02: 2026 (1)	-	-	-	-	-	-	-	-	-	-
IND_02: 2026 (2)	-	-	-	-	-	-	-	-	-	-
IND_02 Median	473.0	4.00	6.30	1.425	0.5900	0.0185	0.0580	613.00	6.7	15.4

Evaluation: The MS4 evaluates the data using the following Scoring Matrix (Matrix) and protocol to interpret and communicate the results. The Matrix includes scores ranging from 0 to 4-points, representing a set increase from EPA benchmarks provided in previous MS4 General Permits.

Table 8.4.3: Stormwater Reference Site from MDEQ and EPA

Site	TSS mg/L	Oil & Grease mg/L	Total Nitro. mg/L	Phosp. mg/L	Zinc mg/L	Lead mg/L	Copper mg/L	COD mg/L	pH
Reference	125	10	2	0.4100	0.2100	0.1650	0.0400	80	6 to 9

Example: The TSS Benchmark is 125 mg/L. As such, the 3-Point range is two times that amount (250), the 2-Point range is three times that amount (375), etc.

Table 8.4.4: Storm Event Monitoring: Scoring Matrix

Parameter	4-Points	3-Points	2-Points	1-Point	0-Points
TSS (mg/L)	0 – 125	126 - 250	251 - 375	376 - 500	> 500
Oil and Grease (mg/L)	0 - 10	11 - 20	21 - 30	31 - 40	> 41
Total Nitrogen (mg/L)	0 - 2.0	2.1 - 4.0	4.1 - 6.0	6.1 - 8.0	> 8.0
Phosphorus (mg/L)	0 - .41	.42 - .82	.83 - 1.23	1.24 - 1.65	> 1.65
Zinc (mg/L)	0 - .20	.21 - .40	.41 - .60	.61 - .80	> .80
Lead (mg/L)	0 - .10	.11 - .20	.21-.30	.31 - .40	> .40
Copper(mg/L)	0 - .04	.041 - .08	.081 - .12	.121 - .160	> .160
COD	0 - 80	81 - 160	161 - 240	241 – 320	> 320
pH (High End)	7.6 - 9.0	9.1 - 10.0	10.1 - 11.0	11.1 -12.0	12.1 - 14.0
pH (Low End)	6.0 - 7.5	5.0 - 5.9	4.0 - 4.9	3.0 - 3.9	1.0 - 3.0

The MS4 relates results to the Matrix and then populate the Storm Event Monitoring charts with the corresponding point totals.

Example: A 2019 RES_01 sample contained 206 mg/L of TSS. The MS4 assigns and populates the Storm Event Monitoring: RES_01 (2) chart TSS box with 3-points.

Table 8.4.5: Storm Event Monitoring: RES_01

Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSS	0	3	0	4	1	3	2	0
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	0	2	0	3	0	0	1	0
Phosphorus	0	3	0	3	1	1	1	0
Zinc	0	3	1	4	3	2	3	0
Lead	3	4	4	4	4	4	4	4
Copper	0	4	3	4	3	3	4	1
COD	0	1	0	0	0	0	1	0
pH	4	4	4	4	4	4	4	4
Event Points:	11	28	16	30	20	21	24	13
Annual Points:	39		46		41		37	

Table 8.4.6: Storm Event Monitoring: IND_01

Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSS	0	2	0	2	0	1	3	0
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	2	0	0	2	0	0	2	0
Phosphorus	0	2	0	2	0	0	3	0
Zinc	0	0	0	0	0	0	1	0
Lead	4	4	3	4	4	4	4	4
Copper	0	3	0	3	2	0	2	2
COD	0	0	0	0	0	0	1	0
pH	4	4	4	4	4	4	4	4
Event Points:	14	19	11	21	14	13	24	14
Annual Points:	33		32		27		28	

Table 8.4.7: Storm Event Monitoring: RES_02

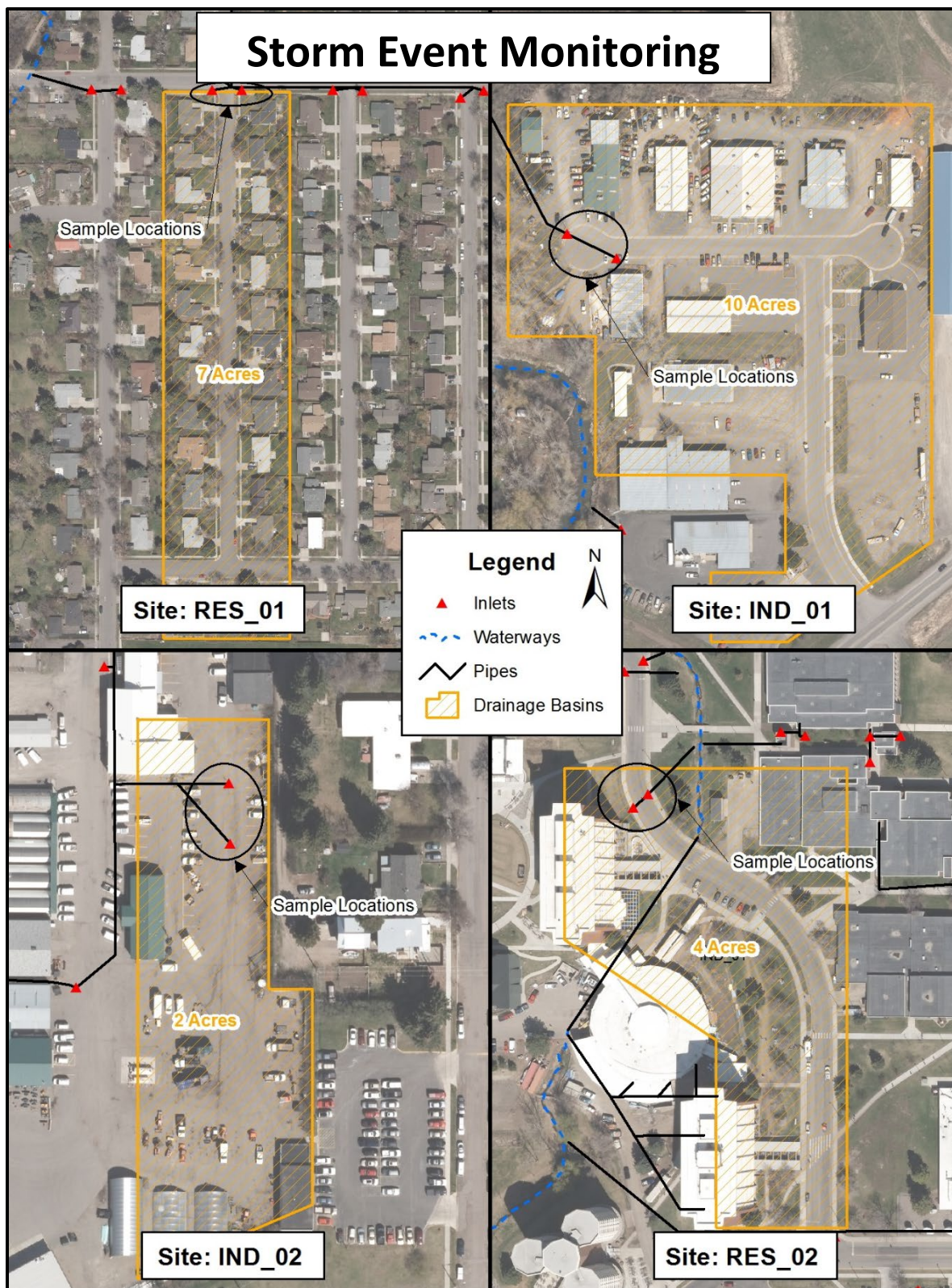
Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSS	0	0	0	3	0	2	0	0
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	0	0	0	1	0	0	1	1
Phosphorus	0	0	0	3	1	1	1	3
Zinc	2	1	2	3	2	0	3	0
Lead	4	4	4	4	4	4	4	4
Copper	2	2	3	4	3	3	3	2
COD	0	0	0	0	0	0	0	0
pH	4	4	4	4	4	4	4	4
Event Points:	16	15	17	26	18	18	20	16
Annual Points:	31		43		36		36	

Table 8.4.8: Storm Event Monitoring: IND_02

Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSS	0	2	0	3	0	1	2	0
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	4	0	2	3	0	0	3	1
Phosphorus	0	1	1	3	2	1	3	0
Zinc	0	0	1	3	3	1	4	0
Lead	4	4	4	4	4	4	4	4
Copper	0	2	3	4	3	2	4	1
COD	0	0	0	1	0	0	1	0
pH	4	4	4	4	4	4	4	4
Event Points:	16	17	19	29	20	17	29	14
Annual Points:	33		48		37		43	

The MS4 sums the individual scores to obtain an Event Point Total, sums both Event Scores to obtain an Annual Point Total, and calculates a Final Score by transferring and summing the Annual Points in the Storm Event Monitoring: Results chart. Finally, the MS4 divides the Total Points by the Possible Points to calculate the Final Score and transfers the Final Score to SWMP Section 8.8.

Table 8.4.9: Storm Event Monitoring: Results				
Sites	2019	2020	2021	2022
RES_01 Annual Points	39	46	41	37
IND_01 Annual Points	33	32	27	28
RES_02 Annual Points	31	43	36	36
IND_02 Annual Points	33	48	37	43
Total Points:	136	169	141	144
Possible Points:	288	288	288	288
Final Score (decimal):	.47	.59	.49	.50



Graphic 8.4.10: Urban Runoff Monitoring Map

8.5 In-Stream Wet-Weather Monitoring

Introduction: The MS4 conducts semi-annual in-stream wet-weather monitoring on impaired waterbodies to document impacts of urban runoff to Bozeman and Mandeville Creeks. Combined, the Creeks receive urban runoff from over 1,700 acres of dense development at over 100 individual discharge points or outfalls. Non-point source pollution sources exist upstream of the MS4 as identified in the Lower Gallatin Planning Area TMDL. This approach allows the MS4 to take sole responsibility for and mitigate the impacts stemming from urban runoff.

Sites: The MS4 monitors two (2) locations on Bozeman Creek and two (2) locations on Mandeville Creek. Each Creek has one (1) station upstream and one (1) downstream of the MS4 boundary. Sample sites include:

1. Site: UPS_01
 - Location: Bozeman Creek upstream of MS4, near Kagy Blvd.
 - Latitude, Longitude: 45.657248, -111.028584
2. Site: DWS_01
 - Location: Bozeman Creek downstream of MS4, near Gold Ave.
 - Latitude, Longitude: 45.699668, -111.027347
3. Site: UPS_02
 - Location: Mandeville Creek upstream of MS4, near Campus Blvd.
 - Latitude, Longitude: 45.656506, -111.05803
4. Site: DWS_02b
 - Location: Mandeville Creek downstream of MS4, near Frontage Rd.
 - Latitude, Longitude: 45.712845, -111.055229
 - Added in 2022 as a replacement for original site DWS_02. Replacement needed due to development.

Methods: The MS4 collects in-stream samples using Thermo-Scientific Nalgene Samplers (Sampler). Before rain events, Staff mounts each Sampler to a metal post driven into the creek bed and positions it to collect a sample as soon as the water levels rise from the first flush. The Sampler closes itself and does not allow additional collection or dilution of the original sample once full.

Analysis: The MS4 collects, composites, and ships samples to a certified laboratory, which analyzes the parameters identified in SWMP Sec 8.3.

The MS4 determines Bozeman Creek's stream flow using real time data collected from the Bozeman Creek gaging station. The MS4 estimates flow for Mandeville Creek using historical data collected by Gallatin Local Water Quality District, since no permanent gauging station exists.

Table 8.5.1: In Stream Wet Weather Monitoring Results * Reporting Limit (RL)

Site	TSS mg/L	Oil & Grease mg/L	Total Nitro. mg/L	Phosp. mg/L	Zinc mg/L	Lead mg/L	Copper mg/L	COD mg/L	pH
UPS_01: 2017 (1)	7	5.80 RL	0.41	0.085	0.0054	0.0005	0.0036	11.6	8.2
UPS_01: 2017 (2)	14	1.00 RL	0.50 RL	0.022	0.0100 RL	0.0010 RL	0.0050 RL	15.0	8.1
UPS_01: 2018 (1)	14	1.00 RL	0.50 RL	0.052	0.0100 RL	0.0010 RL	0.0050 RL	10.0	8.1
UPS_01: 2018 (2)	10 RL	1.00 RL	0.60	0.028	0.0090	0.003 RL	0.0020 RL	5.0 RL	8.3
UPS_01: 2019 (1)	30	7.60 RL	2.79	0.147	0.0505	0.0010 RL	0.0017	9.0	7.7
UPS_01: 2019 (2)	72	1.00 RL	1.60	0.160	0.0300	0.0010 RL	0.0050 RL	5.0 RL	8.2
UPS_01: 2020 (1)	74	1.00 RL	0.50 RL	0.260	0.0200	0.0010 RL	0.0050 RL	26.0	8.1
UPS_01: 2020 (2)*	22	1.00 RL	0.50 RL	0.035	0.0100 RL	0.0010 RL	0.0050 RL	5.0 RL	8.3
UPS_01: 2021 (1)	10 RL	1.00 RL	0.70	0.063	0.0100 RL	0.0010 RL	0.0050 RL	9.0	8.4
UPS_01: 2021 (2)	10 RL	1.00 RL	1.10	0.042	0.0100 RL	0.0010 RL	0.0050 RL	62.0	8.0
UPS_01: 2022 (1)	21.0	1.00 RL	0.50 RL	0.094	0.0100 RL	0.0010 RL	0.0050 RL	25.00	8.0
UPS_01: 2022 (2)	10.0	1.00 RL	1.60	0.026	0.0100 RL	0.0010 RL	0.0050 RL	6.00	8.2
UPS_01: 2023 (1)	-	-	-	-	-	-	-	-	-
UPS_01: 2023 (2)	-	-	-	-	-	-	-	-	-
UPS_01: 2024 (1)	-	-	-	-	-	-	-	-	-
UPS_01: 2024 (2)	-	-	-	-	-	-	-	-	-
UPS_01: 2025 (1)	-	-	-	-	-	-	-	-	-
UPS_01: 2025 (2)	-	-	-	-	-	-	-	-	-
UPS_01: 2026 (1)	-	-	-	-	-	-	-	-	-
UPS_01: 2026 (2)	-	-	-	-	-	-	-	-	-
UPS_01 Median	14.0	1.00	0.55	0.058	0.0100	0.0010	0.0050	9.50	8.2
UPS_02: 2017 (1)	-	-	-	-	-	-	-	-	-
UPS_02: 2017 (2)	-	-	-	-	-	-	-	-	-
UPS_02: 2018 (1)	185	1.00 RL	3.10	0.430	0.0330	0.0027	0.0060	49.0	8.2
UPS_02: 2018 (2)	53	1.00 RL	0.50 RL	0.081	0.0180	0.0004	0.0020	16.0	8.1
UPS_02: 2019 (1)	10	6.8 RL	0.74	0.153	0.0422	0.0010 RL	0.0034	6.0	7.9
UPS_02: 2019 (2)	30	1.00 RL	0.80	0.144	0.0300	0.0010 RL	0.0050 RL	5.0	8.1
UPS_02: 2020 (1)	16	1.00 RL	0.80	0.080	0.0100 RL	0.0010 RL	0.0050 RL	11.0	8.3
UPS_02: 2020 (2)	10 RL	1.00 RL	0.60	0.066	0.0200	0.0010 RL	0.0050 RL	5.0	8.4
UPS_02: 2021 (1)	10 RL	1.00 RL	0.80	0.078	0.0100 RL	0.0010 RL	0.0050 RL	23.00	7.8
UPS_02: 2021 (2)	20.0	1.00 RL	1.30	0.224	0.0100 RL	0.0010 RL	0.0050 RL	34.00	7.9
UPS_02: 2022 (1)	11.0	1.00 RL	4.60	0.079	0.0100 RL	0.0010 RL	0.0050 RL	22.00	8.1
UPS_02: 2022 (2)**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UPS_02: 2023 (1)	-	-	-	-	-	-	-	-	-
UPS_02: 2023 (2)	-	-	-	-	-	-	-	-	-
UPS_02: 2024 (1)	-	-	-	-	-	-	-	-	-
UPS_02: 2024 (2)	-	-	-	-	-	-	-	-	-
UPS_02: 2025 (1)	-	-	-	-	-	-	-	-	-
UPS_02: 2025 (2)	-	-	-	-	-	-	-	-	-
UPS_02: 2026 (1)	-	-	-	-	-	-	-	-	-
UPS_02: 2026 (2)	-	-	-	-	-	-	-	-	-
UPS_02: Median	18.0	1.00	0.80	0.113	0.0190	0.0010	0.0050	13.50	8.1
DWS_01: 2017 (1)	10 RL	5.40 RL	0.55	0.088	0.0070	0.0006	0.0036	15.3	8.2
DWS_01: 2017 (2)	134	1.00 RL	1.80	0.264	0.0300	0.0060	0.0060	42.0	8.1
DWS_01: 2018 (1)	34	1.00 RL	0.50 RL	0.082	0.0100 RL	0.0010 RL	0.0005 RL	18.0	8.1

*: Replacement sample collected on 4/8/21, per MS4 Permit Pat IV.6.b.

** : UPS_02: 2022 (2) sample was not collected. The upstream reach of Mandeville Creek was dry during the July 1 – Dec. 31 sampling event timeframe. Adjacent long-term construction dewatering possibly affected flows.

Table 8.5.1: In Stream Wet Weather Monitoring Results * Reporting Limit (RL)

Site	TSS mg/L	Oil & Grease mg/L	Total Nitro. mg/L	Phosp. mg/L	Zinc mg/L	Lead mg/L	Copper mg/L	COD mg/L	pH
DWS_01: 2018 (2)	17	1.00 RL	0.70	0.057	0.0220	0.0007	0.0002 RL	14.0	8.3
DWS_01: 2019 (1)	100	7.00	3.00	0.238	0.1100	0.0021	0.0045	13.0	7.9
DWS_01: 2019 (2)	350	1.00 RL	3.40	0.645	0.1400	0.0140	0.0210	94.0	8.2
DWS_01: 2020 (1)	58	1.00 RL	0.50 RL	0.141	0.0300	0.0030	0.0050	28.0	8.2
DWS_01: 2020 (2)*	10 RL	1.00 RL	0.05 RL	0.039	0.0100 RL	0.0010 RL	0.0050 RL	9.0	8.5
DWS_01: 2021 (1)	10 RL	1.00 RL	0.70	0.063	0.0100 RL	0.0010 RL	0.0050 RL	9.0	8.4
DWS_01: 2021 (2)	55	1.00 RL	3.20	0.306	0.0400	0.0200	0.0080	100.0	8.0
DWS_01: 2022 (1)	37.0	1.00 RL	1.10	0.168	0.0200	0.0020	0.0070	31.0	7.8
DWS_01: 2022 (2)	10 RL	1.00 RL	1.60	0.026	0.0100 RL	0.0010 RL	0.0050 RL	6.0	8.2
DWS_01: 2023 (1)	-	-	-	-	-	-	-	-	-
DWS_01: 2023 (2)	-	-	-	-	-	-	-	-	-
DWS_01: 2024 (1)	-	-	-	-	-	-	-	-	-
DWS_01: 2024 (2)	-	-	-	-	-	-	-	-	-
DWS_01: 2025 (1)	-	-	-	-	-	-	-	-	-
DWS_01: 2025 (2)	-	-	-	-	-	-	-	-	-
DWS_01: 2026 (1)	-	-	-	-	-	-	-	-	-
DWS_01: 2026 (2)	-	-	-	-	-	-	-	-	-
DWS_01: Median	14.0	1.00	0.55	0.058	0.0100	0.0010	0.0050	9.50	8.2
DWS_02: 2017 (1)	-	-	-	-	-	-	-	-	-
DWS_02: 2017 (2)	-	-	-	-	-	-	-	-	-
DWS_02: 2018 (1)	297	1.00 RL	2.80	0.368	0.0700	0.0168	0.0150	53.0	8.2
DWS_02: 2018 (2)	43	1.00 RL	0.80	0.102	0.0280	0.0026	0.0030	18.0	8.2
DWS_02: 2019 (1)	1180	6.80	3.38	1.340	0.1240	0.0222	0.0173	123.0	8.0
DWS_02: 2019 (2)	84	1.00 RL	2.00	0.235	0.0500	0.0040	0.0050 RL	7.0	8.3
DWS_02: 2020 (1)	190	1.00 RL	2.40	0.365	0.0700	0.0100 RL	0.0130	63.0	8.1
DWS_02: 2020 (2)	68	1.00 RL	2.10	0.191	0.0400	0.0030	0.0080	63.0	8.1
DWS_02: 2021 (1)	19.0	1.00 RL	1.10	0.080	0.0100 RL	0.0010 RL	0.0050 RL	12.0	8.3
DWS_02: 2021 (2)	200	1.00 RL	3.30	0.464	0.0900	0.0100	0.0110	95.0	8.1
DWS_02b: 2022 (1)	29	1.00 RL	1.00	0.103	0.0100 RL	0.0010 RL	0.0050 RL	36.0	8.1
DWS_02b: 2022 (2)	2000	1.00 RL	30.50	2.930	0.4900	0.0740	0.0880	770.0	8.4
DWS_02b: 2023 (1)	-	-	-	-	-	-	-	-	-
DWS_02b: 2023 (2)	-	-	-	-	-	-	-	-	-
DWS_02b: 2024 (1)	-	-	-	-	-	-	-	-	-
DWS_02b: 2024 (2)	-	-	-	-	-	-	-	-	-
DWS_02b: 2025 (1)	-	-	-	-	-	-	-	-	-
DWS_02b: 2025 (2)	-	-	-	-	-	-	-	-	-
DWS_02b: 2026 (1)	-	-	-	-	-	-	-	-	-
DWS_02b: 2026 (2)	-	-	-	-	-	-	-	-	-
DWS_02 Median	137.0	1.00	2.25	0.300	0.0600	0.0070	0.0095	44.50	8.2

*: Replacement sample collected on 4/8/21, per MS4 Permit Pat IV.6.b.

Evaluation: The MS4 analyzes the data using the following Scoring Matrix (Matrix) and protocol to interpret, evaluate, and communicate the results. The Matrix includes scores ranging from 0 to 4-points, representing a set increase from EPA benchmarks provided in previous MS4 General Permits.

Example: A percent change of 0-20% equals 4-points, 21-40% equals 3-points, 41-60% equals 2-points, 61-80% equals 1-point, and 81- >100% equals 0-points.

Percent change is determined using the following formula:

$$\% \Delta = ((Y_2 - Y_1) / Y_1) * 100 \quad \text{Equation 2}$$

For example, TSS: $((200-150)/150) \times 100 = 33.3\%$, resulting in a score of 3-points.

Parameter	4-Points	3-Points	2-Points	1-Point	0-Points
TSS (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Oil/Grease (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Total Nitrogen (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Phosphorus (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Zinc (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Lead (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
Copper (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
COD (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)
pH (% Δ)	(<0) – (20)	(21) – (40)	(41) – (60)	(61) – (80)	(81) – (>100)

The MS4 relates results to the Matrix and then populates the appropriate In-Stream Wet-Weather Monitoring charts with the corresponding scores.

Example: A 2018 Bozeman Creek UPS_01 and DWS_01 TSS percent change equaled 35%. The MS4 assigns and populates the In-Stream Wet-Weather Monitoring: Bozeman Creek UPS_01 and DWS_01 chart TSS box with 3-points. The same approach applies to all sites and parameters.

Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
TSS	0	0	4	4	4	0	1	4
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	4	0	4	4	4	0	0	4
Phosphorus	1	0	4	4	4	0	1	1
Zinc	0	0	2	4	4	0	0	4
Lead	0	0	0	4	4	0	0	4
Copper	0	0	4	4	4	2	3	4
COD	2	0	4	1	4	1	3	0
pH	4	4	4	4	4	4	4	4
Event Points:	15	8	30	33	36	11	16	29
Annual Points:	23		63		47		45	

Table 8.5.4: In Stream Wet Weather Monitoring: Mandeville Creek UPS_02 and DWS_02b

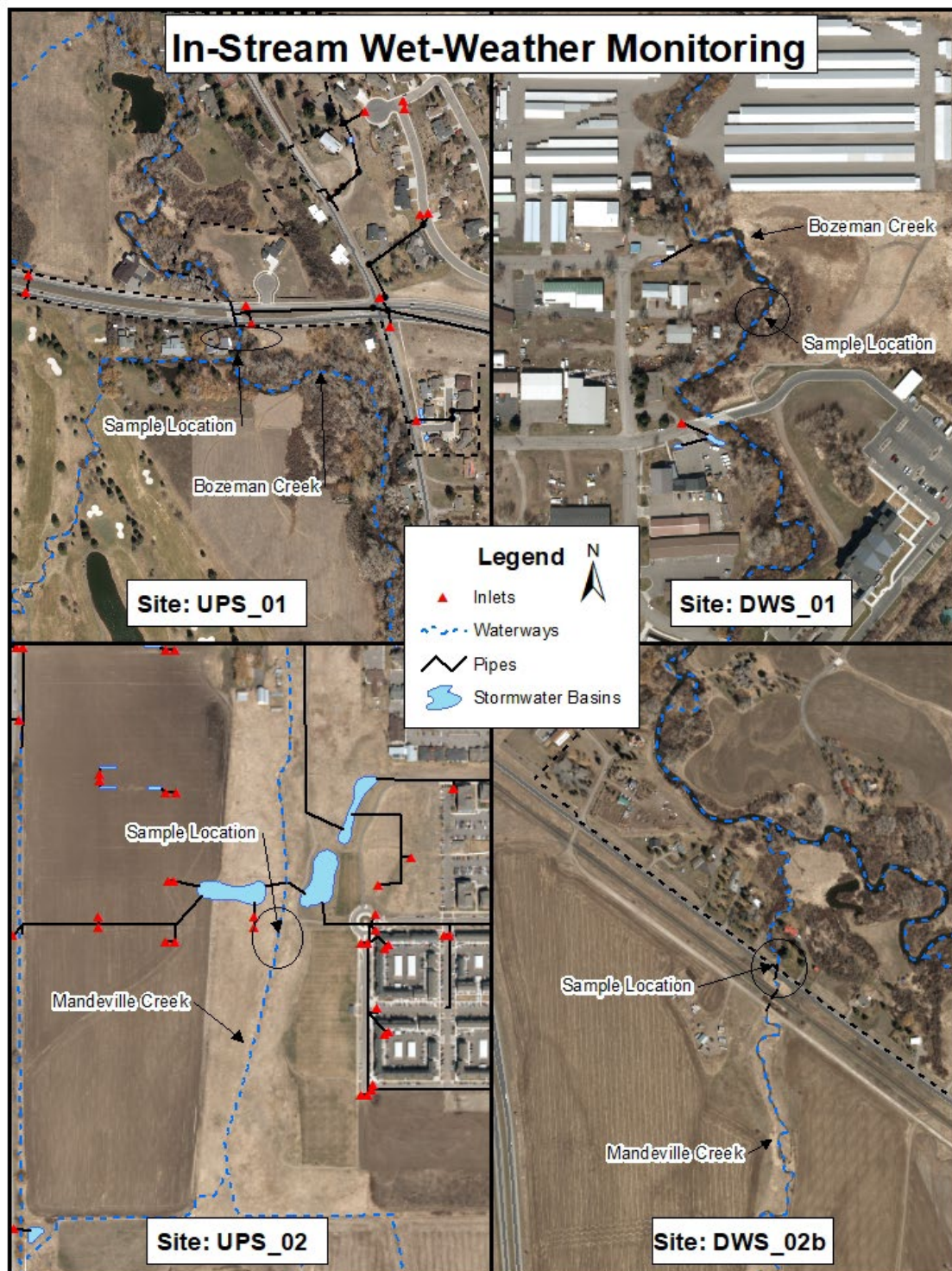
Parameter	2019		2020		2021		2022	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)*
TSS	0	0	0	0	0	0	0	0
Oil and Grease	4	4	4	4	4	4	4	4
Total Nitrogen	0	0	0	0	3	0	4	0
Phosphorus	0	1	0	0	4	0	3	0
Zinc	0	1	0	0	4	0	4	0
Lead	0	0	0	0	4	0	4	0
Copper	0	0	0	2	4	0	4	0
COD	0	3	0	0	4	0	1	0
pH	4	4	4	4	4	4	4	4
Event Points:	8	13	8	10	31	8	28	8
Annual Points:	21		18		39		36	

*: Event 2 not collected at UPS_02, as Mandeville Creek did not have a documented flow during the July 1 – Dec. 31, 2022 sampling period. UPS_02's Long-term median used to calculate point total.

The MS4 sums the individual scores to obtain an Event Point Total, sums both Event Scores to obtain an Annual Point Total, and calculates a Final Score by transferring and summing the Annual Points in the In-Stream Wet-Weather Monitoring: Results chart. Finally, the MS4 divides the Total Points by the Possible Points. The MS4 transfers the Final Score to SWMP Section 8.8.

Table 8.5.5: In Stream Wet Weather Monitoring: Results

Parameter	2019	2020	2021	2022
Bozeman Creek Annual Points	23	63	47	45
Mandeville Creek Annual Points	21	18	39	36
Total Points:	44	81	86	81
Possible Points:	144	144	144	144
Final Score (decimal):	.31	.56	.59	.56



Graphic 8.5.6: In-Stream Wet-Weather Monitoring Map

8.6 Sediment Reduction Monitoring

Introduction: The MS4 conducts Sediment Reduction Monitoring to comply with the Montana DEQ's sediment load reduction requirements detailed in the 2013 Lower Gallatin Planning Area TMDL and to evaluate BMP effectiveness at reducing sediment loads to Bozeman and Mandeville Creeks and the East Gallatin River. The MS4 tracks tons captured in BMPs detailed in SWMP Sections 2.5.

Table 8.6.1: Bozeman Creek Sediment Waste Load Reduction

Sediment Source	Estimated Load	Waste Load Allocation	Required Load Reduction	Load Reduction
MS4	218 tons/year	137 tons/year	37%	81 tons/year **DEQ Imposed**

Table 8.6.2: Mandeville Creek Sediment Waste Load Reduction

Sediment Source	Estimated Load	Waste Load Allocation	Required Load Reduction	Load Reduction
MS4	None	None	None	10 tons/year **Self Imposed**

Sites: Stormwater treatment units described in SWMP Section 2.5.

Methods: Measurement process described in SWMP Section 2.5.

Analysis: The MS4 analyzes the following parameter:

- Total Sediment Captured (tons)

Evaluation: The MS4 enters data into a local spreadsheet for safe record upon receipt. Further, the MS4 incorporates the data into the following Scoring Matrix (Matrix) to interpret, evaluate, and communicate the results. The Matrix includes scores ranging from 0 to 4-points, which relate to total annual sediment capture. For example, a load reduction for Bozeman Creek of ≥ 81 tons equals 4-points, 60 – 80 tons equals 3-points, 40 – 59 tons equals 2-points, 20 – 39 tons equals 1-point, and 0 – 19 equals 0-points.

Table 8.6.3: Sediment Reduction Monitoring: Scoring Matrix (Bozeman Creek)

Parameter	4-Points	3-Points	2-Points	1-Point	0-Points
Sediment Captured (tons)	≥ 81	60 – 80	40 – 59	20 – 39	0 – 19

Table 8.6.4: Sediment Reduction Monitoring: Scoring Matrix (Mandeville Creek)

Parameter	4-Points	3-Points	2-Points	1-Point	0-Points
Sediment Captured (tons)	≥ 10	7.5 – 9.9	5.0 – 7.4	2.5 – 4.9	0 – 2.4

Results: The MS4 relates results to the Matrix and then populate the Sediment Reduction Monitoring: Results chart with the corresponding scores. The MS4 weighs Bozeman Creek more heavily than Mandeville Creek because of DEQ's imposed reduction requirements.

Table 8.6.5 Sediment Reduction Totals

Waterbody	2018	2019	2020	2021	2022
Bozeman Creek	45 Tons	45 Tons	41 Tons	50 Tons	43 Tons
Mandeville Creek	1 Ton	6 Tons	8 Tons	6 Tons	6 Tons
Total:	46 Tons	51 Tons	49 Tons	56 Tons	49 Tons

The MS4 calculates a Final Score by summing the weighted Annual Points in the Sediment Reduction Monitoring: Results chart and dividing by the Possible Points to calculate the Final Score. Finally, the MS4 transfers the Final Score to SWMP Section 8.8.

Table 8.6.5: Sediment Reduction Monitoring: Results				
Waterway	2019	2020	2021	2022
Bozeman Creek Annual Points	$(2) \times (1.5) = 3$	$(2) \times (1.5) = 3$	$(2) \times (1.5) = 3$	$(2) \times (1.5) = 3$
Mandeville Creek Annual Points	$(2) \times (.5) = 1$	$(3) \times (.5) = 1.5$	$(2) \times (.5) = 1$	$(2) \times (.5) = 1$
Total Points:	4	4.5	4	4
Possible Points:	8	8	8	8
Final Score (decimal):	0.50	0.56	0.50	0.50

8.7 Long-Term Trend Monitoring

Introduction: Aquatic macroinvertebrate assemblages respond predictably to sedimentation by shifting from sediment-intolerant to sediment-tolerant taxa. Changes in macroinvertebrate assemblages are quantified using the Observed:Expected (O:E) ratio biological index model, which compares the observed taxa at a site with the expected taxa that would be present at a site under a variety of environmental conditions. Using the percent difference in O:E ratios between upstream and downstream sites the MS4 is able to assess stormwater discharge impacts to macroinvertebrate assemblages. A positive percent difference in O:E ratios indicate that stormwater discharges are not negatively impacting macroinvertebrate community assemblages. Conversely, negative percent differences in O:E ratios indicate that stormwater discharges are negatively impacting macroinvertebrate community assemblies. Sedimentation affects macroinvertebrates community assemblages by:

- Filling interstitial voids in gravel substrate
- Reducing gravel attachment sites
- Altering stream morphology
- Increasing stream temperature

Site: The MS4 monitors benthic macroinvertebrates in Bozeman at the In-Stream Wet-Weather Monitoring Sites (SWMP Section 8.5). The MS4 ceased macroinvertebrate monitoring at the Mandeville Creek upstream and downstream locations due to no observed flow at UPS_02 and site constraints at the new DWS_02b site.

Methods: The MS4 derives macroinvertebrate biological index monitoring protocols from MDEQ Sample Collection, Sorting, and Taxonomic Identification of Benthic Macroinvertebrate Communities Standard Operating Procedures (*one sample taken per location per year*).

Analysis: The MS4 collects and preserves macroinvertebrate samples and then delivers to an accredited lab, which completes the analysis of the following parameters:

- Taxonomic Sorting and Identification
- Species Abundance
- Species Diversity
- Observed / Expected Ratios
- Percentage of Sediment Tolerant Species

Upon receiving macroinvertebrate analysis results, the MS4 enters the calculated O:E ratios in the table below and then calculates the percent change between upstream and downstream sites.

Graphic 8.7.1: Monitoring Results: UPS_01 & DWS_01

Year	O:E Ratio: UPS_01	O:E Ratio: DWS_01	O:E Ratio (% Δ)
2018	0.20	0.37	+85%
2019	0.33	0.20	-39%
2020	0.29	0.33	+14%
2021	0.84	0.76	-10%
2022	0.71	0.51	-28%

Table 8.7.2: Monitoring Results: UPS_02 & DWS_02

Year	O:E Ratio: UPS_02	O:E Ratio: DWS_02	O:E Ratio (% Δ)
2018	0.29	0.16	-45%
2019	0.29	0.25	-14%
2020	0.12	0.20	+67%
2021	0.41	0.28	-32%
2022*	-	-	-

*: Mandeville Creek macroinvertebrate monitoring abandoned in 2022 due to no observed flow at UPS_02 and site constraints and new monitoring location DWS_02b.

Evaluation: The MS4 enters data into a local spreadsheet and stores analysis reports for a safe record upon receipt. Further, the MS4 analyzes the data using the following Scoring Matrix and protocol to interpret, evaluate, and communicate the results. The Scoring Matrix includes scores from 0 to 4-points, which relate to percent change in O:E ratios between the upstream and downstream sites for Bozeman creek.

Example: An O:E ratio percent change of 0-(-20%) equals 4-points, -21-(-40%) equals 3-points, -41-(-60%) equals 2-points, -61-(-80%) equals 1-point, and >-80% equals 0-points.

Percent change is determined using Equation 2 found in SWMP Section 8.3.

Example: An upstream Bozeman Creek sample has an O:E ratio of 1.1, and the downstream sample has an O:E ratio of 0.8. The MS4 finds the difference and divides by the original to arrive at a percentage $((0.8 - 1.1)/1.1) \times 100 = -30\%$, resulting in a score of 3-points.

Table 8.7.3: Long Term Trend Monitoring: Scoring Matrix

O:E Ratio	4-Points	3-Points	2-Points	1-Point	0-Points
O:E Ratio (% Δ)	>0 – (-20)	-21 – (-40)	-41 – (-60)	-61 – (-80)	-81 – (-100)

The MS4 relates results to the Matrix and then populates the Long-Term Trend Monitoring: Results chart with the corresponding scores, and calculates a Final Score by summing the Event Points in the Long-Term Trend Monitoring: Results chart and dividing by the Possible Points. Finally, the MS4 transfers the Final Score to SWMP Section 8.8.

Table 8.7.4: Long Term Trend Monitoring: Results

Waterway	2019	2020	2021	2022
Bozeman Creek Event Points	4	3	4	3
Mandeville Creek Event Points	2	4	4	-
Total Points:	6	7	8	3
Possible Points:	8	8	8	4
Final Score (decimal):	.75	0.88	1.0	0.75

8.8 Evaluation

The MS4 calculates a Final Grade to determine the overall effectiveness of its programs and initiatives detailed in SWMP Section 1.0 to 7.0 by transferring scores from each protocol (SWMP Sections 8.4 - 8.7) to the Programmatic Evaluation: Final Points chart, and utilizes a weighted sum calculation to make the four scores comparable.

Table 8.8.1: Programmatic Evaluation: Final Points (2018)

Evaluation Type	Final Scores	Weight	Weighted Total	Weighted Total (%)
Storm Event Monitoring	.62	.25	.15	15.5%
In-Stream Wet-Weather Monitoring	.63	.25	.16	16.0%
Sediment Reduction Monitoring	.38	.25	.10	10.0%
Long-Term Trend Monitoring	.75	.25	.19	19.0%
Final Weighted Total (%):				60.5%

Table 8.8.2: Programmatic Evaluation: Final Points (2019)

Evaluation Type	Final Scores	Weight	Weighted Total	Weighted Total (%)
Storm Event Monitoring	0.47	.25	0.1175	11.75%
In-Stream Wet-Weather Monitoring	0.31	.25	0.0775	7.75%
Sediment Reduction Monitoring	0.50	.25	0.1250	12.50%
Long-Term Trend Monitoring	0.88	.25	0.2200	22.00%
Final Weighted Total (%):				54.0%

Table 8.8.3: Programmatic Evaluation: Final Points (2020)

Evaluation Type	Final Scores	Weight	Weighted Total	Weighted Total (%)
Storm Event Monitoring	0.59	.25	0.1475	14.75%
In-Stream Wet-Weather Monitoring	0.56	.25	0.1406	14.06%
Sediment Reduction Monitoring	0.56	.25	0.1400	14.00%
Long-Term Trend Monitoring	1.0	.25	0.2500	25.00%
Final Weighted Total (%):				67.8%

Table 8.8.4: Programmatic Evaluation: Final Points (2021)

Evaluation Type	Final Scores	Weight	Weighted Total	Weighted Total (%)
Storm Event Monitoring	0.49	.25	0.1225	12.25
In-Stream Wet-Weather Monitoring	0.59	.25	0.1475	14.75
Sediment Reduction Monitoring	0.50	.25	0.1250	12.50
Long-Term Trend Monitoring	0.88	.25	0.2200	22.00
Final Weighted Total (%):				61.5

Table 8.8.5: Programmatic Evaluation: Final Points (2022)

Evaluation Type	Final Scores	Weight	Weighted Total	Weighted Total (%)
Storm Event Monitoring	0.50	.25	0.1250	12.50
In-Stream Wet-Weather Monitoring	0.56	.25	0.1400	14.00
Sediment Reduction Monitoring	0.50	.25	0.1250	12.50
Long-Term Trend Monitoring	0.75	.25	0.1875	18.75
Final Weighted Total (%):				57.75%

The MS4 relates the Final Weighted Total (%) to the following equally distributed ranges (100-percent scale) and their associated Final Grades, and populates the Stormwater Report Card with a Final Grade for the corresponding year. The 2021 score cannot be calculated definitively without receiving the macroinvertebrate results, but is expected to be near a 63%.

Table 8.8.5: Grading Matrix

Grade	A	B	C	D	F
Score (%)	90 - 100%	80 - 89%	70 - 79%	60 - 69%	0 - 59%

Table 8.8.6: Stormwater Report Card

2019 Final Grade	2020 Final Grade	2021 Final Grade	2022 Final Grade
F 54%	D 68%	D 62%	F 58%

The MS4 utilizes its empirical knowledge, performance measures, and data to continually evaluate and optimize its programmatic workloads detailed in this SWMP. Also, the MS4 compares its Final Grades to the criteria below and, as necessary, works to implement the following improvement strategies:

1. Grade = A: No stormwater impact on receiving waters, allowing for a continuation of administrative programs and reduction of TMDL Action Plan investment to maintain grade.
2. Grade = B: Low stormwater impact to receiving waters, requiring continuation of administrative programs and TMDL Action Plan investment to increase grade.
3. Grade = C: Moderate stormwater impact on receiving waters, requiring an expansion of administrative programs and continuation of TMDL Action Plan investment to increase grade.
4. Grade = D: Significant stormwater impact on receiving waters, requiring an expansion of administrative programs and TMDL Action Plan investment to increase grade.
5. Grade = F: Major stormwater impact on receiving waters, reassessment of administrative programs and TMDL Action Plan investment strategy required.

Section 9.0

Stormwater Management Plan Updates

Graphic: 9.0.1: Permeable Paver Walkway



Graphic 9.0.2: Boulevard Infiltration Gallery

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Introduction

The MS4 updates the information in this SWMP annually, and tracks change specific to each section. This SWMP requires changes to meet operation and policy adjustments that occur in local government.

9.1 Program Administration

January/February 2021:

- Sections 1.1-1.10: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 1.1: Added punctuation and removed language referencing “Master Plan”.
- Section 1.2: Completed minor grammar updates and clarified language.
- Section 1.2: Removed language regarding an MOU requirement between the City and MSU.
- Section 1.3: Updated the 20 total impervious area and total site plan performance measure.
- Section 1.3: Added the FY21 Approved Budget information.
- Section 1.3: Updated Graphic 1.3.1 and 1.3.2.
- Section 1.3: Added Graphics 1.3.3 -1.3.6.
- Section 1.3: Removed excess language, clarified content, and reformatted.
- Section 1.4: Added the FY21 Approved Budget information.
- Section 1.4: Removed excess language, clarified content, and reformatted.
- Section 1.5: Updated and clarified language for all positions.
- Section 1.5: Updated Graphic 1.5.1 to include 2020 numbers, recalculated totals.
- Section 1.6: Completed minor language edits.
- Section 1.7: Updated section title and completed wording edits.
- Section 1.8: Removed two permit references.
- Section 1.10: Updated 2021 SWMP advertisement dates, and updated Graphic 1.10.1.

January/February 2022:

- Section 1.2: Updated population numbers with 2020 census data and enrollment data
- Section 1.3: Updated rate model information
- 1.4: Updated MSU regulated projects
- 1.5 Updated org charts to include points of contact between the co-permittees and roles related to each MCM.

January/February 2023:

- Throughout: Removed the oldest years of data. Where appropriate, older data is provided as an average of the removed years in the first column in a table.
- Section 1.3: Updated impervious area, site plans, staffing and budget summaries for the past year.
- 1.5: Updated titles in the COB org chart

9.2 Capital Project Program

January/February 2021:

- Sections 2.1-2.6: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.

- Section 2.2: Revised the Total Maximum Daily Load Action Plan.
- Section 2.3: Updated performance metrics and projects.
- Section 2.4: Updated projects and graphics, and clarified some names and categories.
- Section 2.5: Updated pollutant reduction totals.
- Section 2.6: Updated performance measures.

January/February 2022:

- Sections 2.1-2.6: Update tables to include 2021 data, including the CIP budget in an easier-to-read table format.

January/February 2023:

- Sections 2.1-2.6: Update tables to include 2022 data, updated the CIP budget
- Section 2.2: Updated graphics to include TMDL Impairments, updated tables.
- Section 2.3: Streamlined project summaries from previous years, focusing on 2022 project updates.
- Section 2.4: Updated maps and graphics

9.3 Public Education Program

January/February 2021:

- Sections 3.1-3.4: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 3.3: Improved formatting.
- Section 3.4: Updated initiative information.

January/February 2022:

- Sections 3.1-3.4: Fixed formatting and updated tables.
- Section 3.4: Included adopt a rain garden program

January/February 2023:

- Removed “Goals” and “Goal Outcome” and replaced with Performance Measure for all tables.
- Updated all tables with 2022 results.

9.4 Illicit Discharge Detection and Elimination Program

January/February 2021:

- Sections 4.1-4.8: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 4.3: Changed Response Protocol to Corrective Action Plan. Expanded and added detail to contained sections to provide additional detail regarding the MS4’s process.
- Section 4.4: Improved language related to the MS4’s Enforcement Response Plan.
- Section 4.5: Added 2020 events and updated Graphics
- Section 4.6: Updated controls for hot tub and pool discharge and remove construction dewatering, which is covered under SWMP Section 5.0.
- Section 4.7: Updated graphics provided more information regarding the MS4’s ORI Inspection Plan, and updated high-priority outfall inspection information.

- Section 4.8: Updated storm sewer infrastructure totals.

June 2021:

- Section 4.5: Updated 2021 IDDE events
- Section 4.5, 4.7: Updated maps

January 2023:

- Section 4.5: Updated 2022 IDDE events
- Section 4.5, 4.7: Updated maps
- Section 4.7: Updated Table 4.7.1: Receiving Waterways
- Section 4.7: Added Outfall Attribute update information
- Section 4.7: Updated High-Priority Outfalls tables and Outfall Inspection Summary table.
- Section 4.8: Removed table 4.8.5

9.5 Construction Site Management Program

January/February 2021:

- Sections 5.1-5.8: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 5.3: Updated to be specific to the MS4's permitting program and account for operational changes made during 2020.
- Section 5.4: Added section to better align with the requirements of the MS4 Permit, including a flow chart and description of the MS4's enforcement process.
- Section 5.5: Added section to include more detailed information regarding high-priority sites and rain events, added 2020 totals, reformatted tables, and updated Graphic.
- Section 5.6: Added 2020 performance totals and audit results and updated the chart.
- Section 5.8: Updated document names.

January/February 2022:

- Section 5.5: Updated construction site inventory
- Section 5.6: Updated performance measures with 2021 audit scores and discussion
- Section 5.7: Added Notice of Violations, Stop Work Order to program document list

January 2023:

- Section 5.5: Updated construction site inventory
- Section 5.6: Updated performance measures with 2022 audit scores and discussion

9.6 Post-Construction Program

January/February 2021:

- Sections 6.1-6.9: Streamlined sections, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Sections 6.1-6.9: Revised the entire section to account for programmatic changes and improve alignment with the MS4 Permit.

January/February 2022:

- Section 6.4: Updated structural BMP inventory tables

- Section 6.6: Updated High-priority list and noted sites that were evaluated and found not to meet the criteria
- Section 6.8: Included 2021 audit data in performance evaluation

January/February 2023:

- Section 6.4: Updated structural BMP inventory tables
- Section 6.6: Updated High-priority list and noted sites that were evaluated and found not to meet the criteria
- Section 6.8: Included 2022 audit data in performance evaluation

9.7 Good Housekeeping Program

January/February 2021:

- Sections 7.1-7.5: Streamlined section, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 7.2: Adjusted infrastructure maintenance frequencies and updated performance totals.
- Section 7.3: Modified Facility Minimum Standards, updated Facility Stormwater Pollution Prevention Plan protocols, added tables and updated map, and removed performance metric.
- Section 7.4: Modified Activity Minimum Standards, updated Activity Stormwater Pollution Prevention Plan protocols, and removed completion performance metric.
- Section 7.5: Developed training section to include tables and updated strategies, updated participation numbers, and updated training events.

January/February 2022:

- Section 7.2-7.4: Added 2021 quantitative data to tables, list of activity and facility SWPPPs to include the creation of new documents as planned by each year.
- Section 7.5: Added 2021 training. Consolidated some bullets based on staffing changes. Next year, further consolidation will occur by position rather than individual due to promotion, staff turnover etc.

January 2023:

- Section 7.3: Condensed SWMT Training into one section.
- Section 7.3: Condensed Construction Site Personnel Training into one section.
- Section 7.3: Condensed Post-Construction Personnel Training into one section.
- Section 7.3: Condensed Field and Facility Personnel Training into one section.
- Section 7.3: Added Conferences and Miscellaneous Trainings section.
- Section 7.5: Added 2021 training. Consolidated some bullets based on staffing changes.
- Section 7.4: Removed Laurel Glen, Cemetery Shops, Bozeman Public Safety Center, City Hall, and Fire Stations 1 – 3 from MS4 Facilities. Added justification for removal.
- Section 7.4: Updated FSWPPP Map.
- Section 7.6: Condensed ASWPPP Training section.

9.8 Sampling and Evaluation Program

January/February 2021:

- Sections 8.1-8.9: Streamlined section, removed excess language, reformatted duplicate information into charts, and corrected grammatical errors.
- Section 8.4: Added 2020 raw data and updated point scores.
- Section 8.5: Added 2020 raw data and updated point scores.
- Section 8.6: Added 2020 raw data and updated point scores.
- Section 8.7: Added 2020 raw data and updated point scores.
- Section 8.8: Calculated 2020 score and updated Graphic 8.8.5.
- Section 8.9: Added 2020 Results.

April 2021:

- Sections 8.1-8.9: Updated UPS_1 and DWS_01 data with replacement sample data.

June/July 2021:

- Section 8.4: Added Spring 2021 raw data and updated point scores.

January/February 2022:

- Sections 8.1-8.9: Updated tables and discussion with all available quantitative data collected in 2021.

January 2023:

- Sections 8.1-8.9: Updated tables and discussion with all available quantitative data collected in 2022.
- Section 8.5: Updated site descriptions and added new DWS_02b site description and In-stream monitoring map.

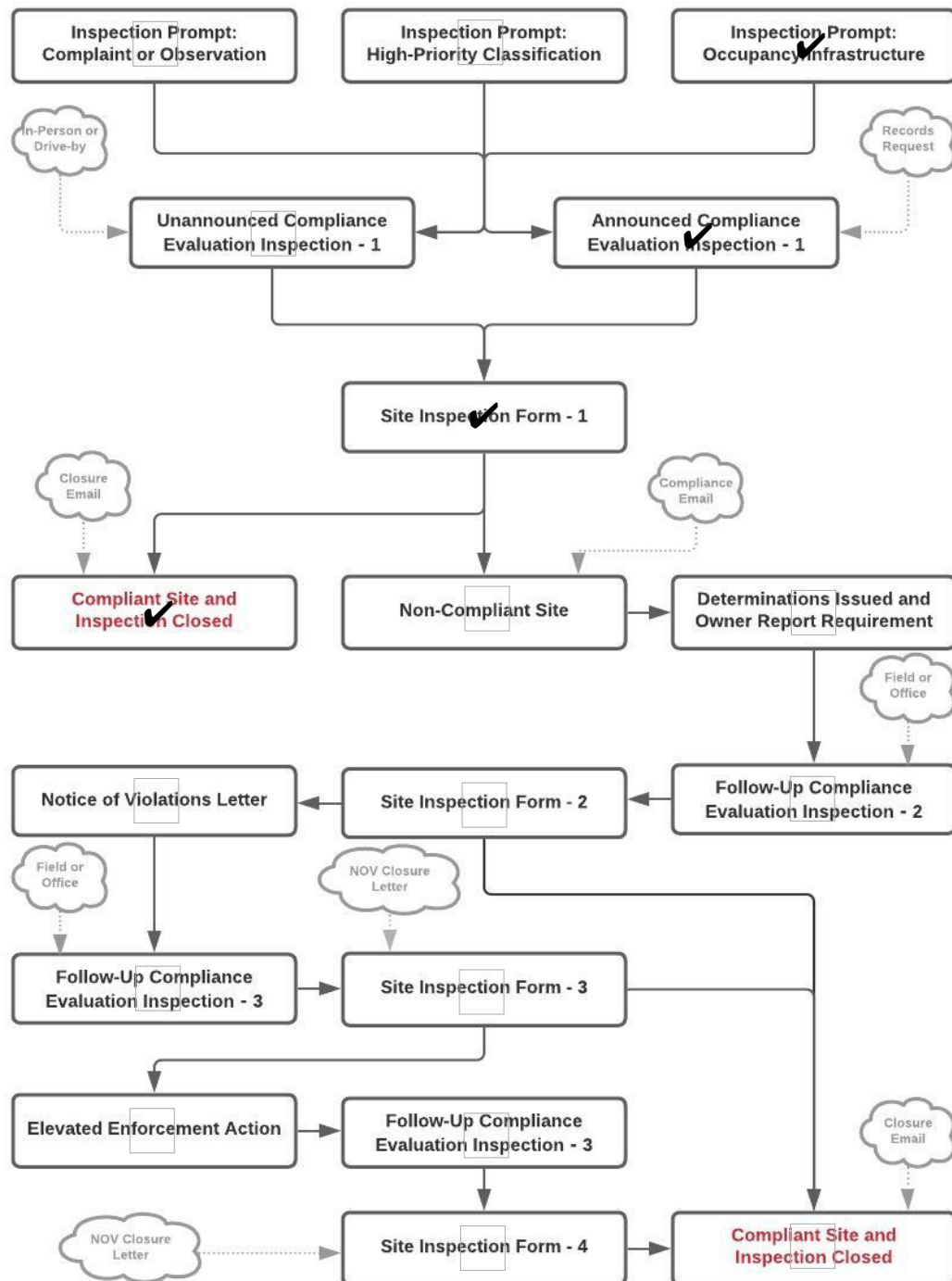
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Occupancy Inspection Workflow

Section 1.0: Occupancy Inspection Information

1. Site ID: 2022 Occupancy Inspections
2. Date: 2022

Section 2.0: Construction Site Compliance Protocol - Occupancy Inspection



2022 Occupancy Inspection Inventory

Approx Date	Site	Status
4-Jan	1695 Tschache	Closed
27-Jan	1619 Tschache	Closed
8-Feb	110 N Tracy	Closed
24-Mar	1683 Tschache	Closed
25-Mar	2055 Kimberwicke	Closed
22-Apr	1611 Tschache	Closed
26-May	1623 Tschache	Closed
4-Jun	1245 N 15th	Closed
21-Jun	815 N 5th	Closed
22-Jun	2145 W Arnold	Closed
24-Jun	2505 Catron	Closed
29-Jun	1631-1645 Tschache	Closed
15-Jul	1894 Orville	Closed
30-Jul	515 W Aspen	Closed
1-Aug	1515 Windrow	Closed
1-Aug	1525 Windrow	Closed
1-Aug	1539 Windrow	Closed
6-Jul	1625 Tschache	Closed
18-Aug	3233 Warbler	Closed
18-Aug	2245 Srpringhill Rd	Closed
22-Aug	104 E Main	Closed
22-Aug	1649-1677 Tschache	Closed
1-Sep	1110 Campbell	Closed
5-Sep	901 N Rouse	Closed
9-Sep	205 N 11th	Closed
10-Jul	5242 Fallon	Closed
29-Sep	1160 S 29th St	Closed
18-Oct	2409 Blue Silo	Closed
18-Oct	2308 Blue Silo	Closed
18-Oct	2410 Blue Silo	Closed
17-Oct	106 E Babcock	Closed
20-Oct	2075 Arnold	Closed
20-Oct	2085 Arnold	Closed
20-Oct	2095 Arnold	Closed
20-Oct	2105 Arnold	Closed
20-Oct	2125 Arnold	Closed
20-Oct	2145 Arnold	Closed
20-Oct	1704 Lincoln	Closed
25-Oct	3905 Wellness Way	Closed
14-Nov	1100 Rosa	Closed
14-Nov	3360 Warbler	Closed
15-Nov	401 E Peach	Closed
17-Nov	5290 Fallon	Closed
21-Nov	1557 Windrow	Closed
21-Nov	1547 Windrow	Closed
21-Nov	1577 Windrow	Closed
21-Nov	1535 Windrow	Closed
28-Nov	Rosa Way 1130	Closed
3-Dec	1543 Windrow	Closed
6-Dec	1555 Windrow	Closed
6-Dec	1585 Windrow	Closed
8-Dec	132 Pond Row	Closed
22-Dec	4020 Valley Commons Dr	Closed

4 - SWPPP Review Checklist



SWPPP Review Checklist

Sec. 1: Administrative Information

1. **Project ID:** OACXX-XXX
2. **Project Name:**
3. **Reviewer:** Choose an item.
4. **QA/QC:** Choose an item.
5. **Date Reviewed:** Click here to enter a date.
6. **Site Priority Points:** Click here to enter text.

Criteria	3-Points	2-Points	1-Point
Site Size	> 10-Acres	5 - 10 Acres	< 5-Acre
Proximity to Waterbody	< 1,000 ft	> 1,000 or < 2,000 ft	> 2,000 ft
Site Steepness per SWPPP	Yes	-	No
Bozeman Creek Watershed	Yes	-	No
Permit Review Checklist Score	> 50	25 - 50	< 25

7. **Site Priority Rating:** Choose an item.

Sec. 2: NOI-SWC Section A: NOI Status

1. **NOI Status:** ☐Yes ☐No:

Sec. 3: NOI-SWC Section B: Facility or Site Information

1. **Site Name:** ☐Yes ☐No:
2. **Site Physical Address:** ☐Yes ☐No:

Sec. 4: NOI-SWC Section C: Applicant (Owner/Operator) Information

1. **Applicant Name:** ☐Yes ☐No:
2. **Applicant Address:** ☐Yes ☐No:
3. **Facility Site Contact:** ☐Yes ☐No:

Sec. 5: NOI-SWC Section D: Other Applicable Permits, Certifications, or Approvals

1. **MPDES:** ☐Yes ☐No:
2. **MGWPCS #:** ☐Yes ☐No:
3. **Other:** ☐Yes ☐No:

Sec. 6: NOI-SWC Section D: MS4

1. **MS4 Recognition:** ☐Yes ☐No:
2. **MS4 Contact:** ☐Yes ☐No:

Sec. 7: NOI-SWC Section F: SWPPP Preparer and Administrator

1. **SWPPP Preparer:** ☐Yes ☐No:
2. **SWPPP Administrator:** ☐Yes ☐No:

Sec. 8: NOI-SWC Section G: Duly Authorized Representative

1. **Duly Authorized Representative:** ☐Yes ☐No ☐N/A:
2. **Attachment A:** ☐Yes ☐No ☐N/A:

Sec. 9: NOI-SWC Section H: Receiving Surface Water(s)

1. **Receiving Water Information:** ☐Yes ☐No:
2. **Receiving Water Impairment Information:** ☐Yes ☐No:

Sec. 10: NOI-SWC Section I: Project Summary

1. **Total Site Area:** ☐Yes ☐No:
2. **Estimate Project Start Date:** ☐Yes ☐No:
3. **Estimated Project Final Stabilization Date:** ☐Yes ☐No:
4. **Type of Construction Project:** ☐Yes ☐No:
5. **Description of Construction Activity / Project:** ☐Yes ☐No:
6. **BMP Summary:** ☐Yes ☐No:

Sec. 11: NOI-SWC Section M: Certification

1. **Signatory:** ☐Yes ☐No:

Sec. 12: SWPPP Section A: SWPPP Status

1. **SWPPP Status:** ☐Yes ☐No:
2. **Matches NOI-SWC:** ☐Yes ☐No

Sec. 13: SWPPP Section B: Facility or Site Information

1. **Site Name:** ☐Yes ☐No:
2. **Site Physical Address:** ☐Yes ☐No:
3. **Matches NOI-SWC:** ☐Yes ☐No

Sec. 14: SWPPP Section C: Applicant (Owner / Operator) Information

1. **Applicant Name:** ☐Yes ☐No:
2. **Applicant Address:** ☐Yes ☐No:
3. **Matches NOI-SWC:** ☐Yes ☐No

Sec. 15: SWPPP Section D: SWPPP Preparer and Administrator

1. **SWPPP Preparer:** ☐Yes ☐No:
2. **SWPPP Administrator:** ☐Yes ☐No:

Sec. 16: SWPPP Section E: Site Description (General Permit 3.3)

3. **Part 1: Activity Nature:** ☐Yes ☐No:
4. **Part 2: Support Activities:** ☐Yes ☐No:
5. **Part 3: Site Areas:** ☐Yes ☐No:
 - a. **Matches NOI-SWC:** ☐Yes ☐No
6. **Part 4: Soils:** ☐Yes ☐No:
7. **Part 5: Vegetation:** ☐Yes ☐No:
8. **Part 6: Runoff Patterns:** ☐Yes ☐No:
9. **Part 7: Outfall Table:** ☐Yes ☐No:

Sec. 17: SWPPP Section F: Potential Pollutant Sources (General Permit 3.4)

1. **Soils:** ☐Yes ☐No:
2. **Materials:** ☐Yes ☐No:
3. **Activities:** ☐Yes ☐No:

4. **Additional Pollutants:** ☐Yes ☐No:
5. **Non-Stormwater Discharges:** ☐Yes ☐No:

Sec. 18: SWPPP Section G: Technology-Based Effluent Limitations and Selection of Best Management Practices (BMPs) (General Permit Parts 2.1 and 3.5)

1. **Limit areas of disturbance and soil exposure.**
a. SWPPP Plan includes: ☐Yes ☐No:
2. **Stabilize ditches, swales, channels, and outlets.**
a. SWPPP Plan includes: ☐Yes ☐No:
3. **Minimize erosion at outlets and conveyance channels.**
a. SWPPP Plan includes: ☐Yes ☐No:
4. **Provide a natural buffer within the construction project area.**
a. SWPPP Plan includes: ☐Yes ☐No:
5. **Maintain natural buffers around state waters.**
a. SWPPP Plan includes: ☐Yes ☐No:
6. **Minimize the disturbance of steep slopes of 15% or greater.**
a. SWPPP Plan includes: ☐Yes ☐No:
7. **Stabilize disturbed areas immediately for any portion of the site that will remain inactive for 14 or more calendar days.**
a. SWPPP Plan includes: ☐Yes ☐No:
8. **Divert stormwater runoff from disturbed areas to sediment removal BMPs.**
a. SWPPP Plan includes: ☐Yes ☐No:
9. **Protect all on-site storm drain inlets.**
a. SWPPP Plan includes: ☐Yes ☐No:
10. **Protect above and below ground infiltration facilities from sedimentation.**
a. SWPPP Plan includes: ☐Yes ☐No:
11. **Minimize vehicle/equipment entrances and exits.**
a. SWPPP Plan includes: ☐Yes ☐No:
12. **Manage vehicle/equipment entrances and exits, equipment laydown, and material storage areas with stabilization techniques.**
b. SWPPP Plan includes: ☐Yes ☐No:
13. **Provide surface outlets for retention and detention facilities during active construction.**
a. SWPPP Plan includes: ☐Yes ☐No:
14. **Provide cover, containment, and protection for all chemicals and liquids, petroleum products, and construction materials, products, and wastes.**
a. SWPPP Plan includes: ☐Yes ☐No:
15. **Use spill prevention and control measures for vehicle maintenance and fueling.**
a. SWPPP Plan includes: ☐Yes ☐No:
16. **Maintain appropriate spill kits.**
a. SWPPP Plan includes: ☐Yes ☐No:
17. **Prevent discharge of equipment wash waters and clean out wastes, and designate these activities away from the state waters and their conveyances.**
a. SWPPP Plan includes: ☐Yes ☐No:
18. **Prevent discharge of concrete products.**
a. SWPPP Plan includes: ☐Yes ☐No:
19. **Run-on / Runoff Control BMPs**

- b. SWPPP Plan includes: ☐Yes ☐No:
- 20. **Post Construction Control BMPs**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 21. **Public Signage**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 22. **Additional BMPs**
 - a. SWPPP Plan includes: ☐Yes ☐No ☐N/A:
- 23. **BMP Design, Installation, and Maintenance Specification Source Documentation**
 - a. SWPPP Plan includes: ☐Yes ☐No:

Section 19: SWPPP Section H: Water Quality Controls for Discharges to Impaired Water Bodies

- 1. **Receiving Water Information:** ☐Yes ☐No: waterway.
- 2. **Receiving Water Impairment Information:** ☐Yes ☐No:

Sec. 20: SWPPP Section I: Municipal Separate Storm Sewer System (MS4s) – Local Erosion and Sediment Control Requirements

- 1. **Control Disturbed Areas**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 2. **Mitigate Vehicle and Equipment Tracking**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 3. **Control Concrete Washout and other Masonry Wastes**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 4. **Manage Soil Stockpiles**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 5. **Manage Dewatering Flows**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 6. **Stabilize Disturbed Areas**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 7. **Protect Onsite Inlets**
 - a. SWPPP Plan includes: ☐Yes ☐No:

Sec.21: SWPPP Section J: Dewatering Activities (General Permit Parts 2.1.4 and 3.6)

- 1. **Description of dewatering activities:**
 - a. SWPPP Plan includes: ☐Yes ☐No:
- 2. **Description of dewatering BMPs:**
 - b. SWPPP Plan includes: ☐Yes ☐No:

Sec. 22: SWPPP Section K: Major Construction Activity and BMP Phasing (General Permit Part 3.7)

- 1. **Total Number of Activities:** ☐Yes ☐No:
- 2. **Major Construction Activity Schedule:** ☐Yes ☐No:
- 3. **Do BMPs match those listed in SWPPP Section G:** ☐Yes ☐No:

Sec. 23: SWPPP Section L: Final Stabilization (General Permit Part 3.8)

- 1. **Final stabilization description:**
 - a. SWPPP Plan includes: ☐Yes ☐No:

Sec. 24: SWPPP Section M: Post-Construction (General Permit Part 3.9)

1. Identification of Post-Construction Features:

a. SWPPP Plan includes: ☐Yes ☐No:

2. Description of applicable local water quality and flood control requirements:

a. SWPPP Plan includes: ☐Yes ☐No:

Sec. 25: SWPPP Section N: Site Map (General Permit Part 3.10)

1. **Site boundaries:** ☐Yes ☐No

2. **Locations and types of activities:** ☐Yes ☐No

3. **Location of ground-disturbing activities:** ☐Yes ☐No

4. **Phasing of major construction activities:** ☐Yes ☐No

5. **Preconstruction topography:** ☐Yes ☐No

6. **State surface waters:** ☐Yes ☐No

7. **Drainage patterns and stormwater flow directions:** ☐Yes ☐No

8. **Stormwater discharge locations:** ☐Yes ☐No

9. **Municipal storm sewer infrastructure:** ☐Yes ☐No

10. **Project run-on:** ☐Yes ☐No

11. **Cut and fill areas:** ☐Yes ☐No

12. **Undisturbed locations:** ☐Yes ☐No

13. **Slope changes pre and post construction:** ☐Yes ☐No

14. **Stockpile locations:** ☐Yes ☐No

15. **Fueling and washing areas:** ☐Yes ☐No

16. **Concrete washout areas:** ☐Yes ☐No

17. **Dewatering activities:** ☐Yes ☐No

18. **Entry and exit points:** ☐Yes ☐No

19. **BMPs detailed in SWPPP Section G:** ☐Yes ☐No

20. **Post construction site conditions:** ☐Yes ☐No

21. **Public Sign:** ☐Yes ☐No

22. **Map scale, north arrow, and legend:** ☐Yes ☐No

Sec. 26: SWPPP Section O: Inspection and BMP Maintenance Procedures (General Permit Part 3.11)

1. **Frequency:** ☐Yes ☐No:

2. **Rainfall amount determination source included:** ☐Yes ☐No:

3. **Description:** ☐Yes ☐No:

Sec. 27: SWPPP Section P: Supplemental Information

1. **Description:** ☐Yes ☐No ☐N/A:

Sec. 28: SWPPP Section Q: Certification

1. **Signatory:** ☐Yes ☐No:

5 - SWPPP Site Inspection Form



Site Inspection Form

Section 1.0: Site Information

1. Site ID, Name:
2. Location:
3. Site Type: Choose an item.
4. Phase: Choose an item.
5. MTR#: Click here to enter text.
6. Site Priority: Choose an item.
7. Inspection Type: Choose an item.
8. Weather: Choose an item.
9. Last Precipitation: Choose an item.
10. Inspector Name: Choose an item.
11. Inspector Information: (Email/Phone) Choose an item.
12. Administrator Name:
13. Administrator Information (Email/Phone):
14. Owner Name:
15. Owner Information (Email/Phone):
16. Contractor Name:
17. Contractor Information (Email/Phone):

Section 2.0: Prohibited Discharges (General Permit Section 2.1.7)

1. Is a prohibited discharge(s) currently occurring?
 - a. Determination: Choose an item.
 - b. If yes, provide description/NTU reading:

Section 3.0: Compliance Determination and Enforcement Response

1. Inspection #1: Click here to enter a date.
 - a. ☐ Site is compliant.
 - b. ☐ Site is not compliant, determinations issued, follow-up inspection.
 - Estimated Follow-Up Inspection Date: Click here to enter a date.
 - c. ☐ Site is not compliant, Notice of Violations (NOV), follow-up inspection.
 - NOV Date: Click here to enter a date.
 - d. ☐ Site is not compliant, enforcement response, follow-up inspection.
 - Enforcement: ☐ Stop Work Order ☐ Judicial ☐ Occupancy Withheld
 - Enforcement description:
2. Inspection #2: Click here to enter a date.
 - a. ☐ Site is compliant.
 - b. ☐ Site is not compliant, non-compliance determinations, follow-up inspection.
 - Estimated Follow-Up Inspection Date: Click here to enter a date.
 - c. ☐ Site is not compliant, Notice of Violations (NOV), follow-up inspection.
 - NOV Date: Click here to enter a date.
 - d. ☐ Site is not compliant, enforcement response, follow-up inspection.
 - Enforcement: ☐ Stop Work Order ☐ Judicial ☐ Occupancy Withheld
 - Enforcement description:

3. Inspection #3: Click here to enter a date.
 - a. ☐ Site is compliant.
 - b. ☐ Site is not compliant, non-compliance determinations, follow-up inspection.
 - Estimated Follow-Up Inspection Date: Click here to enter a date.
 - c. ☐ Site is not compliant, Notice of Violations (NOV) issued, follow-up inspection.
 - NOV Date: Click here to enter a date.
 - d. ☐ Site is not compliant, enforcement response, follow-up inspection.
 - Enforcement: ☐ Stop Work Order ☐ Judicial ☐ Occupancy Withheld
 - Enforcement description:

Section 4.0: Stormwater Pollution Prevention Plan (General Permit Part 3)

1. Is the SWPPP onsite? Choose an item.
2. Is the SWPPP signage onsite? Choose an item.
3. Is the SWPPP and/or supporting documentation updated to reflect site conditions?
 - a. Determination: Choose an item.
 - b. Finding:
4. Is the site map available at the time of the inspection?
 - a. Determination: Choose an item.
 - b. Finding:
5. Is the SWPPP map updated to reflect site conditions?
 - a. Determination: Compliant
 - b. Findings:
 - Site boundaries. Included: ☐Yes ☐No ☐N/A
 - Matches the current phase of construction. Included: ☐Yes ☐No ☐N/A
 - State surface waters. Included: ☐Yes ☐No ☐N/A
 - Drainage patterns and stormwater flow directions. Included: ☐Yes ☐No ☐N/A
 - Channelized stormwater discharge locations. Included: ☐Yes ☐No ☐N/A
 - Municipal storm sewer infrastructure. Included: ☐Yes ☐No ☐N/A
 - Site run-on. Included: ☐Yes ☐No ☐N/A
 - Cut and fill areas. Included: ☐Yes ☐No ☐N/A
 - Undisturbed locations. Included: ☐Yes ☐No ☐N/A
 - Stockpile locations. Included: ☐Yes ☐No ☐N/A
 - Fueling and washing areas. Included: ☐Yes ☐No ☐N/A
 - Concrete washout areas. Included: ☐Yes ☐No ☐N/A
 - Dewatering activities. Included: ☐Yes ☐No ☐N/A
 - Entry and exit points. Included: ☐Yes ☐No ☐N/A
 - Location of all erosion and sediment control BMPs. Included: ☐Yes ☐No ☐N/A
 - Location of all structural and non-structural BMPs. Included: ☐Yes ☐No ☐N/A
 - Public Signage. Included: ☐Yes ☐No ☐N/A
 - Map scale, north arrow, and legend. Included: ☐Yes ☐No ☐N/A
6. Are BMP design, installation, implementation, and maintenance specifications onsite?
 - a. Determination: Choose an item.
 - b. Finding:

Section 5.0: Inspections (General Permit Part 3.2.2, 2.2.3 and 3.11)

1. Are inspections being performed by the SWPPP Administrator identified in the NOI?
 - a. Determination: Choose an item.
 - b. Finding:
2. What is the Site's inspection frequency? Choose an item.
3. Are reports compliant with General Permit Parts 2.3 and 2.4?
 - a. Determination: Choose an item.
 - b. Finding:
4. Is the SWPPP Administrator certified per General Permit Part 3.2?
 - a. Determination: Choose an item.
 - b. Finding:

Section 6.0: Technology-Based Effluent Limitations (General Permit Part 2.1)

1. Complete implementation and installation of BMPs before or at the start of each major construction activity.
 - a. Determination: Choose an item.
 - b. Finding:
2. Implement and install all BMPs in accordance with good engineering practices and design specifications.
 - a. Determination: Choose an item.
 - b. Finding:
3. Maintain BMPs in effective operating condition.
 - a. Determination: Choose an item.
 - b. Finding:
4. Minimize erosion within the construction site area.
 - a. Determination: Choose an item.
 - b. Finding:
5. Divert stormwater runoff from disturbed areas to sediment removal BMPs.
 - a. Determination: Choose an item.
 - b. Finding:
6. Minimize sediment discharges from the construction site area.
 - a. Determination: Choose an item.
 - b. Finding:
7. Minimize erosion at outlets and conveyance channels.
 - a. Determination: Compliant
 - b. Finding:
8. Protect all storm drain inlets.
 - a. Determination: Choose an item.
 - b. Finding:
9. Manage and minimize vehicle/equipment entrances and exits to the construction site area.
 - a. Determination: Choose an item.
 - b. Finding:
10. Stabilize ditches, swales, channels, and outlets.
 - a. Determination: Choose an item.
 - b. Finding:
11. Provide surface outlets for retention and detention facilities for active construction, and discharge the highest quality water from the facility.
 - a. Determination: Choose an item.
 - b. Finding:

12. Protect infiltration facilities from sedimentation during active construction.
 - a. Determination: Choose an item.
 - b. Finding:
13. Limit areas of disturbance and soil exposure.
 - a. Determination: Choose an item.
 - b. Finding:
14. Provide a natural buffer within the construction site area.
 - a. Determination: Choose an item.
 - b. Finding:
15. Design and construct cut-and-fill slopes to minimize erosion.
 - a. Determination: Choose an item.
 - b. Finding:
16. Divert stormwater or groundwater away from slopes and disturbed areas.
 - a. Determination: Choose an item.
 - b. Finding:
17. Prevent stormwater run on from impacting sediment removal BMPs.
 - a. Determination: Choose an item.
 - b. Finding:
18. Maintain natural buffers around state waters.
 - a. Determination: Choose an item.
 - b. Finding:
19. Direct stormwater runoff to vegetated areas.
 - a. Determination: Choose an item.
 - b. Finding:
20. Mark and maintain clearing limits before disturbing soils and during construction activities.
 - a. Determination: Choose an item.
 - b. Finding:
21. Preserve topsoil.
 - a. Determination: Choose an item.
 - b. Finding:
22. Control ground water, surface water, and/or accumulated stormwater dewatering activities to prevent discharges to state waters.
 - a. Determination: Choose an item.
 - b. Finding:
23. Obtain authorization under the construction Dewatering General Permit prior to discharge of dewatering effluent to state surface waters.
 - a. Determination: Choose an item.
 - b. Finding:
24. Provide cover, containment, and protection for all chemicals and liquids, petroleum products, and construction materials, products, and wastes.
 - a. Determination: Choose an item.
 - b. Finding:
25. Use spill prevention and control measures for vehicle maintenance and fueling.
 - a. Determination: Choose an item.
 - b. Finding:
26. Maintain appropriate spill kits and clean up spills and leaks immediately.
 - a. Determination: Choose an item.
 - b. Finding:

27. Prevent discharge of equipment wash waters and clean out wastes and designate these activities away from the state waters and their conveyances.
 - a. Determination: Choose an item.
 - b. Finding:
28. Prevent discharge of concrete products.
 - a. Determination: Choose an item.
 - b. Finding:
29. Public signage or other form of notice to legally display confirmation of permit coverage is positioned in a safe, accessible location in close proximity to the project, and is visible from the nearest road.
 - a. Determination: Choose an item.
 - b. Finding:

Section 7.0: Soil Stabilization (General Permit Part 2.1.3.)

1. Stabilize disturbed areas immediately for any portion of the site that will remain inactive for 14 or more calendar days with erosion control BMPs.
 - a. Determination: Choose an item.
 - b. Finding:
2. Stabilize disturbed areas within any portion of the site that have completed clearing, grading, excavation, or other earth disturbing activities with erosion control BMPs.
 - a. Determination: Choose an item.
 - b. Finding:

Section 8.0: Post-Construction Facilities (General Permit Part 3.9)

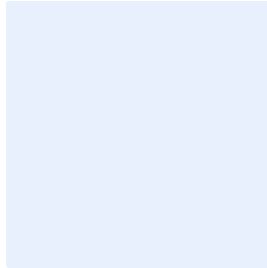
1. Does the SWPPP describe local requirements?
 - a. Determination: Choose an item.
 - b. Finding:
2. Does the SWPPP describe post-construction measures used to control stormwater and potential pollutants after site completion?
 - a. Determination: Choose an item.
 - b. Finding:
3. Are post-construction facilities and infrastructure installed per the site plan?
 - c. Determination: Choose an item.
 - a. Finding:
4. Are post-construction facilities and infrastructure correct in the City's GIS?
 - a. Determination: Choose an item.
 - b. Finding:
5. Has occupancy been approved?
 - a. Date: Click here to enter a date.
 - b. Determination: Choose an item.
 - c. Finding:

Section 9.0: Additional Notes and Findings

Section 10.0: Images

Image 1

- a. Date: Select a date
- b. Description:



2022 Facility Inspections & Resulting Actions

Facility ID	Facility Owner	Facility Description	Facility Discharge Location	Facility Area (SqFt)	Facility Easting (meters)	Facility Northing (Meters)	Facility Last Inspection Date	Plan due	Maint Due	Maint Priority
DP.N03.00006	HOA - Laurel Glen Subdivision	Surface Detention Facility	Unnamed Tributary	98	490740.47	5059508.53	2022	3/14/2023	2023	medium
DP.N03.00007	HOA - Jennifer Place Condos	Surface Retention Facility	Unnamed Tributary	39	490980.16	5059821.43	2022	n/a	n/a	low
DP.N03.00008	HOA - Charles Place Condos	Surface Detention Facility	Unnamed Tributary	27	490812.62	5059370.91	2022	n/a	n/a	low
DP.I09.00010	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	51	494413.00	5054815.27	2022	2/1/2023	2023	low
DP.I09.00009	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	85	494397.04	5054635.84	2022	2/1/2023	2023	low
DP.I09.00008	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	21	494392.41	5054468.05	2022	2/1/2023	2023	low
DP.J09.00039	HOA - Meadow Creek Subdivision	Surface Retention Facility	N/A	388	493940.76	5054648.25	2022	2/1/2023	2023	low
DP.F08.00022	City of Bozeman	Surface Detention Facility	Mathew Bird Creek	80	497087.01	5055170.43	2022	complete	complete	high
DP.I08.00010	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	227	494604.37	5055466.38	2022	2/1/2023	2023	medium
DP.I08.00009	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	1,168	494532.30	5055228.50	2022	2/1/2023	2023	low
DP.F01.00026	Public - City of Bozeman	Surface Detention Facility	East Gallatin River	208	497563.74	5061140.28	2022	n/a	n/a	low
DP.I09.00001	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	23	494495.33	5054408.13	2022	2/1/2023	2023	medium
DP.I09.00006	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	42	494571.94	5054866.97	2022	2/1/2023	2023	high
DP.I09.00024	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	18	494547.77	5054914.79	2022	2/1/2023	2023	low
DP.I08.00008	HOA - Meadow Creek Subdivision	Surface Detention Facility	East Fork Catron Creek Tributary	306	494519.91	5055128.85	2022	2/1/2023	2023	low
DP.M06.00001	HOA - Loyal Garden Subdivision	Surface Detention Facility	Baxter Creek	167	491809.08	5057114.61	2022	n/a	n/a	low
DP.M06.00002	HOA - Loyal Garden Subdivision	Surface Detention Facility	Baxter Creek	80	491786.48	5057201.29	2022	n/a	n/a	low
DP.M06.00003	HOA - Loyal Garden Subdivision	Surface Detention Facility	Baxter Creek	54	491751.16	5057374.89	2022	n/a	n/a	low
DP.M06.00004	HOA - Loyal Garden Subdivision	Surface Detention Facility	Baxter Creek	287	491692.77	5057424.90	2022	n/a	n/a	medium
DP.M06.00005	HOA - Loyal Garden Subdivision	Surface Retention Facility	N/A	164	491546.94	5057466.60	2022	n/a	n/a	medium
DP.M06.00006	HOA - Loyal Garden Subdivision	Surface Retention Facility	N/A	79	491482.64	5057469.58	2022	n/a	n/a	low
DP.N03.00001	HOA - Laurel Glen Subdivision	Surface Detention Facility	Unnammed Tributary	84	490789.20	5059158.29	2022	3/14/2023	2023	medium
DP.N03.00002	HOA - Laurel Glen Subdivision	Surface Detention Facility	Unnamed Tributary	122	490745.34	5059320.53	2022	3/14/2023	2023	medium
DP.N03.00004	HOA - Laurel Glen Subdivision	Surface Detention Facility	Unnamed Tributary	298	491015.72	5059889.89	2022	3/14/2023	2023	high
DP.N03.00005	HOA - Cinnamon Ck Condo Assoc	Surface Detention Facility	Unnamed Tributary	26	490724.90	5059440.94	2022	3/14/2023	2023	low

2022 High Priority Stormwater Detention Facilities

#	Facility ID	Owner	HP Waterbody	Maintenance Action
1	DP.H06.00028	Public - Montana State University	Mandeville Creek	n/a
2	DP.H07.00022	Public - City of Bozeman	Mandeville Creek	n/a
3	DP.H07.00023	Public - City of Bozeman	Mandeville Creek	n/a
4	DP.H06.00026	Public - Montana State University	Mandeville Creek	n/a
5	DP.H06.00023	Public - Montana State University	Mandeville Creek	n/a
6	DP.H04.00006	Private - Bozeman School District	Mandeville Creek	n/a
7	DP.I51.00074	Public - City of Bozeman	East Gallatin River	n/a
8	DP.E02.00006	Public - City of Bozeman	East Gallatin River	n/a
9	DP.H06.00025	Public - Montana State University	Mandeville Creek	n/a
10	DP.I51.00075	Public - City of Bozeman	East Gallatin River	report & follow-up 2023
11	DP.H06.00400	Public - Montana State University	Mandeville Creek	n/a
12	DP.I51.00076	Public - City of Bozeman	East Gallatin River	n/a
13	DP.H06.00024	Public - Montana State University	Mandeville Creek	n/a
14	DP.G02.00017	Private - HOA	Mandeville Creek	report & follow-up 2023
15	DP.G03.00050	Private	Mandeville Creek	report & follow-up 2023

7 - Post Construction Plan Review Checklist

Project Name:

Project Location:

Reviewed By:

Items Required Prior to SP Approval:

easements, CILWR, ect

Items Required for Infrastructure Submittal:

Water, sewer, ect.

Items Required Prior to Building Permit Approval:

Concurrent Constrcution approval, ect.

Items Required Prior to Occupancy Approval:

completion of Davis Lift Station, ect.

Reviewer Notes:

notes during review

brief description and dates of significant phone calls, emails, and meetings

MEMORANDUM

To: Planner, Title**From:** Engineer, Title**Application:** Project #: 21### - Project Title**Date:**

The following comments are provided in response the above referenced project. The applicant must provide additional information or corrections in accordance with the applicable code sections and requirements.

ENGINEERING COMMENTS:**General**

1

2

Legal**Stormwater****Utilities****Transportation****CONDITIONS OF APPROVAL:****ADVISORY COMMENTS:**

General Engineering Requirements	
----------------------------------	--

[illegible]

Legal Engineering Requirements

	Check	Approved			Code Section - Code Requirement	Internal Notes
		NA	Yes	No		
1 Payback					The subject property is located within the (List Payback) payback district boundary. If the subject property did not participate in the original cost of construction of improvements the subject property will be accessed a payback charge prior to (planning application approval). Reference document (paste link). BMC 38.410.060 - All Easements indicated below must be provided on city standard easements templates. Drafts must be prepared for review and approval by the city with site plan submittal. Signed hard copies of the easements must be submitted to the city prior to site plan approval. The applicant may contact the review engineer to receive standard templates.	
10' easement along property frontage					The applicant must provide a ten foot utility easement (power, gas, communication, etc.) along the developments property frontage.	
Sewer and Water Easement					The applicant must provide a thirty (30) foot public utility easement to accommodate both water and sewer. An additional ten feet of width is required for each additional main that occupies the easement.	
insert all easements					DSSP V.D.5 - At no time will the utility line in question be less than nine (9) feet from the edge of the easement or less than ten (10) feet from a parallel utility line. Utility easements will also be required for all meter pits and fire hydrants maintained by the City of Bozeman. DSSP V.D.5.c - A utility occupancy permit, found on the engineering department's webpage, and approval from the City's Water Superintendent is required for any private utility occupying a public water or sewer easement. The permit and approval is required for the proposed storm system prior to site plan approval. BMC 38.410.060.C.1 – (Trail Section). The applicant must provide a <u>thirty (30)</u> foot trail corridor easement to accommodate the proposed trail sections prior to Master Site Plan Approval. The applicant may contact the Engineering Department to receive a copy of a utility easement template. DSSP V.D.5 - No permanent structures shall be placed within a utility easement unless an encroachment permit has been obtained. Trees or other significant landscaping features shall not be placed within ten (10) feet of any utility main or service lines.	

Grading and Drainage Engineering Requirements

Check	Approved			Reference Section - Requirement	Internal Notes	development notes
	NA	Yes	No			
GRADING AND DRAINAGE PLAN REQUIREMENTS						
1	Contours and spot elevations			Site Plan Checklist - Topographic contours at a minimum interval of 1 foot, or as determined by the Director. Include sufficient spot elevations and slope arrows.		
2	Retention/detention locations			Site Plan Checklist - On-site retention/detention location, include size, volume and relevant elevations.		
3	Stormwater infrastructure elevations			Site Plan Checklist - Invert elevations for all stormwater conveyance infrastructure including pipes, control structure, overflows, curb chase, etc.		
5	On site surface water			Site Plan Checklist - Surface water, including: Ponds, streams and irrigation ditches (include classifications based upon a determination of the Gallatin Conservation District; note classification of each feature on plans). Watercourses, water bodies and wetlands (include classifications based upon a determination of the Gallatin Conservation District, Army Corps of Engineers, or Wetland Delineation Report; note classification of each feature on plans). Include dimensions of watercourse setbacks including Zones 1 and 2. Floodplains as designated on the Federal Insurance Rate Map or that may otherwise be identified as lying within a 100 year floodplain through additional floodplain delineation, engineering analysis, topographic survey or other objective and factual basis. The flood hazard area(s) as identified with a floodplain analysis report in compliance with Article 6, BMC, if required.		
6	Prevent of off-site discharge			BMC 40.04.700 (A.4.a) - Stormwater management plans and comprehensive drainage plans shall prevent any off-site direct discharge of untreated stormwater and non-stormwater from development or redevelopment improvements.		
	Grading around buildings			BMC 38.410.080 (8) - Provisions must be made for the control and drainage of surface water around buildings. Generally, all lots and street boulevard areas must be graded no lower than the back of curb or level of street, whichever is applicable.		
	Drainage way easement			BMC 38.41.080 E - The city may require the developer to establish easements or other perpetual controls to prevent encroachment or disruption of drainageways or facilities.		
	Strom facilities do not occupy more than 1/3 of the front setback			BMC 38.410.080 (F) - Stormwater facilities generally must not occupy more than one-third of a required front setback. Departures will be considered (per section 38.250.060) for stormwater facilities with Low Impact Development (LID) components, underground components, or exceptional design.		
	Stormwater facilities aesthetics			BMC 38.410.080 (H) - Stormwater retention/detention facilities in landscaped areas must be designed as landscape amenities. They must be an organic feature with a natural, curvilinear shape. The facilities must have 75 percent of surface area covered with live vegetation appropriate for the depth and design of the retention/detention facility, and be lined with native grasses, indigenous plants, wet root tolerant plant types and groupings of boulders to create a functional, yet natural site feature. A cross section and landscape detail of each facility must be submitted with the final landscape plan for review and approval. Facilities with a slope up to and including ten percent grade may be grassed and irrigated to blend into the adjacent landscaped area.		
	Snow storage			BMC 38.540.020 (M) - Snow removal storage areas must be provided sufficient to store snow accumulation on site. Such areas may not cause unsafe ingress/egress to the parking areas, may not cause snow to be deposited on public rights-of-way, may not include areas provided for required parking access and spaces, and may not be placed in such a manner as to damage landscaping. All snow removal storage areas must be located and designed such that the resultant stormwater runoff is directed into landscaped retention/detention and water quality improvement facilities as required by the engineering department, or in compliance with the storm drainage provisions of chapter 40 article 4, and/or best practices manual.		
	Parking lot perimeter curbing			BMC 38.540.020 (J) - All open off-street parking areas and drive aisles must have perimeter concrete curb around the entire parking lot, including driving access ways, except for individual townhouse/rowhouse units and one- to four-household dwellings.		
	Parking lot drains into detention / retention facilities			BMC 38.540.020 (P) - Stormwater drainage from parking lots must be directed into landscaped detention/retention facilities and water quality improvement facilities as required by the engineering department, or in compliance with the storm drainage provisions of chapter 40 article 4, and/or best practices manual adopted by the city.		
	Nothing impervious in the watercourse setback			BMC 38.410.100 (A.2.d) - No newly constructed residential or commercial structure, addition to an existing structure, fence, deck, fill material (other than that required for exempt uses), parking lot or other impervious surfaces, or other similar improvements may be located within required watercourse setbacks, unless approved through, and in conformance with, a variance or deviation process as authorized in this chapter.		
	Stormwater treatment not in watercourse setback zone 1, allowed in zone 2			BMC 38.410.100 (A.2.e(1)) - On-site stormwater treatment facilities may be located in Zone 2.		
	Sump pump discharge is retained on site and capacity is allocated for the discharge			A sump pump connection to the sanitary collection system or to the public right-of-way is not allowed. An engineered drywell or retention system may be permitted; however, the applicant will need to provide infiltration data and calculations demonstrating that the drywell or retention system is sized to infiltrate the volume and flow rate from the sump pump.		
	Have a Storm Drainage plan with site and storm features and square foot coverage of different surfaces			DSSP II.B.1 - A Storm Drainage Plan shall include a map or plat showing building site(s), open areas, drainage ways, ditches, culverts, bridges, storm sewers, inlets, storage ponds, roads, streets, and any other drainage improvements. The map shall also include identification and square foot coverage of the various ground surfaces (i.e. vegetation, gravel, pavement, structures).		
	description of destination of stormwater			DSSP II.B.3 - A Storm Drainage Plan shall include a description of the ultimate destination of storm water runoff from the project and an evaluation of its impact on downslope drainage facilities and water quality.		
DRAINAGE SUBMITTALS						
	Drainage design report			BMC 40.04.700 (A) - To control the quality, volume and rate of stormwater runoff to storm drains and prevent the deterioration of water quality, all new developments and redevelopment projects will be required to submit a stormwater management plan or a comprehensive drainage plan to the city engineering department for approval. The stormwater master plan and city Design Standards establish standards and guidelines for implementing BMPs and stormwater management is incorporated by reference and made part of this article.		
	Storm drainage maintenance plan			DSSP II.B.5 - Identify ownership of all facilities. Establish a schedule for maintenance activities necessary to keep the system operationally effective. Identify the responsible party in charge of the specific maintenance duties.		
	High groundwater			Montana Post-Constriction Storm Water BMP Design Guidance Manual - The proposed project is located in an area that is known to have seasonally high groundwater. The applicant must demonstrate that seasonal high groundwater will not impact the function or maintenance of the proposed facilities. Industry guidance recommends a three-foot minimum separation from the bottom of the proposed facility to the underlying groundwater table.		
DRAINAGE DESIGN CRITERIA						
	Drainage report calculations and certification			BMC 40.04.700 (A.5) - All drainage system reports, peak flow rates and runoff volume calculations, safety requirements, and grading plans shall be certified by a licensed professional authorized by the state to perform such functions.		
	Storm Sewers: Alignment			DSSP II.A.3.a - Alignment between manholes shall be straight.		
	Storm Sewers: Slope			DSSP II.A.3.b - The sewers shall be uniformly sloped to maintain a minimum velocity of 3-fps at the design storm depth of flow, or when flowing full, to prevent sediment deposits.		
	Storm Sewers: Erosion Protection			DSSP II.A.3.c - Pond inlet and outlet piping shall be protected and designed to prevent erosion (i.e. splash pads, rip rap, etc.).		
	Storm Sewers: Materials			DSSP II.A.3.d - Publicly maintained storm sewers located in the public right-of-way shall be constructed of reinforced concrete pipe (RCP) or solid-wall or corrugated PVC pipe, complying and installed in accordance with the current edition of MPWSS as modified by the COB. PVC pipe may only be used for pipe sizes of 36" diameter or less. Other pipe materials may be considered for private storm sewer facilities. Use 12-inch minimum pipe size for inlet structures and 15-inch minimum pipe size within the storm drain system.		
	Storm Sewers: Pipe Sizing			DSSP II.A.3.e - Storm sewer facilities shall be designed to handle(convey) a 25-year storm event.		
	Storm Sewers: Inlet Sumps			DSSP II.A.3.f - Inlets and manholes shall have 9-inch sumps for sediment collection unless otherwise approved by the City Engineer.		
STORAGE / TRFATMNT DESIGN						

Post development runoff less than predevelopment		DSSP II.A.1 - The stormwater drainage plan shall be designed to limit stormwater runoff from the development site to the pre-development runoff rates. The pre- developed rate calculations shall be included as part of the required facility design calculations. Adequate on-site stormwater detention shall be provided for design storm runoff exceeding the pre-development rate.		
Capture first .5" of storm		DSSP II.A.4 - For all new development or redevelopment projects greater than or equal to one acre, the drainage plan shall include, to the greatest extent feasible, low impact development practices that infiltrate, evapotranspire, or capture for reuse the runoff generated from the first 0.5 inches of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation.		
Detention ponds sizing		DSSP II.C - On-site detention with release rates limited to pre-development runoff rates is required. The controlling basin volume is determined by subtracting the total basin release volume from the runoff volume at different storm durations. The release rate is equivalent to the pre-development runoff rate at the piping system design frequency (Table 1-3). The runoff rate is determined at the piping system design frequency using development runoff coefficients.		
Retention pond sizing		DSSP II.C - Retention ponds shall be sized based on a 10-year, 2-hour storm intensity.		
Sediment Control Sizing		DSSP II.C.2 - A minimum basin area of 145-square feet per 1-cfs release rate is required for sediment control.		
Pond sizing with major downstream flood concerns		DSSP II.C.2 - Where the potential for major property damage exists due to downstream flooding and the terrain and availability of land permit the construction of a large detention basin, a 100-year design frequency should be used for sizing the pond.		
Min and max basin/water depth.		DSSP II.C.2 - Basins located in areas accessible to the public shall have a maximum water depth of 1.5 feet and a maximum basin depth of 2.5 feet.		
Basin Fencing		DSSP II.C.2 - Deep basins designed only for stormwater detention shall be placed in remote areas and fenced.		
Basins serving multiple lots		DSSP II.C.3 - Basins serving multiple lots shall be located in common open space owned by a Homeowners or Property Owners Association. Locating a basin within an easement on a lot will not be permitted unless approved by the governing body.		
Basins in public parks		DSSP II.C.3 - Public park land shall not be used for storm water detention or retention ponds unless approved by the Superintendent of Facilities and Lands.		
Basin length to width ratio		DSSP II.C.4.a - To prevent short circuiting, basin length shall be at least three times the width and inlet velocities should be dissipated.		
Basin slopes		DSSP II.C.4.b - Basin slopes shall be 4: 1 or flatter. (UDO 18.48.050)		
Vegitative channels		DSSP II.C.4.c - Vegetative channels shall be utilized wherever possible to remove wastewater contaminants.		
Basin overflows		DSSP II.C.4.e - Overflows shall be provided to prevent overtopping of dike walls.		
Retention volume calculation		DSSP II.C.5 - Retention volumes shall be calculated as follows: Volume = (Weighted C Factor)*(Intensity see figure I-2, I-3 for 10 year 2 hr storm)*(Area)		
Orifice calculations		DSSP II.D.2 - Orifice or weir calculations shall be provided for controlling the discharge to the pre-development rate.		
No long term standing water in ponds		DSSP II.D.c. - Ponds shall be designed so as to avoid long-term standing water in the pond.		
Peak runoff		DSSP II.E.3 - The peak runoff rate occurs when the duration of the storm equals the time of concentration.		
Strom intensity		DSSP II.E.4 - The intensity of the storm is determined from Figure I-2 or I-3. Duration is assumed to be equal to the time of concentration.		



August 24, 2023

SENT VIA EMAIL: b.d@gmail.com

XHomeowners Association
Attn: BD, Registered Agent
9Flanders Creek Ave.
Bozeman, Montana 59718

RE: Flanders Creek Subdivision Stormwater Infrastructure Inspection

Ms. D,

The XAssociation (HOA) is responsible for the maintenance of three stormwater facilities that collect and store stormwater generated within and around the HOA's property. Properly performing stormwater infrastructure is important to reduce risk to residents, structures, and the environment by decreasing the chance of flooding and waterway pollution.

On August 20th, 2020, the Stormwater Division completed an inspection of the HOA's stormwater infrastructure and have compiled the following documents for your review:

1. Stormwater Facility Map
2. Stormwater Facility Inspection Reports, including findings and maintenance needs
3. Record drawings and development documents not attached (available upon request)

The Stormwater Division identified the following general issues during the inspection:

- Facility #1 received a medium maintenance priority rating. Removal of trash and excess vegetation is needed to restore function to this facility.
- Facility #2 received a low maintenance priority rating, meaning it is generally functioning as constructed, although some vegetation should be removed from the inlet area.
- Facility #3 received a high maintenance priority rating. Removal of trash, excess vegetation, and sediment is needed to restore function to this facility.

Bozeman Municipal Code Sec. 40.04.720 requires that stormwater facilities be maintained and that the responsible party create and store records of such work. Please submit a maintenance plan to the Stormwater Division which addresses the issues listed on the Inspection Form as well as ongoing maintenance within six months for review.

The City appreciates the HOA's attention to these issues. I am available to answer questions at rsmith@bozeman.net or 406-582-2937.

Regards,

Russell Smith, Stormwater Project Coordinator

Stormwater Facility Inspection Form

Section 1: General Information	
Facility ID:	Facility Type:
Date/Time:	
Owner:	Contact:
Inspector's Name, contact info:	
Location/Access info:	
Type of Inspection: ☐ Routine, Dry Weather ☐ Routine, Wet Weather ☐ Complaint Driven ☐ Other: _____	
Section 2: Weather and Discharge Information	
Most recent precipitation or melt: Temperature:	
Is a stormwater discharge occurring? ☐ Yes ☐ No If yes, what is the source and quality of discharge?	
Is an illegal discharge occurring? ☐ Yes ☐ No If yes, what is the source and quality of discharge?	
Section 3: Facility Maintenance Priority	
☐ Low: Stormwater facility appears to be functioning as designed. Continue scheduled maintenance.	
☐ Medium: Stormwater facility requires minor to moderate sediment and vegetation maintenance to mitigate the risk of flooding, waterway pollution, and infrastructure failure.	
☐ High: Stormwater facility requires significant sediment dredging, vegetation removal, and/or infrastructure repairs to restore function.	
<u>Notes, Findings & Recommendations:</u> 	
Inspector's Signature: _____ Date: _____	

Section 4: Qualitative Analysis					
Components	#	Items	Conditions	Results	Notes and Required Actions
General	1.1	Accessibility	Degraded, missing, or inadequate maintenance access?	☐ Yes ☐ No	
	1.2	Debris	Trash, sediment, and waste within and around the facility?	☐ Yes ☐ No	
	1.3	Vegetation	Overgrown or dead cattails, woody shrubs, weeds, grass, and trees?	☐ Yes ☐ No	
	1.4	Infrastructure Condition	Damaged inlet pipe, outlet pipe, outfall structure, or fencing?	☐ Yes ☐ No	
Facility Condition	2.1	Pretreatment Bay or Facility	Clogged, obstructed, or filled pretreatment forebay or facility?	☐ Yes ☐ No	
	2.2	Storage Bay	Clogged or filled storage bay?	☐ Yes ☐ No	
	2.3	Groundwater or Standing Water	Stagnant water with infiltration greater than 48 hours post-rain event?	☐ Yes ☐ No	
	2.4	Flow Path	Clogged or obstructed flow path?	☐ Yes ☐ No	
	2.5	Side Slopes	Barren or exposed surfaces on Facility's side slopes and bottom?	☐ Yes ☐ No	
Maintenance	3.1	Maintenance Plan or Agreement	Is there a written plan specific to this facility?	☐ Yes ☐ No	
	3.2	Implementation	Is there evidence of maintenance?	☐ Yes ☐ No	

Section 5: Quantitative Analysis

Vegetation	Cover type	% Within facility	Notes	
	Bare ground			
	Aquatics			
	Grasses/Herbaceous			
	Trees >3" DBH			
	Shrubs			
	Total	100		
Elevation Analysis	Location	Reading (ft)	Elevation (ft)	Notes
	SRV#CP Control Point			
	SRV#1 Inlet			
	SRV#2 Outlet			
	SRV#3 Center			
	SRV#4 North of Center			
	SRV#5 East of Center			
	SRV#6 South of Center			
	SRV#7 West of center			
	SRV#8 Berm or overflow			
	SRV#9			
	Summary			

Section 6: Facility Sketch

Section 7: Photo Log

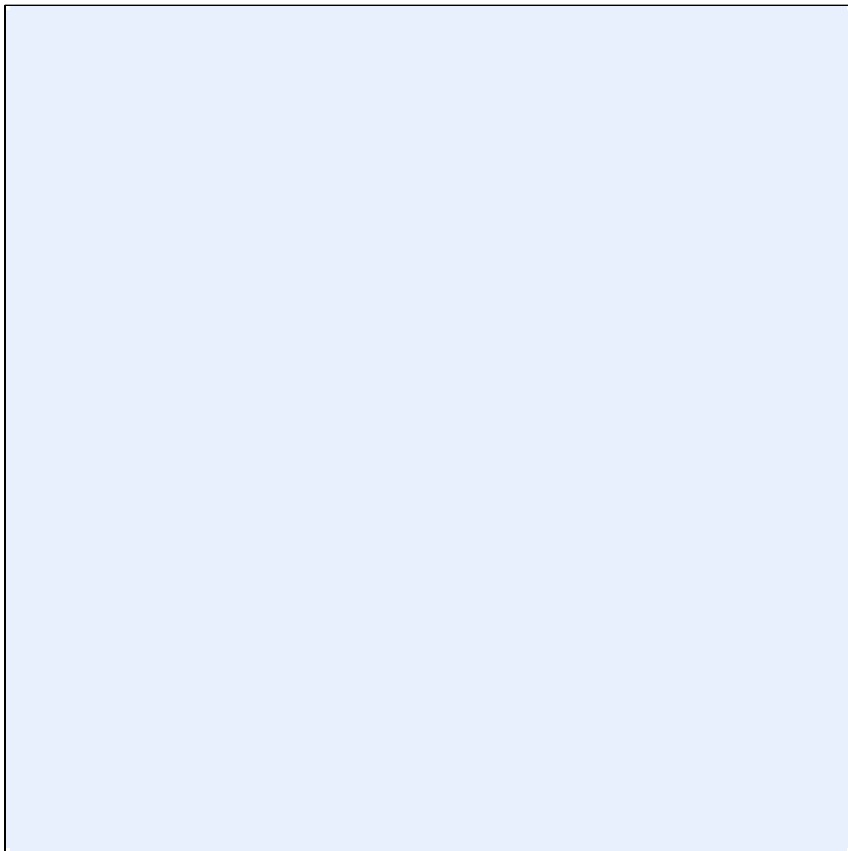


Image 3
description

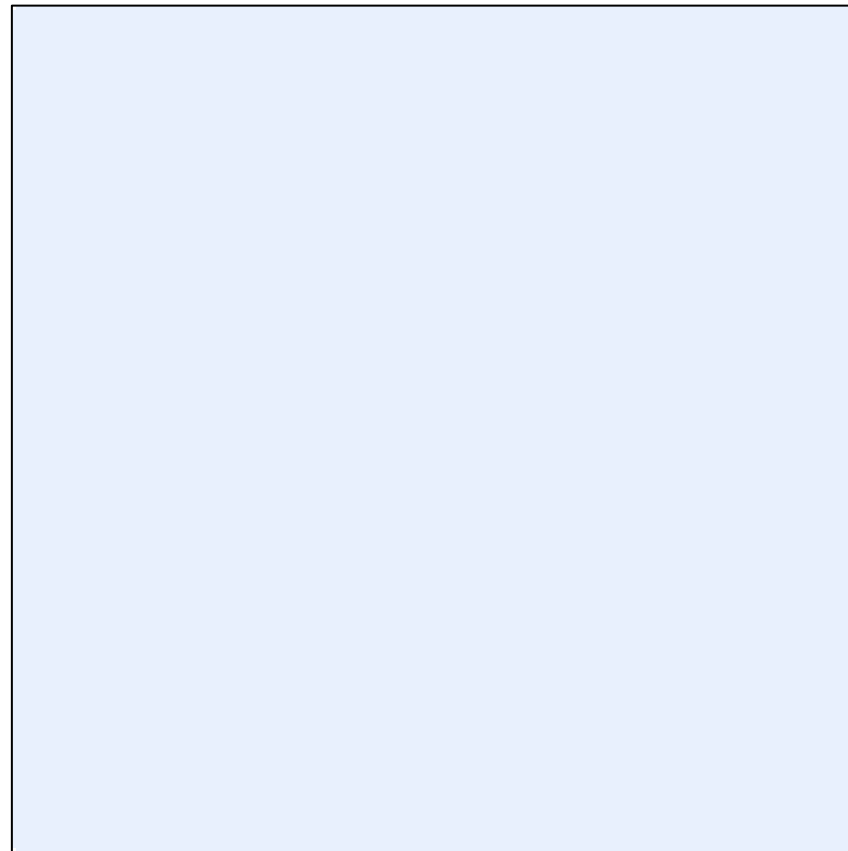


Image 4
description