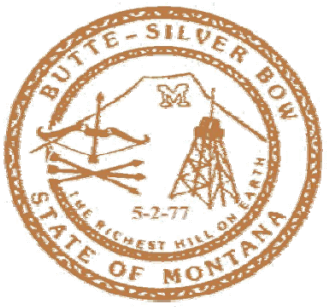

Butte Silver Bow's Municipal Storm Water Engineering Standards

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1 INTRODUCTION

It is the purpose of these Storm Water Engineering Standards to enact a comprehensive and coordinated storm water control program for the conservation and protection of land, water, public and private resources of Butte-Silver Bow to:

- Encourage the use of land in accordance with its capabilities;
- Prevent or reduce degradation of streams, reservoirs, lands and lakes; and
- Protect and promote the health, safety, and general welfare of the people.

The intent of the standards is to establish uniform design practices; however, it does not replace the need for engineering judgment or preclude the use of information not specifically required.

The urbanized area of Silver Bow County consisting of Butte, Walkerville and the municipal and developed area of Summit Valley surrounding these communities are regulated for storm water discharge by the Montana Department of Environmental Quality (MDEQ) as required by the Clean Water Act (CWA). These standards are intended to conform to the current requirements promulgated under Phase II of the National Pollutant Discharge Elimination System (NPDES) regulations as related to small municipal separate storm sewers (MS4s) and to provide guidance to Owners, Engineers and Contractors designing, and performing construction activities in Butte-Silver Bow. This guidance is intended to set forth a uniform set of minimum guidelines that conform to accepted design principals, existing specifications and standards such as the Montana Public Works Standards Specifications (MPWSS), and current storm water practices in Butte-Silver Bow.

Several reference documents will be referred to periodically by these Engineering Standards. The design Engineer should be familiar with these references as necessary for design of storm drainage systems. Reference documents are detailed in Section 11.

1.1 Definitions

For the purpose of this ordinance, the following terms phrases and words, and their derivatives shall have the meaning given herein, except where the context clearly indicates a different meaning:

Accelerated erosion means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

Applicant means a property owner or applicant of a property owner who has filed an application for a storm water management permit.

As-built plan means a set of engineering or site drawings that delineate the specific permitted storm water management features as actually constructed.

Appeals board shall be the Public Works Committee of the Council of Commissioners.

Authorized enforcement agency means the Director, employees or designees of the Butte-Silver Bow Public Works Department are designated to enforce this ordinance.

Best Management Practices (BMPs): schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Butte-Silver Bow means the local government of the City and County of Butte-Silver Bow, Montana, including all officers, employees, agents, boards, departments, commissions and authorities and includes all of that area within its jurisdiction with authority to inspect or enforce storm water compliance.

Channel means a natural or artificial watercourse with a definite bed and banks that conveys flowing water continuously or periodically.

Clean Water Act means the federal Water Pollution Control Act (33 U.S.C. ' 1251 et seq.), and any subsequent amendments thereto.

Construction activity means activities subject to the requirements of this ordinance. These include construction projects resulting in land disturbance greater than or equal to 1-acre. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Construction Site BMP Manual means the most current Montana Department of Transportation Erosion and Sediment Control Best Management Practices (BMP) Reference Manual and Field Manual or EPA National Menu of Best management Practices (BMPs), as amended from time to time.

Dedication means the deliberate appropriation of property by its owner to general public use.

Drainage easement means a legal right granted by a landowner to a grantee allowing the use of private land for storm water management purposes.

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

Illegal discharge means any direct or indirect non-storm water discharge to the storm water system, except as exempted in Article III, Section 2 of the BSB Storm Water Ordinance.

Illicit connections means an illicit connection is defined as either of the following:

a. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm water system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm water system and any

connections to the storm water system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency.

b. Any drain or conveyance connected from a commercial or industrial land use to the storm water system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Impervious cover means those surfaces that cannot effectively infiltrate rainfall (e.g., building rooftops, pavement, sidewalks, driveways. etc).

Industrial activity means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Land disturbing activity means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial, removal of vegetation, or any activity which bares soil or rock or involves the diversion or piping of any natural or artificial watercourse.

Landowner means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

Lateral means storm conveyance piping from the inlet to the municipal trunk main.

Maintenance agreement means a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

MS4 means Municipal Separate Storm Sewer as defined by the Environmental Protection Agency.

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit means a permit issued by EPA (or by a State under authority delegated pursuant to 33 USC ' 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-point source pollution means pollution from non-discernable, unconfined, diffuse sources and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal, and urban runoff sources.

Non-storm water discharge means any discharge to the storm drain system that is not composed entirely of storm water.

Off-site facility means a storm water management measure located outside the subject property boundary described in the permit application for land development activity.

On-site facility means a storm water management measure located within the subject property boundary described in the permit application for land development activity.

Off-site sedimentation means the deposit of soil material beyond the limits of the property undergoing land disturbing activity or in city streets, alleys or drainage facilities in an amount sufficient to constitute a threat to public safety and comfort.

Outfall means the place where a sewer, drain, or channel discharges to surface waters.

Person means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises mean any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking areas.

Professional engineer means an engineer properly registered, licensed, and qualified to conduct storm water and erosion control design work within the State of Montana.

Responsible party means a business entity, franchised utility company, developer, landowner, contractor or holder of a building permit who is required to comply with the terms of this ordinance.

Stop work order means an order issued which requires that all land disturbance activity on a site be stopped.

Storm water means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Storm water system means publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Storm water management means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow rates.

Storm water management facilities mean those structures and facilities that are designed for the collection, conveyance, storage, treatment, and disposal of storm water runoff.

Storm water engineering report means a written document that details the Best Management Practices, use of structural or non-structural practices to be implemented by a person or business designed to reduce storm water runoff, pollutant loads, discharge volumes, and/or peak flow rates to the maximum extent practicable.

Storm Water Pollution Prevention Plan means a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.

Temporary erosion control devices means devices installed or practices implemented and maintained during land disturbance activities to prevent, minimize, or control the erosion and deposit of soil materials.

Wastewater means any water or other liquid, other than uncontaminated storm water, discharged from a facility.

Watercourse: A natural or artificial channel through which water flows.

Water quality means those characteristics of storm water runoff from a land disturbing activity that relates to the physical, chemical, biological, or radiological integrity of water.

Water quantity means those characteristics of storm water runoff that relate to the rate and volume of the storm water runoff to downstream areas resulting from a land disturbance activity.

2 COVERAGE AREAS

According to the DEQ, the Butte MS4 regulated area is based on the current city limits or urban area. However, Butte-Silver Bow is a combined city-county government; as a result, these engineering standards apply to all of Silver Bow County. A map of the Butte urban area is presented as Figure 1 located in Appendix A.

Refer to: http://www.deq.state.mt.us/wqinfo/mpdes/StormWater/ms4.mcpx for current information from the MDEQ regarding storm water.

In addition, certain design standards may be modified to conform to the character of the historic district of uptown Butte. These standards include curbing, inlet grates and other surface treatments visible to the public. Figure 2 is a map of the uptown Butte Historic District (located in Appendix A).

3 EXEMPTIONS (AS REGULATED IN S.W. ORDINANCE 13.32.210)

The following development activities are exempt from Ordinance provisions:

- Land disturbance activities on agricultural land for production of plants and animal useful to man (crops, dairy, poultry, livestock, etc), except if the land disturbance includes the construction of a major building which requires the issuance of a building permit.
- Land disturbing activities undertaken on forest land for the production and harvesting of timber and timber products.
- Land disturbance activities that are less than 1-acre of disturbance and are not part of a subdivision or part of a commercial or industrial development.
- Emergency land management practices posing an immediate danger to life or property, or substantial flood or fire hazards.

4 APPLICABLE REGULATIONS AND ORDINANCES

4.1 Clean Water Act

The Clean Water Act (CWA) is a law enacted by Congress and signed by the President that establishes environmental programs, including the National Pollutant Discharge Elimination System (NPDES) program, to protect the Nation's waters and directs EPA to develop, implement, and enforce regulations consistent with this law.

The 1972 amendments to the Federal Water Pollution Control Act (known as the Clean Water Act or CWA) provide the statutory basis for the NPDES permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Section 402 of the CWA specifically required EPA to develop and implement the NPDES program.

Final Rule for Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges NPDES (Phase II MS4 Regulation):

> *Phase II regulations expand the existing NPDES storm water program (Phase I) by addressing storm water discharges from small MS4s and construction sites that disturb 1 to 5 acres. Although these sources are automatically designated by the rule, the rule allows for the exclusion of certain sources from the national program based on a demonstration of the lack of impact on water quality, and the inclusion of others based on a higher likelihood of localized adverse impact on water quality. The regulations also exclude from the NPDES program storm water discharges from industrial facilities that have "no exposure" of industrial activities or materials to storm water.*

4.2 MS4 Permit

EPA's Stormwater Phase II Rule requires a Municipal Separate Storm Sewer System (MS4) Storm Water Management Program (SWMP) that is intended to improve the Nation's waterways by reducing the quantity of pollutants that storm water runoff transports into storm drain systems during storm events. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers, and plastic bottles. Within the Butte MS4 sits the Butte Priority Soils Operable Unit (BPSOU), a federal Superfund site from historic mining activities in the Butte area. Within the BPSOU, sediment carrying heavy metals may also be a potential pollutant to area receiving waters. Additional storm water requirements may be necessary within this area. When deposited into nearby waterways through MS4 discharges, these pollutants can impair the waterways, thereby discouraging recreational use of the resource, contaminating drinking water supplies, and interfering with the habitat for fish, other aquatic organisms, and wildlife.

In 1990, EPA promulgated rules establishing Phase I of the National Pollutant Discharge Elimination System (NPDES) storm water program. The Phase I program for MS4s requires operators of "medium" and "large" MS4s, that is, those that generally

serve populations of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges from these MS4s. The Stormwater Phase II Rule extends coverage of the NPDES storm water program to certain "small" MS4s defined as located outside of an urbanized area serving a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people/square mile.

> *According to 40 CFR 122.26(b)(8), "municipal separate storm sewer means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):*
>
> *i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.*
>
> *ii. Designed or used for collecting or conveying storm water;*
>
> *iii. Which is not a combined sewer; and*
>
> *iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."*

Operators of regulated small MS4s are required to design their programs to:

- Reduce the discharge of pollutants to the "maximum extent practicable" (MEP);
- Protect water quality; and
- Satisfy the appropriate water quality requirements of the Clean Water Act.

Implementation of the MEP standard will typically require the development and implementation of Best Management Practices (BMPs) and the achievement of measurable goals to satisfy each of the six minimum control measures.

The Phase II Rule defines a small MS4 Storm Water Management Program as a program comprising six elements called *minimum control measures* that, when implemented in concert, are expected to result in significant reductions of pollutants discharged into receiving waterbodies. BSB has completed a SWMP as part of its Phase II MS4 permit coverage (*Storm Water Management Program for the Butte MS4, March 2003*). This document is available at the BSB Public Works office.

These engineering standards are intended to conform to the requirements outlined in the current MDEQ General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer System, effective January 1, 2010. Strategies and requirements related to two of the six minimum control measures (construction site storm water control, and post-construction storm water management in new development and redevelopment) are discussed in detail in Sections 7 and 8 respectively.

4.3 Liability

Neither the approval of a plan or any other action of Butte-Silver Bow under the provisions of these Standards shall relieve any person from the responsibility for damage to any person or property otherwise imposed by law, nor impose any liability upon Butte-Silver Bow for damage to any person or property.

5 ENGINEER REPORT REQUIREMENTS

A storm water engineering report shall be prepared by a professional engineer for any engineered storm water structure, conveyance or study as required by the BSB Storm Water Ordinance. The report is required with all permit applications and will include sufficient information to evaluate the environmental characteristics of the project site, the potential impacts of the proposed development, both present and future, on the water resources, and the effectiveness and appropriateness of the measures proposed for managing storm water generated at the project site. The intent of this planning process is to determine the type of storm water management measures necessary for the proposed project, and ensure adequate planning for management of storm water runoff from future development.

All drainage reports must include the design calculations necessary to support the proposal. The selection of water quality BMPs must be completed by going through the selection process in HEC-22, Chapter 10.1, in conjunction with Section 7 of these standards. Approval will only be issued when final, complete detailed plans and specifications have been submitted to the reviewing authority and found to be satisfactory, as defined in the BSB Storm Water Ordinance. Three copies of the final plans and specifications must be submitted. Two approved sets will be returned to the applicant, one must be retained at the construction site at all times during construction. Storm water engineering reports should incorporate the following in approximately this format:

- Engineering report including a summary of the basic design,
- General layout of drainage patterns and drainage structures,
- Detailed plans and specifications, and
- Attachments as appropriate.

ENGINEERING REPORT

The engineering report for storm water projects shall present the following information:

General information, including:

A. Identification of the project,

B. Physical address of the site where work is proposed, and

C. Name, mailing address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.

Extent of the storm drainage, including:

A. Describe existing conditions including structures, basins, bypass areas, flow type and flow paths, pervious/impervious areas, slopes, vegetation/surface and CN numbers, soil type(s), constants used (s,n,k…), upstream offsite flow routing conditions,

B. Describe proposed developed conditions including structures, basins, bypass areas, compensatory areas, flow type and flow paths, pervious/impervious areas, slopes, vegetation/surface and CN numbers, constants used (s,n,k ...), upstream offsite flow routing, source control BMP's runoff control, runoff treatment, nutrient control, frontage improvements and associated storm improvements, time of concentration, storage volume, release rates, and overflow route capacity. If something is not required, state in the report,

C. State runoff control/treatment design assumptions. Describe method of analysis. Selection of water quality treatment BMPs must follow the process in HEC-22 Chapter 10.1,

D. Delineation of drainage areas within the project boundaries, estimates of peak flows generated within these drainage areas, and estimates of flow volumes if detention ponds or other storage facilities are included in the design,

E. Delineation of drainage areas outside the project that flow through the project area, and estimates of peak flows generated within these drainage areas,

F. For flows that originate outside the project area, provisions for passing these flows through the project without flooding structures or drainfield sites (at a recurrence interval of the 100-year, 24-hour storm), and without overtopping of roadways (at a recurrence interval of the 10-year, 24-hour storm event),

G. For flows that originate within the project, provisions for detaining or retaining these flows, so that the peak flow (from Section 6.1.1) that leaves the project area after development does not exceed the peak flow before development,

H. Where storm drainage is intended to be discharged into the ground, locations of nearby (within 200 feet) wells and drainfields that may be impacted, or a statement that there are no wells or drainfields nearby,

I. If a storm water management control measure depends on the hydrologic properties of soils (e.g., infiltration basins), then a geotechnical report shall be submitted. The geotechnical report shall be based on on-site boring logs, test pit profiles, percolation test results, or appropriate NRCS soils information. Soil borings or test pits may be required by the Butte-Silver Bow Public Works Department if deemed necessary to determine the suitability and distribution of soil types present for the control measure, and

J. Show calculations/figures required to support the design including basin summary, time of concentration, weighted CN numbers, percent impervious area, level pool routing summary, stage-discharge and stage-storage tables, volume correction, and conveyance system capacity calculations. Suggested CN values are given in HEC-22 Table 3-6. Calculations should be located in an appendix.

K. A detailed plan must be submitted for management of vegetation at the site after construction is complete, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved.

PLANS

Plans for storm drainage improvements as prepared by a professional engineer shall provide for the following:

General layout including:

A. Suitable title,

B. Name of entity responsible for maintaining the storm drainage improvements (if other than Butte Silver Bow),

C. Scale, in feet,

D. North arrow,

E. Name of the designer and date of design,

F. Legible prints,

G. Location, nature and size of existing storm drainage facilities, if any, including drainage structures under existing roadways, and

H. All elevations shall be based on NAVD 88 datum.

Detailed plans, including:

A. Location, size, type, slope and minimum cover of any proposed pipes,

B. Location and details of any proposed structures,

C. Direction of drainage flow paths with slope, flow type, surface type, and run length,

D. Location, size, length and slope of any proposed storm drain trunk lines,

E. Location and details of any proposed detention or retention ponds,

F. Location and details for erosion control (temporary and permanent) at each location where storm drainage leaves the project, and at any other location where erosive velocities may occur. Information on soil types at these locations will be necessary to determine appropriate erosive velocities,

G. Site property boundary, basin/sub-basin/bypass area boundaries, wetlands, sensitive area buffers and setbacks, easements, two-foot contours, etc.,

H. State on each figure the total area and the amount of pervious and impervious area in each basin/sub-basin/bypass area, and

I. The location of storm water discharge from the project boundary to the nearest existing municipal storm water structure or natural water body.

J. The location of existing utilities as listed in Section 9.4.

SPECIFICATIONS

Complete, detailed, technical specifications shall be supplied for the proposed drainage project.

ATTACHMENTS

The following attachments shall be submitted as required in the Storm Water Ordinance:

A. Approved MPDES Permit Application Package and approval letter from MDEQ.

B. Operation and Maintenance Agreement.

PERFORMANCE BOND/SECURITY

The Butte-Silver Bow Public Works Department will require the submittal of a performance security or bond prior to issuance of a permit in order to insure that the storm water practices are installed by the permit holder as required by the approved storm water engineering report. The amount of the installation performance security shall be the total estimated construction cost of the storm water management practices approved under the permit, plus 25%. The performance security shall contain forfeiture provisions for failure to complete work specified in the storm water engineering report. The installation performance security shall be released in full only upon submission of as built plans and written certification by a professional engineer that the storm water practice has been installed in accordance with the approved plan and other applicable provisions of this ordinance. The Butte-Silver Bow Public Works Department will make a final inspection of the storm water practice to ensure that it is in compliance with the approved plan and the provisions of this ordinance.

PREPARATION BY A PROFESSIONAL ENGINEER

All storm water engineering reports, plans, specifications, and inspections or certifications shall be signed and stamped by a professional engineer qualified to conduct erosion control and storm water design work in the State of Montana.

6 ANALYSIS REQUIREMENTS

6.1 Hydrologic Analysis & Design

All storm water volume calculations shall be designed using a hydrologic analysis based on hydrograph methodology. Peak flow calculations and volume calculations are governed by the procedures and methods outlined in Chapter 3.3 of the HEC-22 Manual.

6.1.1 Design Storms

The design storm for all hydrograph analyses shall be a 24-hour duration (if available), standard SCS Type I rainfall distribution resolved to 10-minute time intervals. Refer to

Table 6-1 for the City of Butte's measured precipitation levels, located at the Butte Airport. Table 6-2 summarizes the information from the State of Montana Precipitation Isopluvials, NOAA Atlas 2, Vol. 1. For projects outside of the Butte urban boundary the design storm will be based on the NOAA Atlas 2 unless more detailed information is available.

Existing and post-development conditions shall be analyzed to quantify runoff rates, volumes and treatment needs for the following storms:

- 6-month, 24-hour storm (water quality design storm, urban setting on-site retention);
- 2-year, 6-hour storm (rural setting on-site retention)
- 2-year, 24-hour storm (stream bank protection);
- 10-year, 24-hour storm (on-site inlets, lateral piping and conveyances);
- 25-year, 24-hour storm (municipal trunk main piping and conveyances); and
- 100-year, 24-hour storm (runoff control, floodplain delineations and regional ponds).

Table 6-1. Butte Airport 24-Hour Precipitation Depths

Recurrence Interval	24-Hour Precipitation Depth(inches)
6-month	0.78
1-year	0.92
2-year	1.07
5-year	1.42
10-year	1.66
25-year	1.99
50-year	2.25
100-year	2.51

Table 6-2. SCS Rainfall Distribution Curve Determination

NOAA ATLAS Rainfall Distribution			Rainfall Distribution Curve
2-year	**Precipitation (inch)**	**P_6 / P_{24} Ratio**	
6-hr	0.75	0.625	Type I
24-hr	1.20		
5-year			
6-hr	1.00	0.625	Type I
24-hr	1.60		
10-year			
6-hr	1.10	0.611	Type I
24-hr	1.80		
25-year			
6-hr	1.40	0.636	Type I
24-hr	2.20		
50-year			
6-hr	1.50	0.577	Type I
24-hr	2.60		
100-year			
6-hr	1.70	0.607	Type I
24-hr	2.80		

6.1.2 Rational Method

The Rational Method may be used in predicting a conservative peak flow rate to determine the required capacity for storm water laterals, trunk mains and culverts for drainage sub-basin areas (A) not exceeding 25 acres for a single calculation. The Rational Method may be used to calculate the peak discharge in conjunction with a hydrograph method to calculate the run-off volume, (retention and detention); or, the hydrograph method may be used solely for all calculations.

6.1.2.1 Time of Concentration

The minimum time of concentration (Tc) shall be 6.3 minutes, and the maximum shall not exceed 100 minutes.

6.1.2.2 Precipitation Intensity Values to match Time of Concentration (Tc)

Short duration precipitation intensity values are not available from the Butte weather station. If short duration precipitation intensity values are required, the one-hour precipitation values (in inches) presented in Table 6-3 can be multiplied by the statewide averages for short duration intensities summarized in Table 6-4 to calculate the short duration precipitation intensity (i) to be used with the Rational Method.

Table 6-3. One-Hour Precipitation (in)

Station	Return Period (Years)					
	2	**5**	**10**	**25**	**50**	**100**
8 Miles S of Butte	0.41	0.58	0.70	0.85	0.97	0.96

Source: MDT Hydraulics Manual, Appendix B

Table 6-4. Statewide Averages for Short-Duration Intensities

Duration (minutes)	**Multiply 1-hour intensity by:**
5	4.7
10	3.4
15	2.8
30	1.7

Source: MDT Hydraulics Manual, Appendix B

6.1.3 Hydrologic Models

Storm drain systems may be designed using hydrograph-based computer modeling methods or the Rational Method as permitted in these standards.

Acceptable computer modeling packages:

- TR-20 (or any software that uses this program),
- TR-55 (or any software that uses this program),
- Hydrological Simulation Program-Fortran (HSPF),
- EPA Storm Water Management Model SWMM 5.0,
- Stormcad ®,
- Stormshed ®, and
- HydroCAD ®.

The list provided may not be all inclusive but serves as a general guideline. Other programs not included in this list may also be acceptable and can be reviewed and approved for use on a case-by-case basis by the Butte-Silver Bow Public Works Department. It is incumbent on the licensed engineer to select the appropriate modeling program and apply it appropriately to the design situation.

Time of Concentration Calculations - Use the procedures and methods outlined in Chapter 3.2.2.3 of the HEC-22 Manual.

Curve Numbers - Curve numbers are set forth in Table 3-6 of the HEC-22 Manual. For single-family residential plat developments, use Table 3.6 of the HEC-22 Manual as minimum values. Storm water system designs shall address future build-out of the proposed development. Impervious areas of future development may justify higher curve numbers and greater impervious area coverage. For commercial and multi-family residential developments, use actual project values.

Soil Types - Use site-specific geotechnical information (when available) or the Soil Survey – Butte Silver Bow County Area (MT670) – prepared by the Natural Resources Conservation Service (NRCS) to identify the hydrologic soil group.

6.1.4 Runon/Runoff Capacity Analysis

Offsite capacity analysis is required when either the location of discharge or rate of discharge will be changed by a proposed development.

On a map (minimum USGS 1:24000 Quadrangle Topographic Map) delineate the upstream drainage areas to the site and to the downstream system. Physically inspect the existing on- and off-site drainage system and investigate any known problems. Also document historical on- and off-site drainage performance by contacting BSB Public Works Department and property owners of known problems. The analysis must extend from the proposed project discharge location to the point downstream where the site runoff would join the nearest existing municipal storm water structure or existing drainage course.

Describe the makeup and general condition of the existing and proposed drainage system. Include such information as pipe sizes, channel characteristics, and drainage structures. Address anticipated drainage problems.

For any existing and/or predicted problem drainage location identified in the analysis, develop hydrographs or peak flow rates for the 100-year, 24-hour design storm events for the (total composite) drainage area tributary to that location for existing runoff conditions, excluding the proposed project development runoff. Then evaluate impacts of adding the controlled peak runoff from the proposed project development to this existing peak runoff from the drainage area tributary to these problem drainage locations.

6.1.5 Floodplain/Floodway Analysis

The official floodplain maps for Butte Silver Bow are the Flood Insurance Rate Maps (FIRM) and Flood Boundary Floodway Maps from a scientific and engineering report entitled "The Flood Insurance Study for Butte-Silver Bow, Montana," dated February, 1982, and the "Floodplain Management Study, Big Hole River, Silver Bow County Montana." Updated mapping is in the process of being reviewed and adopted by FEMA in 2010-2011. Floodplain and floodway analyses require the most current official maps for determination of floodplain/floodway location and the ordinances in Title 18 for associated requirements.

6.2 Hydraulic Analysis and Design

Unless otherwise noted, all structures shall be designed with proper materials, sizing and appurtenances to provide for a 75-year design life.

6.2.1 Open Channels

Use the criteria set forth in Chapter 5 of the HEC-22 Manual for open channel flow capacity analysis.

6.2.2 Culverts & Bridges

Culvert and bridges shall be sized to accommodate the peak runoff from a 100-year, 24-hour storm. Bridge designs shall be reviewed by the Butte Silver Bow bridge engineer unless on a State route in which case MDT will be responsible for design review. Cross-drain culverts outside of a designated floodplain area may use the 50-year, 24-hour storm event, provided that the roadway is not overtopped.

6.2.2.1 Hydraulic Criteria - Culverts

All applications requiring culverts larger than 24" shall be hydraulically designed. Use methods set forth in Chapter 9 of the MDT Drainage Manual as modified herein to design culverts. Determine capacity by analyzing inlet, outlet, and barrel controls.

When an abrasive bed load is anticipated or when velocities exceed 10 feet per second, protective measures shall be implemented to minimize pipe damage and provide for a minimum 75-year design life.

6.2.2.2 Hydraulic Criteria - Bridges

Bridges shall conform to Montana Department of Transportation requirements.

6.2.3 Storm Main Piping

Refer to HEC-22 Manual, Section 7 for design parameters for storm drain pipe capacity analysis. Table 7-7 of HEC-22 provides minimum pipe slopes based on pipe size and flow.

Storm drain piping infrastructure shall have non-pressurized (non-surcharged) flow during the 25-year design storm; except that the last pipe run upstream of a detention facility or open outfall (into a stream or lake) may be inundated during the 100-year event to a maximum distance of 200 linear feet, so long as all the other conditions of these Engineering Standards are met. This also applies for those outfalls into streams where the outfall elevation is set at the approximate bankfull water surface elevation (2-year runoff event).

The flows computed at structures (manholes and catch basins) may be used to estimate the water surface profile along the pipe system.

When an abrasive bed load is anticipated or when velocities exceed 10 feet per second, protective measures shall be implemented to minimize pipe damage and provide for a minimum 75-year design life.

6.2.4 Detention and Retention Facilities

Use the criteria and methods set forth in Section 8 of the HEC-22 Manual for capacity analysis requirements and design considerations for appurtenant structures such as orifices, weirs, etc.

The design of storm water detention and retention facilities must consider both water quality and storm water routing. Storm water shall be routed through a catch basin or pre-sediment basin prior to discharging to the pond, in order to facilitate the easy maintenance and removal of transported sediments and debris.

The 100-year, 24-hour storm shall be detained for runoff control. The 6-month, 24-hour storm shall be retained to address water quality concerns.

When existing conditions make storm water detention impossible for some portion of a site, compensatory storage volume and reduction of the release rates may be allowed if the bypass area and detention system are tributary to the same drainage basin both prior to and after development. The peak rate of runoff (developed condition) from the bypass areas shall be subtracted from the allowable release rate to determine the detention system release rate. In no case shall the runoff from the entire site exceed the allowable release rate.

Runoff control systems shall be designed to maximize reliability, minimize maintenance needs, maximize the distance between the inlet and outlet to improve runoff quality, minimize hazards to persons or property (both on-site and off-site), and minimize nuisance problems and risk of failure.

In areas of high groundwater, groundwater collection system flows shall bypass the storm water detention system.

Runoff control facilities proposed to serve multiple sites are subject to all of the engineering and design requirements in the Storm Water Ordinance and these Standards. For phased developments, conceptual site plans for the entire site to be served by the proposed storm water facilities shall be submitted to Butte-Silver Bow for review, in addition to a detailed engineering design for the first project phase. Detailed design plans will be submitted as appropriate for future project phases. Construction of storm water facilities must occur in conjunction with each project phase.

The 100-year water surface shall not surcharge roof, footing and yard drains, or under-drains.

Runoff control facilities serving the public right-of-way shall be owned and operated by Butte-Silver Bow and shall be separate from private on-site systems. If storm water facilities will be owned and operated by Butte-Silver Bow, runoff from the right-of-way and private properties may be combined and controlled in a single facility. Private detention systems may accommodate public drainage (e.g., from a public right-of-way) if a hold harmless agreement is completed by the Owner and recorded against the property, and the proposal meets all the other design requirements of the Utility.

Drainage basins may be considered as separate if tributary areas drain to different storm water conveyance networks via drainage routes that remain separate for a minimum of ¼-mile downstream.

6.2.5 Storm Drain Outfalls

Use methods set forth in Chapter 7.1.5 of the HEC-22 Manual as modified herein.

The invert of any outfalls shall discharge at the bankfull water surface elevation (2-yr storm) in open channels or streams.

The orientation of the outfall should be pointed in the downstream flow direction and must include considerations for scour at the outlet.

7 EASEMENTS

7.1 General

Drainage facilities that are constructed to serve predominantly public property or public right-of-way shall be publicly owned and shall be dedicated to Butte-Silver Bow.

Where possible, public storm water conveyance systems shall be constructed within the public right-of-way. When site conditions preclude this requirement, public utility easements or dedicated tracts shall be provided and included on the Certificate of Survey. Private drainage facilities shall be constructed on private property.

When vehicle access for maintenance is required, a dedicated tract or access easement shall be provided. The access easement conditions shall prohibit the property owner from installing any landscaping, improvements, retaining walls, etc., which would hinder access to the drainage facility or necessitate restoration of access easement area.

7.2 Easement Width

For pipes and vaults, the required utility easement width can be calculated using one of the following methods: 1) a minimum of 20-feet; or 2) determined by extending a line from the bottom edge of the structure or the bottom of the excavation at the outside diameter for pipes, at a 1 H: 4V slope until it intercepts the finished grade. Butte-Silver Bow Public Works shall select the required easement width based on site conditions.

For pipes/vaults 5 feet and greater in width, the minimum utility easement width shall be the outside dimension plus 15 feet, but not less than 20 feet total width.

For open channels to be maintained by the Butte-Silver Bow, the utility easement width shall include the entire width of the channel (top-of-bank to top-of-bank or width at freeboard elevation) plus maintenance access when deemed necessary by the Butte-Silver Bow Public Works. For privately-maintained open channels, the private utility easement width shall be, at minimum, the width of the channel at freeboard elevation.

For maintenance access roads, the minimum access easement width shall be 15 feet.

Storm drainage facilities shall be located in the center of the easement unless approved by Butte-silver Bow Public Works.

7.3 Easement Documentation

All easements shall be shown on the project plans and shall be designated either "private" or "public".

All property documentation shall be properly executed. Easement/tract documents shall include a map, the Butte Silver Bow County Certificate of Survey number of affected properties, property legal description, Geocode, and owners' names.

Easements shall be dedicated to and approved by Butte-Silver Bow prior to acceptance of a public drainage system. Grantee shall be "Butte-Silver Bow, a municipal corporation, its heirs, successors, or assignees."

Indemnification and hold-harmless agreements to hold Butte-Silver Bow harmless shall be included in recorded documents where maintenance access across private property and/or pumping of storm drainage is deemed necessary by Butte-Silver Bow.

Bills of sale for all drainage facilities appurtenant to public easements or tracts shall be given to Butte-Silver Bow with the executed real property documents that transfer property rights to Butte-Silver Bow. Grantor shall pay all title policy and recording fees necessary to transfer rights to Butte-Silver Bow.

7.4 Maintenance Access

All storm water facilities shall have sufficient easement widths in order to be accessible for maintenance and operation.

When vehicle access is necessary, access roads shall be provided in dedicated tracts or dedicated access easements. The minimum clear driving lane width is 12 feet.

For culverts, provide maintenance access easements for inspection and debris removal of the upstream and downstream ends of the culvert.

Gates and/or bollards are required when necessary to restrict access to storm water facilities. Cables and/or chains stretched across access roads are not acceptable.

Where no direct vehicle access can be provided or when greater than 15 feet from a roadway, all structures shall be channelized and shall not have catchments. Provide an oversized catch basin to compensate for lost catchments at the first available access point for maintenance vehicles. An easement for to a vehicle access ramp shall be provided as necessary.

Roof, footing, and yard drainage systems, drainage systems on commercial and multi-family properties, drainage facilities within private easements, and drainage facilities otherwise denoted as private, shall be designed to provide access for maintenance and operation by the owners of such facilities.

Additional maintenance requirements specific to individual storm water facilities are included in Section 9.

8 STORM WATER CONTROL AT CONSTRUCTION SITES

8.1 General

As required by the Storm Water Ordinance, storm water Best Management Practices (BMPs) shall be implemented to protect water quality in accordance with Chapter 10 of the HEC-22 Manual and these Engineering Standards. These standards define approved water quality BMPs for new development and redevelopment construction projects in Butte-Silver Bow. Construction storm water BMPs will be described in a written Storm Water Pollution Prevention Plan (SWPPP). All construction on public rights-of-way shall be completed in accordance with Butte-Silver Bow's municipal standards and the procedures and methods set forth in the Montana Public Works Standard Specifications (MPWSS) as modified herein.

Land disturbance activities greater than 1-acre must comply with requirements of the MPDES *General Permit for Storm Water Discharge Associated with a Construction Activity*, permit number MTR1000000. These requirements include preparation of a SWPPP on a form provided by MDEQ.

A copy of the approved Engineering Report and SWPPP must be kept on-site during construction. The applicant is responsible for obtaining any other required or related permits prior to beginning construction.

Wastewater from construction cleaning operations shall not be discharged to the storm drainage system, surface waters, or the BSB sanitary sewer system without prior approval by the Butte Silver Bow Wastewater Superintendent. Owner and/or Contractor shall be responsible for cleanup of mud and debris tracked onto city streets. Finally, under no condition shall sediment be discharged to surface waters or natural wetlands.

8.2 Construction Project SWPPP

Construction projects with land disturbance activities greater than 1-acre shall submit a copy of their MPDES *General Permit for Storm Water Discharge Associated with a Construction Activity* Storm Water Pollution Prevention Plan (SWPPP), and permit approval letter from MDEQ. Information and submittal requirements can be found on the MDEQ website: http://deq.mt.gov/wqinfo/mpdes/stormwaterconstruction.mcpx.

8.2.1 Minimum Components of SWPPP

The construction SWPPP should contain a description of best management practices (BMPs) which shall be implemented to control erosion. Several strategies are discussed in this section of the Engineering Standards. The following minimum components shall be addressed along with a schedule for implementation, unless approved otherwise in writing by the Butte-Silver Bow Public Works Department:

- A description of construction practices designed to preserve existing vegetation where practicable and revegetate open areas as soon as possible after grading or construction. In developing vegetative practices, the operator shall consider: temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffer/filter strips, grassed waterways, erosion control blankets and tree and shrub planting;
- A description of temporary structural practices (BMPs) which indicates how, to the degree practicable, the Contractor will divert, store, or otherwise limit runoff from exposed areas of the site. In developing structural practices the operator shall consider the appropriateness of: straw bale dikes, silt fences, straw fiber rolls/wattles, earth dikes, brush barriers, drainage swales, check dams, subsurface drains, drop structures, rock outlet protection, drain inlet and outlet protection, temporary drain diversions, sediment traps, temporary sediment basin, infiltration trenches or basins, and retaining walls. All temporary control structures, including silt fences and straw bale dikes, shall not be removed until permanent vegetation and site stabilization has taken place;
- Where practical, use gravel surfacing on access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads. All unpaved roads on the site carrying more than 25 vehicle trips per day should be graveled; and

- When trucking saturated soils from site, either leak-proof trucks must be used or loads must be required to drain until drippage has been reduced to less than 1 gallon per hour before leaving the site.

Visible or measurable erosion which leaves the construction site is prohibited. Visible or measurable erosion is defined as:

- Deposits of mud, dirt, sediment or similar material exceeding 1 cubic foot in volume in any area of 100 square feet or less on public or private streets, adjacent property, or into the storm and surface water system, either by direct deposit, dropping, discharge, or as a result of the action of erosion; or
- Evidence of concentrated flows of water over bare soils; turbid or sediment laden flows; or evidence of on-site erosion such as rivulets or rills on bare soil slopes, where the flow of water is not filtered or captured on the site using the techniques in the approved erosion control plan; or
- Earth slides, mud flows, earth sloughing, or other earth movement which leaves the property; or
- Measured turbidity greater than 280 NTUs as required by the EPA under the Clean Water Act.

Contractors need to address controls for the following pollutants: fuel (gasoline and diesel), oils, grease, solvents, paints, concrete truck wash down material, and miscellaneous, raw materials, litter, and debris.

8.2.2 Exemptions

A construction SWPPP will not be required for construction projects with land disturbance less than 1-acre, or other development activities specifically exempted in the BSB Storm Water Ordinance. However, construction BMPs should still be employed at these smaller sites. If problems are noted at construction sites, BSB may consider sediment releases illicit discharges per the storm water ordinance.

8.3 Source Control and Waste BMPs

Source control and waste BMPs are preventive BMPs and include good site design and use, minimizing use and storage of deleterious products at the construction site, good site management/housekeeping, and good operation and maintenance procedures. The goal of source control BMPs is to keep contaminants associated with a project's activities from entering the storm water system rather than removing contaminants (i.e: runoff treatment later), thereby reducing the amount of pollutants picked up by storm water. These BMPs are aimed at activities that produce the contaminants and are preferred by Butte Silver Bow over treatment BMPs because of the lower development and maintenance costs.

As stated in the requirements for the SWPPP, Contractors need to provide source controls for the following pollutants:

- fuel (gasoline and diesel),
- oils,

- grease,
- paints,
- solvents,
- concrete truck wash down,
- raw materials for manufacturing concrete (sand, aggregate, and cement),
- litter,
- debris, and
- sanitary wastes.

8.3.1 Erosion Control

The objective of erosion control is to minimize erosion of disturbed areas during the construction of a project. Erosion and subsequent sediment transport can have a significant impact on the water quality of receiving surface waters. Sediment loads to surface waters increase turbidity, increase water temperatures, degrade fish habitat and spawning areas, and depress dissolved oxygen concentrations. Moreover, toxic substances, trace metals and nutrients, which are absorbed to soil particles, can be transported into surface waters. The addition of these substances to surface waters degrades the existing water quality.

The following are the main erosion control principles required at a construction site:

- Construction plans must conform to existing topography and soil type to create the lowest practical erosion potential.
- To the maximum extent practicable, natural vegetation shall be retained, protected, and supplemented. Temporary vegetation or mulching shall be employed to protect exposed areas during development.
- Stripping of vegetation, regrading and other development activities shall be conducted in such a manner so as to minimize erosion, and the duration of exposure to erosive elements shall be kept to a practicable minimum.
- Cut and fill operations must be kept to a minimum and may not endanger adjoining property. Fills also may not encroach upon natural water courses or constructed channels in a manner that adversely affects other property owners.
- Grading equipment must cross flowing watercourses via bridges or culverts except when such methods are not feasible.
- Design and install BMPs to minimize runoff velocities and retain runoff on-site. BMPs can be used to effectively control runoff velocity and detain it to remove 80 to 90 percent of the sediment from runoff.

- Perimeter control practices can protect the disturbed area from off-site runon and runoff and to prevent sedimentation damage to areas downgradient of the construction site. A sediment and runoff barrier surrounding the disturbed area prevents construction site runoff from moving offsite and fouling surface waters downstream.
- Stabilize disturbed areas immediately after final grade has been attained. Any exposed soil is subject to erosion from rainfall, wind, and vehicle traffic. Soil stabilization BMPs should be applied as quickly as possible after the land is disturbed. Temporary stabilization practices include seeding, mulching, and erosion control blankets or mats.
- Coordinate disturbance activities with seasonal precipitation and growing patterns to reduce the exposure of disturbed ground to the elements, and to minimize the window between disturbance and revegetation.
- Develop a schedule and implement a BMP inspection and maintenance program. This principle is vital to the success of erosion control. BMPs must receive regular inspection and maintenance to ensure that they are operating effectively and optimally, both during and after construction.

8.3.2 Conventional Pollutant Treatment

Refer to Table 10-2 in the HEC-22 Manual for approved conventional pollutant treatment BMPs. The selected BMPs shall be designed in accordance with Chapter 10.2 of the HEC-22 Manual as modified herein.

Only runoff from conventional pollutant-generating surfaces must be treated using BMPs set forth herein. Conventional pollution-generating surfaces typically include driving surfaces (streets and roads), uncovered parking areas, driveways, and uncovered storage areas for wastes, materials, equipment, etc. Drainage from surfaces that typically do not generate conventional pollutants include roof tops, sidewalks, and landscaping. Such runoff need not be treated for conventional pollutants and may bypass the conventional pollutant treatment facility, if feasible.

8.3.2.1 Oil/Water Separation

There are three types of oil/water separation BMPs:

- Spill Control (SC) separators which are effective at retaining small spills, coarse sediments and floating debris.
- American Petroleum Institute (API) separators which can remove dispersed oil and floating debris, and contain spills.
- Coalescing plate (CP) separators which can remove dispersed oil, and floating debris, and contain spills.

It is incumbent on the design Engineer, in consultation with Butte Silver Bow Public Works Department, to determine the appropriate type of oil water separator for the project.

Location Requirements for Oil/Water Separators

Locate the appropriate oil/water separator upstream from the detention system, or immediately before leaving the site if there is no detention system. If there are multiple outfalls into the detention system or water quality facilities (other than oil/water separators), then an oil/water separator must be included in the last catch basin in each tributary line draining a potential spill area.

8.3.2.2 Nutrient Treatment

Nutrient removal from storm water is difficult and can be very expensive. The best way to remove nutrients from storm water is to prevent them from entering the storm water system. Therefore, source control is the best mechanism for addressing nutrients in storm water. Land uses with potentially nutrient-rich runoff include but are not limited to nurseries, gardening supplies, animal care and boarding facilities, golf courses, parks, sports fields, livestock stables, and pastures, etc.

Source control strategies may include:

- Design of new facilities and storm water structures to prevent comingling of nutrient rich water and storm water runoff,
- Proper timing and application rate of fertilizers,
- Proper watering (to prevent overwatering and runoff) of fertilizer/nutrient rich areas, and
- Buffer strips between nutrient rich areas and storm water channels/infrastructure.

8.4 Runoff Treatment BMPs

8.4.1 General

Runoff treatment BMPs are designed as part of the on-site storm water system and must treat the water quality design storm (6-month, 24-hour storm). This exemption does not apply to source control and oil/water separation requirements. Areas which are not anticipated to produce contaminants are not required to be treated.

Runoff treatment BMPs are categorized by the type of contaminants most effectively removed. These categories are:

- Conventional Pollutant Treatment designed to remove particulates and contaminants typically associated with particulates, such as heavy metals.
- Oil/Water Separation designed to remove and contain oil.
- Nutrient Treatment designed to remove suspended and dissolved nutrients.

Follow these steps to determine which treatments are required for a specific development or redevelopment proposal.

- Determine if the proposed project is subject to runoff treatment requirements.
- Determine if nutrient treatment or oil/water separation is required for the proposed project.

- Select the appropriate BMP(s) to treat contaminants anticipated from the proposed project. Use Table 10-2 of the HEC-22 Manual for evaluation of pollutant removal of various BMPs.
- Incorporate runoff treatment BMPs into the design of the on-site storm water system. Note that several of the allowable BMPs can also be designed to meet runoff control requirements.
- The Montana Section 303(d) List (of impaired waterbodies) needs to be referenced when planning a proposed project. , Any implications to a waterbody on the list should be noted in the drainage report and ESC.

There are a number of common and practical BMPs for runoff treatment depending on the area requiring treatment, depth to groundwater, slope, soil type, geometric constraints, etc. Table 10-1 in the HEC-22 manual provides a summary of runoff treatment BMPs summarized in this list:

- Biofiltration,
- Infiltration Trench,
- Infiltration Basin,
- Grassed Swales (with Check Dams),
- Filter Strips,
- Water Quality Inlets,
- Detention Ponds,
- Retention Ponds,
- Extended Detention/Retention Ponds, and
- Detention/Retention Ponds with Wetland Bottoms.

Runoff treatment facilities for the right-of-way shall be owned and operated by Butte-Silver Bow and shall be separate from private on-site systems. Maintenance agreements between Butte Silver Bow and other government agencies (such as MDT) may be necessary. In a development where the storm water facilities will be owned and operated by Butte-Silver Bow, runoff from the right-of-way and private properties may be combined and treated in a single facility.

If "clean" runoff is routed to the water quality facility, those flows must be included in the sizing calculations for the facility. Drainage from landscaped and vegetated areas, especially areas in native vegetation, should not be mixed with untreated runoff from streets and driveways, if practical. Once runoff from non-contaminant generating areas is combined with runoff from contaminant-generating areas, it cannot be discharged without treatment.

Drainage basins may be considered as separate if tributary areas drain to different storm water conveyance networks via drainage routes that remain separate for a minimum of ¼-mile downstream.

Proprietary BMPs shall be evaluated on a case-by-case basis through the deviation process and Chapter 10 of the HEC-22 Manual.

8.4.2 Sediment Control

Under no condition shall sediment be discharged to surface waters or natural wetlands. Installation of temporary sediment ponds, sedimentation tanks, filter vaults, or other sediment control facilities is required to control sediment laden storm water during construction. All types of ponds (detention, retention, extended, and wet) provide adequate suspended sediment removal if properly designed and maintained. Other sediment control BMPs include:

- Sedimentation tanks,
- Filter vaults,
- Infiltration trenches, and
- Infiltration basins.

Filter strips and grassed swales provide minimal sediment control. Porous pavement is not an acceptable method for controlling or treating runoff.

If ponds or infiltration structures cannot be used at the site for sediment control, the Owner of the project and their Engineer will need to consult with Butte-Silver Bow Public Works to determine alternative sediment control mitigation measures such as source control, temporary paving, preservation of existing vegetation, etc.

8.5 Construction BMP Operation and Maintenance Schedule

All approved construction BMPs as detailed in the construction SWPPP must be inspected at a minimum every 14 days during construction and after every precipitation event. An inspection and maintenance log shall be maintained by the Contractor and shall be provided to Butte-Silver Bow Public Works Department upon request.

After significant construction activities are completed on the site, but before the implementation of permanent vegetation and/or structural BMPs, the Contractor shall inspect and maintain the construction BMPs not less than monthly and after every significant precipitation event (0.5 inches or greater).

9 STORM WATER CONSTRUCTION AND MANAGEMENT FOR NEW DEVELOPMENT/ REDEVELOPMENT

9.1 General

In accordance with the 2010 MS4 Permit, the Owner shall retain and use low impact development practices that infiltrate, evapo-transpire, or capture for reuse the runoff generated from the storm events listed in Section 6.1.1. If this requirement cannot be implemented for a new development project or redevelopment project, the Owner must provide documentation demonstrating why this requirement cannot be met. The Owner shall evaluate and document alternatives for reducing the amount of impervious surface

area for either new developments or redevelopments, and shall include this information in the design drawings or in the engineering report for the project.

Street and parking overlays are considered to be routine maintenance and are not considered to be redevelopment and, therefore, are not subject to provisions in this section.

9.2 Structural BMPs

This section details the general types of storm water structural BMPs that are permissible to Butte-Silver Bow Public Works Department. They are grouped into ponds (surface water structures) and infiltration structures (subsurface). These structural BMPs must be designed by a licensed professional engineer and are required for all new projects that increase the amount of impervious area or are reasonably anticipated to adversely impact storm water quality. BMPs not included in this section will be evaluated by Butte-Silver Bow on a case-by-case basis. Refer to Section 10 of the HEC-22 Manual for additional information regarding these BMPs.

9.2.1 Ponds and Water Quality BMPs

The following are the peak reduction and water quality BMPs that are permissible by the Butte-Silver Bow Public Works Department. Refer to Section 10 of the HEC-22 Manual for additional information regarding these BMPs.

- **Extended Detention Dry Ponds** are depressed basins that are designed to temporarily store storm water for a minimum of 24 and up to 48 hours following a storm event. These storm water facilities typically do not impound water or have a free water surface between storm events.
- **Wet Ponds / Retention Basins** are designed to store a permanent pool of water between storm events.
- **Constructed Wetlands** are similar to wet or dry ponds with the exception that they are specifically planted with wetland and/or riparian vegetation to provide some storm water treatment.
- **Water Quality Catch Basin Filters** These types of filters are commercially available for specific pollutants, litter, or oil and grease.

9.2.2 Infiltration BMPs

The following are the infiltration BMPs that are permissible by the Butte-Silver Bow Public Works Department. Storm water infiltration by its nature typically resolves surface water quality impacts. However, consideration must be given to the potential for creating groundwater quality impacts with these types of BMPs. Section 10 of the HEC-22 Manual contains some additional information regarding these BMPs.

- **Infiltration Basin** is similar in appearance to dry ponds and consists of a shallow impoundment that detains and infiltrates runoff into permeable soils.
- **Underground Infiltration** is defined as temporary storage and infiltration of runoff in an infiltration chamber located beneath an engineered layer of soil and vegetation.

- **Infiltration Trenches** are shallow trenches which have been backfilled with rock and have positive drainage. An infiltration trench may be used as part of a larger storm drain system (like a commercial parking lot), or it may serve a portion of a roof or a single catch basin.
- **Dry Well / Seepage Pit** is typically a smaller underground Infiltration system designed to temporarily store and infiltrate runoff from a building or structure.
- **Constructed Filters** are structures or excavated areas containing a layer of sand, compost, organic material, peat, or other filter media that reduce pollutant levels in storm water runoff by filtering sediments, metals, hydrocarbons, and other pollutants.
- **Vegetated Swales** are broad, shallow, trapezoidal or parabolic channels, densely planted with a variety of trees, shrubs, and/or grasses. It is designed to attenuate and/or infiltrate runoff, allowing some pollutants to settle out in the process. In steeper slope situations, check dams may be used to enhance attenuation and infiltration.
- **Vegetated Filter Strips** are permanent, maintained strips of planted or indigenous vegetation located between nonpoint sources of pollution and receiving water bodies for the purpose of removing or mitigating the effects of nonpoint source pollutants such as nutrients, pesticides, suspended solids.
- **Infiltration Berm & Retentive Grading** consists of a mound of compacted earth with gently sloping sides to detain storm water runoff and allow infiltration. These structures can be used in conjunction with grassed channels to allow for detention and infiltration during storm events.

9.3 Non-structural BMPs

Non-structural BMPs focus on preserving open space, protecting natural systems, and incorporating existing landscape features such as wetlands and stream corridors into a site plan to manage storm water at its source. Focus should be placed on clustering and concentrating development, minimizing disturbed areas, and reducing the size of impervious areas. The following lists primary non-structural BMPs that should be implemented on all sites to the maximum extent practicable:

1. Preserving and utilizing existing natural features and systems;
2. Managing storm water as close to the source as possible;
3. Sustaining the hydrologic balance of surface and ground water;
4. Disconnecting, decentralizing and distributing sources and discharges;
5. Source control of potential pollutants into runoff;
6. Appropriate construction sequencing and planning;
7. Good housekeeping and pollution prevention strategies on construction sites;
8. Integrating storm water management into the initial site design process; and
9. Inspecting and maintaining all BMPs.

9.4 New Infrastructure Operation and Maintenance Agreement

For privately maintained storm water systems, an operation and maintenance (O&M) agreement and schedule for source control, runoff control and runoff treatment BMPs must be approved by the Butte-Silver Bow Public Works Department prior to acceptance of the completed storm drainage system. For private storm water facilities, the party responsible for O&M must be identified. If storm water facilities are to be maintained by Butte-Silver Bow, the O&M schedule shall provide information regarding any unique facilities or features not normally used by Butte-Silver Bow. The agreement must allow access to Butte-Silver Bow for inspection purposes, and must be recorded with the property deed to ensure the agreement is bound to the property in perpetuity.

An example storm water maintenance agreement is included in Appendix C.

9.5 Plan Implementation

Each landowner or responsible party shall implement and maintain storm water management facilities and temporary erosion and sediment control measures to minimize and control erosion during any land disturbance activity. During construction, appropriate phasing and implementation of BMP's is required. Inspection of all temporary control measures will be conducted during active construction activities. All storm water management facilities will be constructed according to the design plans and specifications.

9.6 Inspection and Certification

The applicant must notify the Butte-Silver Bow Public Works Department in advance before the commencement of construction. Inspections of the storm water management system construction may be conducted by Butte-Silver Bow Public Works Department personnel at its discretion to determine the overall effectiveness of the storm water engineering report. All inspections shall be documented and shall contain the following information:

1. The date and location of the inspection.
2. Whether construction is in compliance with the approved storm water engineering report.
3. Variations from the approved construction specifications.
4. Any violations that exist.

AS-BUILT PLANS

Applicants are required to submit as-built plans for any on-site or off-site storm water management practices after final construction is completed. The plan must show detailed final specifications for all storm water management facilities and must be certified by a professional engineer. A final inspection by the Butte-Silver Bow Public Works Department is required before the release of any performance securities can occur.

LANDSCAPING AND STABILIZATION REQUIREMENTS

Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be revegetated within thirty (30) days of the completion of such clearing and construction, or have appropriate storm water controls implemented. In addition, all components of the landscaping plan submitted as part of the Storm Water Engineering Report must be completed, as appropriate.

9.7 Post Construction Infrastructure Acceptance Procedure

Prior to use or occupancy of any portion of a phased development, storm drainage facilities shall be completed and operational to provide conveyance, runoff control, and water quality treatment for the phase for which occupancy is requested.

Prior to the installation of impervious surfacing, detention facilities shall be operational.

Contractor shall provide Manufacturer's Certificate of Compliance when requested by Butte-Silver Bow for all pipe, fittings, precast concrete products, castings, and manufactured fill materials to be used in the project.

Testing of the drainage system by the Contractor shall conform to the testing requirements for the particular component of the system as set forth in the MPWSS and issued permits.

Documentation for the newly installed drainage facilities required by these standards or issued permits shall be submitted and approved prior to construction acceptance. Prior to the final inspection, the Contractor shall clean the storm drain system and any off-site drainage systems affected by construction activities by a method approved by Butte-Silver Bow.

10 MINIMUM DESIGN STANDARDS

The Design Engineer and Contractor shall refer to MPWSS as modified by these minimum Engineering Standards promulgated by Butte-Silver Bow Public Works Department.

10.1 Road Section

Roads and streets shall be designed with adequate longitudinal and cross slopes (minimum 0.5% and 2% respectively) and to ensure proper drainage. If possible, roads should have a normal crown at the center of the road (or between opposing driving lanes).

10.2 Curb and Gutter

Curb and gutter shall be required for all new and redevelopment projects. For projects located with the Historic Uptown Butte Zoning District, a vertical curb and gutter section shall be constructed to maintain historical character of the area. Refer to the Figure in Appendix A for the current Historic Designations of Uptown Butte. All other areas of Butte and the surrounding area shall have an integral curb and gutter system

conforming to the curb and gutter details provided in MPWSS (Standard Drawing 02528-1), unless written approval is granted by the Butte-Silver Bow Public Works Department.

10.3 Open Channels

Minimum freeboard requirements for open channels shall be one half (0.5) foot below the top of bank for the design flow rate. Additional freeboard should be included for large conveyance channels.

Rock riprap for channel armoring shall conform to the Montana Department of Transportation for Road and Bridge Construction, Section 613, Rip-rap and Slope and Bank Protection.

Swales shall be located no closer than 10 feet to any structure foundation measured horizontally from the edge of the swale at the freeboard elevation.

10.4 Underground Utility Separations and Minimum Clearances

Storm drain piping shall not be located:

- Within the 1:1 slope from the bottom edge of the pipe or structure to the finished grade at a building or structure; and
- Within the 1:1 slope from the bottom edge of the pipe or structure to the property line at finished grade when an easement is not provided on the adjacent property; and
- Underneath any structure (e.g. buildings, sheds, decks, or retaining walls which run parallel to the pipeline); and
- Where such facilities interfere with other underground utilities; and
- Where allowable design loads would be exceeded.

At a minimum, the following utilities shall be shown on the plans: cable television, fiber optic cable, natural gas, power, sanitary sewer, telephone, and water. Check for crossing or parallel utilities. Maintain minimum vertical horizontal clearances. Avoid crossing at highly acute angles (the smallest angle measure between utilities should be between 45 and 90 degrees).

Where storm drain pipes cross over or below a water main, one full length of pipe shall be used with the pipes centered for maximum joint separation. All storm water piping crossing water mains must consider the potential effects of frost and measures should be considered by design Engineer to prevent the freezing of water mains.

For storm drain crossings of water and sanitary sewer pipelines, the Montana Circulars DEQ 1 and 2 for water/wastewater systems and Montana Department of Environmental Quality criteria will apply.

All clearances listed below are from edge-to-edge of each pipe.

Table 10-1. Required Utility Clearances

Utility	Required Clearance	
	Vertical (inches)	Horizontal (feet)
Water	18	10
Sewer	12	5
Cable TV	12	5
Gas (distribution only)	12	5
Power	12	5
Telephone, Fiber Optics	12	5

10.5 Trench Design

Trenches shall be excavated to the width, depth, and grade as set forth in MPWSS. Material excavated that is unsuitable for backfill shall not be used for filling on or around storm water facilities. In paved areas within the public right-of-way, provide a neat vertical cut in existing pavement by saw cutting.

Trenches shall be backfilled in accordance with MPWSS as modified herein. All backfill within the pipe compaction zone shall be compacted to a minimum of 95% of maximum dry density per ASTM D 1557 (Modified Proctor).

Excavated material may be used as trench backfill when it has been demonstrated by the Contractor to meet gradation and compaction requirements.

10.5.1 Installation of Storm Drain Pipe

Installation of storm drain pipe shall be in accordance with the MPWSS as modified.

Existing storm flows shall be diverted away from the pipe segment under construction by methods approved by Butte-Silver Bow Public Works Department.

10.5.2 Pipe Bedding Material

Pipe bedding material shall be in accordance with MPWSS for Trench Excavation and Backfill for Pipelines & Appurtenant Structures as well as pipe and fitting manufacturer's specifications for bedding material.

Excavated material may be used as pipe bedding when it has been demonstrated by the Contractor to meet gradation and compaction requirements.

10.6 Connections/Modifications to Public Drainage System

When connecting existing metal storm pipe to new catch basins, the Contractor shall treat the newly exposed end of the pipe per the following.

Provide enamel linings and coatings in accordance with the following:

- Provide minimum dry film of 5 mils of acceptable asphalt base material.
- Provide coating subject to following additional requirements.

- Do not use enamel-lined or coated-steel pipe exposed to temperatures below 10 Deg F.
- Do not handle enamel-lined or coated-steel pipe when temperature of pipe is below 20 Deg F.
- Galvanize surface in accordance with hot-dip method using a grade of zinc acceptable to ASTM B6.

Where new pipe is connected to existing, the Contractor shall verify the type of existing pipe and join in-kind with new. If the existing pipe is no longer an approved material, the Contractor shall connect the new to the existing with an appropriate coupling device. The appropriate coupling device shall be approved by Butte-Silver Bow Public Works Department prior to installation.

The following connections to a pipe system shall be made only at structures:

- When the inletting pipe is greater than 8 inches in diameter; or
- When roadway, driveway or parking lot runoff is conveyed; or
- When commercial and multi-family storm water pipes connect to the municipal conveyance system; or
- When connecting to corrugated metal pipe (CMP) conveyance systems.

Roof/footing/yard drain pipes, 8 inches or less in diameter, from single family residences, may be connected to the existing storm water conveyance system by core drilling the appropriate diameter hole. Protrusions into to storm drain mains or laterals shall be contoured to match main inside wall if a Tee is not used.

When a connection is made without the benefit of a structure, a clean-out shall be provided upstream of each tee on the inletting private drainage system pipe.

When connecting pipes at structures, match crowns whenever possible.

10.7 Storm Drain Piping

Off-site storm water flows passing through the site shall be conveyed by a hydraulically adequate conveyance system as set forth herein.

Catch basins or manholes are required when joining pipes of different materials (does not apply to "taps") and joining pipes of different slopes. Vertical bends are not permitted.

Minimum slope for storm drain mains shall be 0.5%, unless specified otherwise herein. Minimum diameter for storm drain mains within a road section or public right of way shall be 12-inches.

Only the pipe materials listed below are approved for use in storm drain systems and culverts. Pipe systems shall meet MPWSS, as modified herein, for the materials shown below. The minimum pipe diameter for all publicly owned and maintained storm pipe shall be 8-inches; however, some pipe materials have higher minimum diameters.

Solid Wall Polyvinyl Chloride (PVC) Pipe

PVC pipe must be at least SDR 35 and meet the requirements of ASTM D 3034 for diameters up to 15 inches and ASTM F 679, Type I for sizes 18 to 27 inch diameter.

The maximum fill depth is 25 feet.

Profile Wall PVC Pipe

Profile wall PVC pipe shall conform to AASHTO M 304. Joints shall be an integral bell gasketed joint conforming to ASTM D 3212. Elastomeric gasket material shall conform to ASTM F 477.

The minimum pipe diameter shall be 8 inches. The maximum pipe diameter shall be 15 inches or the diameter for which a supplier has a joint conforming to ASTM D 3212, whichever is less.

Fittings for profile wall PVC pipe shall meet the requirements of AASHTO M 304 and shall be injection molded, factory welded, or factory solvent cemented.

The maximum fill depth is 25 feet.

Polypropylene (PP) Pipe

Polypropylene (PP) pipe shall have smooth interior and shall be joined with a gasketed integral bell and spigot joint providing a water tight seal. Fittings shall utilize welded or integral bell and spigot with gaskets meeting ASTM F 477. Fitting joints shall meet the watertight joint performance requirements of ASTM D 3212. Installation of PP pipe shall be in accordance with ASTM D 2321 and manufacturer's recommended guidelines. Gasketed joints shall be lubricated during installation as recommended by the manufacturer.

The minimum pipe diameter shall be 12 inches.

Minimum fill depth shall be one foot from top of pipe or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

Corrugated Polyethylene Pipe (CPEP)

Corrugated polyethylene pipe (CPEP), a type of HDPE, shall have a smooth interior wall and meet the requirements of AASHTO M294, Type S for 12-inch through 60-inch sizes (or AASHTO M252, Type S for 8 and 10-inch sizes) and ASTM F2306. Joints for corrugated polyethylene pipe shall be watertight per ASTM D 3212. Installation of PE pipe shall be in accordance with ASTM D 2321 and manufacturer's recommended guidelines. Gasketed joints shall be lubricated during installation as recommended by the manufacturer.

The minimum pipe diameter shall be 8 inches.

Minimum fill depth shall be one foot from top of pipe or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

Reinforced Concrete Pipe (RCP)

RCP shall meet ASTM C-76 with a joint conformation to ASTM C-443, providing a water tight O-Ring gasket joint.

Minimum cover is one foot from the top of pipe to the finished grade or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

10.8 Culverts

Culvert crossings within the urban and surburban area of Butte are generally limited to driveway culverts. The minimum diameter of any driveway culvert shall be 12-inches. Where minimum cover requirements can be met, an 18-inch diameter culvert is required to minimize debris blockages.

Culverts outside of the urban boundary may be made of concrete, steel, aluminum, or corrugated polyethylene pipe (CPEP). Culverts within the urban boundary shall be made of concrete or CPEP only. Factors to be considered in material selection include: bed load, structural strength, hydraulic roughness, in-place foundation conditions, abrasion and corrosion resistance and water tightness requirements.

Headwalls, cut-off walls, and/or anti-seep collars shall be provided on culverts where the hydraulic piping of bedding and backfill materials is possible.

10.9 Manholes, Catch Basins, and Inlets

10.9.1 Design Considerations

Storm water inlets located in a roadway with a sloping grade shall be located in the curb line and shall be fitted with vaned grates.

A through-curb inlet frame shall be used where conditions limit the effectiveness of a flat grate inlet. Examples of such conditions are where a high likelihood of clogging from leaf fall or other debris exists, in sag vertical curves, intersection curb returns, and when the structure is a surface drainage end point, such as in a cul-de-sac.

Non-vaned grates shall be used in vertical sag locations (low spots).

10.9.2 Spacing Requirements

Maximum spacing between inlet grates shall be based on the spread width calculations provided by the Design Engineer. The spread width for the design storm cannot exceed ½ the nearest travel lane. The inlet spacing may need to be decreased as required by grate flow capacities. Refer to HEC-22 Section 4.4.6 and Appendix B.

Maximum distance between manholes is 400 feet along storm mains. For storm mains greater than 13 feet in depth (as measured from the deepest pipe invert to the top of the grate or manhole), manholes shall be a minimum of 60" in diameter. For storm mains greater than 20 feet deep manholes shall be 72" in diameter.

The number and size of pipes that may be connected to any one structure (manhole or catch basin) shall be limited in order to maintain the integrity of the structure and must follow manufacturer's specifications for pipe spacing and structure sizing.

10.9.3 Adjusting Manholes and Catch Basins to Grade

Where shown on the approved plans or as directed by Butte-Silver Bow, existing manholes, catch basins and inlets shall be adjusted to conform to finished grade in accordance with standard detail Adjusting Manholes and Catch Basins to Grade of the MPWSS as modified herein.

Where riser bricks (blocks) are used to bring the frame to grade, the maximum height of the brick shall be two rows. If more than two rows of bricks are required, a precast riser section shall be used along with no more than two rows of bricks to complete the adjustment.

10.9.4 Materials

Precast concrete products for manholes, inlets, and catch basins shall comply with the MPWSS. Infrastructure within the Butte historic district may need to be adjusted to comply with integrated sidewalk and vertical curb.

Metal castings for frames, inlet grates, and rectangular covers shall conform to the MPWSS as modified herein. Rings and covers shall be designed per Butte-Silver Bow Utilities Division Standards.

Acceptable inlet grates and manhole covers are listed in Table 9-2:

Table 10-2. Approved Inlet Grates

Manufacturer*	Grate #	Dimensions	Style	Application
D&L Foundry	I-3559	36” Dia	Vaned	Inlet on slope
	I-3559	36” Dia	Non-vaned	Inlet on sag
	I-3517	31”x43”	L	Combination manhole sloping, high traffic & bikes
	I-3519	31”x43”	DL, Directional	Combination manhole sag high water flow areas
	A-1174	24” Dia	Label as Storm Drain	Storm manhole cover

Note: *D&L Foundry provided for reference or approved equal

All catch basin grated covers in roadways shall be ductile iron grates with cast iron frames, per these engineering standards or approved equal. Vaned gates shall be used where S > 0.4%, or as required by Butte-Silver Bow Public Works Department.

All grated covers shall have in raised letters "Outfall to Stream, Dump No Pollutants".

Manhole round covers and rectangular covers shall have the word "STORM DRAIN" in block letters at least two (2) inches high, recessed so as to be flush with the surface.

Dipping, painting, welding, plugging or any repair of defects to castings shall not be permitted in accordance with AASHTO M 306.

All structure ladders, when used, shall be firmly attached using stainless steel hardware and extend to the bottom of the structure.

Vertical ladders or steps shall be installed immediately under the cover or grate opening to a walkable surface on all structures exceeding four feet deep to the pipe invert.

When connecting to a concrete structure, openings must be core-drilled unless an existing knockout is available. Connections shall be made with watertight rubber boots, sand collars, manhole adapters, or other approved watertight connectors except for: 1) concrete; 2) ductile iron; 3) corrugated metal pipe. For 1, 2, and 3 above, connections shall be made with non-shrink Portland Cement Grout to make a watertight connection.

10.10 Service Connections

Private storm drainage systems shall comply with all criteria for storm water systems set forth herein unless specifically exempted.

All service connections shall connect to any existing storm water conveyance system within 100 feet and downgradient of the property line

For driveways, parking lots and situations not listed above, the minimum diameter for conveyance pipes shall be 8-inches.

Any storm line with a 20% slope or greater shall provide pipe anchors to provide stability on the slope.

10.11 Runoff Control

10.11.1 Discharge Location

The Owner or Engineer shall show the location of storm water discharge from the project boundary to the nearest existing municipal storm water structure or natural water body.

10.11.2 Unconcentrated Flow

Where no downstream drainage system exists adjacent to the property and the runoff from the project site was previously unconcentrated flow, the downstream drainage system shall be extended to the property line and the location and direction of all runoff from the property shall be documented. The Owner shall secure drainage easements from the downstream owners and record such easements prior to drainage design plan approval as necessary under State Law.

10.11.3 Alternate Discharge

If the Owner finds that easements per Section 6 herein are not reasonably obtainable, then all additional runoff from development shall be conveyed to an infiltration system per these engineering standards.

10.11.4 Temporary Discharges to the Sanitary Sewer

Storm water runoff into the sanitary sewer system is prohibited. Temporary discharges into the sanitary sewer system may be permissible but must be approved by:

- The Public Works Department
- Wastewater Treatment Plant (WWTP) Supervisor
- Utilities Maintenance Supervisor

Butte-Silver Bow WWTP Supervisor and the Metro Sewer Utility Maintenance Supervisor will determine the:

- Location of connection to the sanitary sewer,
- Method for the connection and pre-connection requirements (i.e., settling tanks, sump pump, etc.),
- Time of discharge,
- Duration, rate and volume of the discharge, and
- Other applicable discharge conditions.

10.12 Detention Pond Facilities

10.12.1 Detention Design Considerations

Upstream, off-site runoff must bypass the proposed detention facilities, if possible. However, if the existing 100-year, 24-hour peak runoff rate from the upstream, off-site area is less than 50 percent of the allowable release rate for the 100-year, 24-hour design storm event of the proposed project, then upstream runoff will be allowed. Existing water quality treatment must also remain unchanged.

The detention pond outlet shall include debris barriers or trash racks to protect the outlet from blockage or plugging.

10.12.2 Sites with Existing Storm Water Detention Systems

When runoff control is required on a site with an existing detention system, the design Engineer may choose one of the following options:

- Retain the existing detention system, modify the control structure and add volume as needed to meet the current requirements for runoff control;
- Retain the existing detention system to control runoff from existing impervious surfaces and design a second system to meet current requirements to control runoff from new portions of the development; or
- Replace the existing detention with a system designed to meet current runoff control requirements for both existing and proposed conditions.

Existing storm water detention ponds may be used as interim sedimentation facilities during construction, if they are cleaned and restored to approved plan conditions following completion of all construction activities.

10.12.3 Embankments

Embankment material for detention ponds shall conform to the guidelines set forth in the MPWSS and the Montana State Department of Natural Resources and Conservation Dam Safety guidelines. Pond vegetation should be established using the materials described in these standards.

Fill placed around structures in the pond embankment shall be placed in 12- inch maximum lifts and compacted to 95 percent of ASTM D- 1557.

The maximum embankment height is measured from the down-slope toe to the crest of the embankment.

All embankments for detention facilities 6-feet and higher shall be designed, inspected and certified by a licensed and qualified professional engineer. The professional engineer shall submit a letter certifying that all embankment design requirements have been met during embankment construction.

Anti-seep collars or other design features shall be used on all conveyance pipes and trenches within the embankment to prevent embankment piping failures from seepage along the outlet pipe.

Ponds may be designed with retaining walls only as approved by Butte-Silver Bow Public Works on a case-by-case basis. Public safety shall be a primary design consideration.

10.12.4 Detention Pond Setbacks

Detention ponds shall not be located:

- within the 1:1 plane from the pond bottom to the finished grade at an adjacent building; and
- within the 1:1 plane from the pond bottom to the property line when an easement is not provided on the adjacent property; and
- where such facilities interfere with other underground utilities.

The top of a cut embankment and the toe of a fill embankment shall be setback at least 5 feet from property lines.

For ponds where the maximum design water depth is less than three (3) feet deep, the minimum bottom width is 6 feet.

For ponds where the maximum design water depth is 3 feet deep and greater, the minimum bottom width shall be 12 feet to allow maintenance.

The pond bottom shall be sloped at 0.5% towards the outlet for drainage to help facilitate maintenance.

10.12.5 Vegetation & Landscaping

Vegetation on pond embankments shall be limited to shallow rooted varieties, as tree roots can affect the integrity of a pond embankment. Deciduous shrubs and shrub/trees may be used in other areas to provide habitat and for aesthetic purposes.

All pond landscaping shall provide for slope stability, erosion control, and low maintenance. Landscape materials shall be fully compatible with use as a storm water detention facility, including runoff treatment.

Ponds with walls higher than 6 feet shall be landscaped.

Floatable or erodible material (i.e., wood chips, beauty bark, straw mulch, etc.) shall not be allowed in the pond interiors. Vegetation shall be placed into topsoil above or adjacent to the engineered pond embankment.

If detention pond vegetation shall be maintained by the Utilities Department, landscaping shall be non-irrigated, low maintenance and drought tolerant native plant species. Lawn or turf grass is not allowed. Utilize plant species native to the State of Montana to the maximum extent practicable.

For Butte-Silver Bow maintained facilities, all plant material shall be guaranteed for a period of one (1) year after acceptance. Defective materials shall be promptly replaced in like kind and size. The guarantee period may be extended for those defective materials which are replaced.

10.12.6 Multi-Purpose Use

Detention facilities designed for multiple-use (neighborhood parks, open space, play areas, picnic areas, etc.) are allowed but must be approved by Butte-Silver Bow Public Works Department.

Storage for runoff from more frequent storms shall be stored separately from the multiple use areas. At a minimum, the detained volume for the 2-year, 24-hour design storm shall be used to size the separate facilities.

All multi-use amenities shall be anchored to prevent floatation. Maintenance of multi-use amenities must be included in the Maintenance Agreement for the proposed development and approved by Butte-Silver Bow during the design process.

10.12.7 Safety

Fencing shall be required when vertical walls are used, when more than 25% of the perimeter side slopes are steeper than 3 H: 1V, and when the permanent pool depth exceeds 2 feet.

10.12.8 Emergency Overflow & Spillways

Use the criteria set forth in Chapter 8.4.4.4 of the HEC-22 Manual as modified herein.

All detention storage facilities shall include a provision for non-erosive control of overflows. Overflow design must protect adjacent and downstream properties from damage. Calculations and data to support the design shall be provided in the engineering report.

Surface detention ponds shall provide a minimum of two controlled emergency overflows - the primary overflow in the control structure and the secondary overflow at the engineered embankment.

The crest of the secondary overflow shall be at least 0.5 feet above the crest of the primary overflow.

10.12.9 Detention Structure Maintenance Access

All storm water detention system control structures shall be accessible for maintenance and operation.

In new subdivisions, control structures, which are not abutting a roadway, shall be provided with dedicated tracts at least 15-feet wide to accommodate maintenance vehicles. The minimum clear driving width shall be 12-feet.

Maintenance access to the bottom of the detention pond is required when the bottom width is 15-feet or greater and/or when the height of the interior pond embankment and/or wall is greater than 4-feet. The grade of the access ramp shall be no steeper than 20%.

Maximum access road grades shall be 15%.

Gates and/or removable bollards are required to restrict access, as necessary, to drainage facilities. Cables and/or chains stretched across access roads are not acceptable.

10.13 Outfalls

10.13.1 Design Considerations

Storm drain pipelines shall not be installed aboveground and shall be buried in accordance with the manufacturer's specifications and these Engineering Standards.

Conveyance systems downstream of detention facilities or water quality treatment facilities shall be designed to prevent backwater conditions.

The use of pumped systems or backflow preventers shall not be used to prevent flooding due to backwater conditions.

Each runoff control facility shall provide emergency storage of at least 10% of the 100-year, 24-hour design storm volume or a minimum of 0.5 feet deep on the site prior to discharging runoff to a safe overflow route. The overflow route shall have the capacity for the 100-year, 24-hour flow in the event of overflow. Overflows shall be routed to the municipal storm drainage system, or an alternative overland flow discharge shall be identified and shown on the plan.

10.13.2 Control Structures

Use the criteria and methods set forth in Chapter 8 of the HEC-22 Manual except as modified herein.

Precast concrete products for control structures shall comply with the MPWSS.

Ponds four feet deep or greater to be maintained by Butte-Silver Bow shall be equipped with a slide gate. Ponds less than four feet deep can utilize an orifice plate to control discharge.

The minimum clearance between the rim of the overflow standpipe and the bottom side of the structure's top slab shall be a minimum of 0.5-feet.

The minimum clearance between the flow restrictor (standpipe, orifices, shear gate, etc) and the steps/ladder rungs shall be 2-feet.

10.13.3 Orifices

Orifices less than 8-inches in diameter must be screened.

A notch weir may be incorporated into the tee-type flow restrictor when a floatable baffle is provided.

Orifice plates shall be fabricated from aluminum plate (0.125-inch), high density polyethylene (HDPE) sheeting (0.25-inch), or PVC sheeting (0.25-inch). Orifice plates shall be bolted to the flange on the flow restrictor with stainless steel hardware. Orifices may be fabricated by drilling the specified diameter hole in an end cap, but must still meet screening requirements.

Protective screening for orifices less than 8 inches in diameter shall be hot-dipped galvanized, 0.5-inch x 0.5-inch "hardware cloth" or polymer geo-grid with the approximate same size openings.

10.13.4 Energy Dissipation

Energy dissipation must be provided when exit velocities are in excess of 10 fps. When discharging to an existing ditch, swale, or stream, energy dissipation is required to minimize erosion and scour. Energy dissipation measures shall be designed pursuant to FHWA HEC-14, “Hydraulic Design of Energy Dissipators for Culverts and Channels,” as modified herein.

10.13.5 Materials

Acceptable pipe materials for all outfall sections of storm water pipe shall include those listed in Section 9 of these Standards, except that PVC pipe is not permitted due to ultraviolet light sensitivity and degradation.

10.14 Retention Systems

Retention ponds and infiltration systems must have the capacity to fully detain and infiltrate the 100-year, 24-hour design storm. A routing diagram must show the discharge location for storm water flows that exceed the 100-year, 24-hour storm event. In addition provisions must be made so that storm water run-on can be by-passed around the project.

10.14.1 Retention Ponds

Retention ponds shall have the same design considerations as detention ponds with the only distinction being that they will not have an outlet structure. They will however, have an emergency spillway and are subject to all other requirements within these Standards.

10.14.2 Infiltration Systems

Use the criteria and methods set forth in Chapter 10 of the HEC-22 Manual as modified herein.

All storm water shall be routed through a catch basin prior to discharging to detention vaults or pipes to facilitate the easy removal of transported sediments and debris.

Infiltration Design Considerations

Infiltration systems for runoff control shall be designed to infiltrate the 100-year, 24-hour design storm volume in 24 hours or less after the storm is over. Soil capabilities must be established by a geotechnical investigation.

The Engineer shall demonstrate through: 1) Infiltration testing; 2) soil logs; and 3) a written opinion of a licensed professional engineer, that sufficient permeable soils exist

for a properly functioning infiltration system meeting the requirements herein. The infiltration rate shall be measured at a depth equal to the proposed bottom grade of the facility.

A detention system (storage) may be used in conjunction with the infiltration system to meter flows to a rate that can be infiltrated.

Depth to seasonal high water table, bedrock, hardpan or other impermeable layer shall be no less than 3-feet below the bottom of roof downspout infiltration systems and 5 feet below the bottom of all other infiltration facilities.

To obtain the design infiltration rate, a 1.75 safety factor shall be applied to the lowest measured infiltration rate.

Infiltration facilities shall not be located: 1) within 20 feet of any structure, property line, protected area or another infiltration system; or 2) within the 1:1 plane from the bottom edge of the excavation to the finished grade at the structure foundation, whichever is greater, except as provided herein. Infiltration facilities shall be setback at least 50-feet from downhill slopes which are 15% or greater. Infiltration areas shall not be: 1) driven on or across by any vehicles or equipment, 2) used for material storage or stockpiles, or 3) used for vehicle or equipment parking, unless specifically designed for these purposes.

Approval of an infiltration system shall obligate the owner to repair, replace, or reconstruct the infiltration system if it fails to operate as designed. The operation and maintenance agreement for an infiltration system shall include such a provision. Surface storage for groundwater infiltration structures is recommended to make the Owner aware of a problem with the infiltration system.

Geotechnical Report Requirement

An adequate number of test holes shall be located over the proposed site to provide representative data for the final layout of the development. At a minimum, test holes shall be located in a grid of 50 feet by 50 feet in the infiltration area. Test hole locations shall be clearly identified in the geotechnical report and labeled on the drainage plan.

Soil logs must be submitted to describe soil type and depth and a site map shall be submitted showing the location of each test hole.

Borings or test pits shall extend at least 3-feet below the bottom of roof downspout systems and 5-feet below the bottom of all other infiltration facilities. Soil logs shall include the depth to the seasonally high ground water table and impervious strata. Seasonal water table elevation measurements shall be made bi-weekly during the period when the water table elevation is expected to be at its maximum (April 15 through July 30).

The geotechnical report shall address the potential impact of the infiltration system on downgradient areas both on-site and off-site.

During the course of construction, an inspection of the soil by an engineer shall be made after the system is excavated and before the gravel backfill is placed to confirm that suitable soils are present.

Infiltration Test Requirement

The design infiltration rate shall be determined using the procedure outlined in DEQ Circular 4, Appendix A.

Infiltration Structure Setbacks

Underground detention structures shall not be located:

- Underneath any surface building or structure (e.g. buildings, sheds, decks, carports, retaining walls, etc.); and
- Within the 1:1 plane from the bottom edge of the vault or the bottom of the excavation at the outside diameter for tanks, to the finished grade at an adjacent structure foundation; and
- Within the 1:1 plane from the bottom edge of the vault or the bottom of the excavation at the outside diameter for tanks, to the property line when an easement is not provided on the adjacent property; and
- Where such facilities interfere with other underground utilities.

If vaults are constructed aboveground, they shall be provided with visual screening and landscaping.

Infiltration Maintenance Access

Infiltration system components shall be accessible for periodic inspection and routine maintenance.

For infiltration systems which are not abutting a roadway, the minimum clear driving width shall be 12 feet.

For roof downspout infiltration systems, access allowances for maintenance and construction equipment shall be made to facilitate routine maintenance activities and potential future reconstruction.

Underground detention facilities are subject to confined space entry regulations and such facilities shall be designed to meet all OSHA safety requirements for safe inspection and maintenance.

Access structures at each end of the facility shall be required. Spacing between access openings shall not exceed 50-feet. Covers, grates, and hatches shall be bolt locking. If the vault or pipe contains cells, a minimum of one access per cell is required.

Access openings shall be at least 24-inches in diameter and centered over a ladder and/or steps. For control structures, accesses must be located so that an 8-inch rigid Vactor® tube can reach the sump directly from the top, and so that a person entering the structure can step onto the ladder or step onto the floor. The opening shall allow visual inspection of the restrictor pipe (if used), while maintaining vertical Vactor® truck access to the sump area. In order to achieve both requirements, it may be necessary to increase the control structure size to provide two 24-inch access openings or a hatched cover that conforms to the loading requirements given the proposed location.

Orifice elbows shall be located on the side of the stand pipe nearest the ladder for clear visual inspection from above.

Gates and/or removable bollards may be required to restrict access to drainage facilities. Cables and/or chains stretched across access roads are not acceptable.

10.15 Non-Gravity Systems (Pumps)

In general, pump systems (includes the pumps, force mains, electrical and power supply equipment, structures and appurtenances) are not an approved method of conveying, storing, or treating storm water. The Engineer shall demonstrate that the pump system is the only feasible drainage alternative. A deviation must be approved by Butte-Silver Bow Public Works in order to pump storm water.

11 MISCELLANEOUS DESIGN CONSIDERATIONS

11.1 Trench Plugs

Trench plugs shall be installed in accordance with MPWSS as modified herein.

Where utility conduits may convey groundwater in the trench backfill material, trench plugs shall be installed in accordance with MPWSS, but at a frequency of no less than one per block or 500-feet, whichever is less.

Trench plugs may be constructed of low permeability clays (1x10-7 cm/s), or flowable fill as defined by MPWSS.

11.2 Encasing Requirements

Storm water pipelines shall be encased in casing pipe when crossing under the following structures, where the ability to remove and replace pipe without disturbance to the structure is needed:

- Crossing under retaining walls over five (5) feet high (measured from the bottom of the base rock to top of wall);
- Crossing under retaining wall footings over five (5) feet wide; or
- Crossing under segmental block, crib, and reinforced earth-type retaining walls.

Casings shall extend beyond the facing, footing and backfill reinforcement zone a minimum of 5 feet or a distance equal to the depth of the pipe whichever is greater. The carrier pipe shall be supported by casing spacers when the casing length exceeds 10 feet where casing spacers are not used, the carrier pipe shall be more than 10 feet in length (no pipe joints inside casing).

If the cover is less than 3-feet between the bottom of footing or base rock, a casing is required regardless of wall height.

For storm pipes greater than 24” diameter, design exceptions for encasement pipe may be permitted on a case-by-case basis by Butte Silver Bow Public Works Department. Design exceptions, if allowed, are only permitted on a pre-authorization basis, and only after fully considering other alignments, routing, and methods of conveyance.

11.3 Locators

Installation of all non-linear plastic pipe, lot stubs and under-drains shall include a locator wire. The locator wire shall be installed on top of and secured to the pipe. The Contractor shall furnish and install a No. 12 AWG solid copper wire between drainage structures and extend the wire at least 1-foot into the structure.

Ends of each storm drain stub at the property line shall be capped and located with a 2-inch by 4-inch timber, embedded to the stub cap, with a copper locator wire attached, and marked permanently "STORM". The stub depth shall be indicated on the marker.

11.4 Abandoning Facilities

Abandoning Pipe In-Place

The Contractor shall completely fill the pipeline to be abandoned with concrete, or controlled density fill; or remove it.

Abandoning Structures

Abandonment of ponds, infiltration basins or other detention/retention structures shall be completed only after conveyance systems have been properly abandoned. Structures within the public right -of-way, a public easement or which are part of the publicly-owned and maintained system, must be removed completely or abandoned provided no conflicts with new utilities or improvements arise.

11.5 Protection of Wetlands and Riparian Areas

When storm water discharges to a wetland and there is no alternative downstream discharge location, runoff may be discharged to the wetland in accordance with the provisions in this section. In order to maintain and protect the characteristic uses of the existing wetland, storm water runoff shall be limited to:

1) 50 percent of the existing 2-year 24-hour design storm peak runoff rate for the area tributary to the wetland;
2) A rate as determined by a qualified wetlands biologist; or
3) A rate specified by a resource agency having jurisdiction over wetlands. Runoff in excess of the specified rate shall be bypassed around the wetland.

Wetlands may not be filled in without prior approval from the US Army Corps of Engineers and local authorities, as appropriate. In situations where a wetland is allowed to be filled, the owner must provide runoff treatment and conveyance equivalent to that provided by the existing wetland to be filled, in addition to any other runoff treatment and/or wetland mitigation required by these standards and applicable codes.

11.6 Emergency Land Management Practices

No prior notification is required for emergency land management practices necessitated by fire, flood, windstorm, earthquake, structural failure or other catastrophic events. Within five days after commencement of such activity, the Owner shall notify Butte-Silver Bow Engineer of the action with an explanation of why emergency action was necessary. Reasonable care must be taken to minimize soil disturbance and erosion during the conduct of emergency land management practices.

12 REFERENCES

FHWA HEC-14, Hydraulic Design of Energy Dissipators for Culverts and Channels, 2006

FHWA HEC-22 Urban Drainage Design Manual 2002

Montana DEQ Circulars DEQ 1 February 2006

Montana DEQ Circular DEQ 2 September 1999

Montana DEQ Circular DEQ 4 2004

Montana DEQ Circular DEQ 8 2002

Montana DEQ, General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewers (MS4), Permit Number MTR04000, January 1, 2010

Montana Public Works Standards Specifications Sixth Ed. April 2010

Montana Department of Transportation Model Drainage Manual October 1995

Montana Department of Transportation for Road and Bridge Construction, Section 613, Rip-rap and Slope and Bank Protection

NOAA Atlas 2, Volume 1 Montana Precipitation Isopluvials 1973

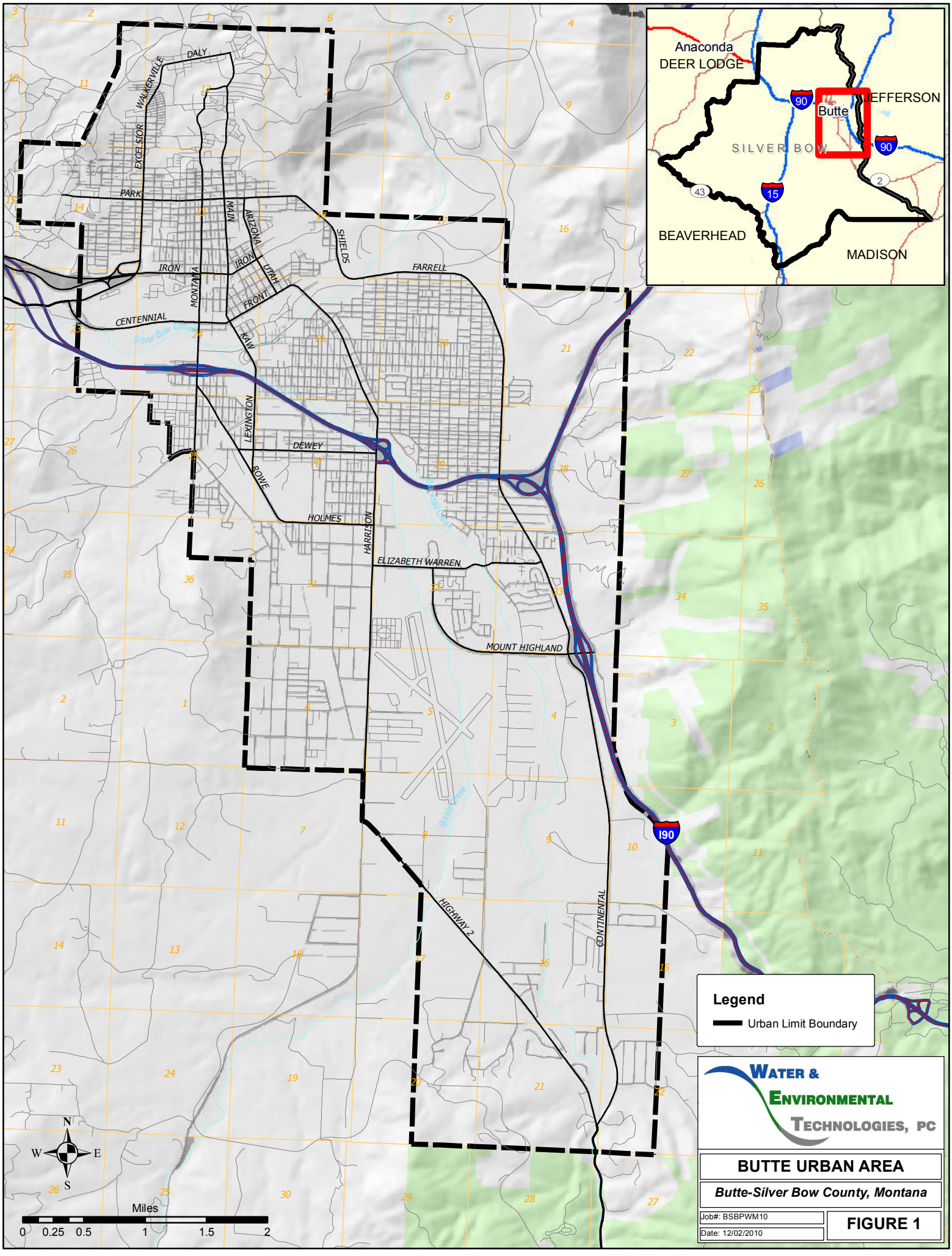
United States Department of Agriculture, Natural Resources Conservation Service. 2009. Soil Survey of Silver Bow County Area and Parts of Beaverhead and Jefferson Counties, Montana.

Federal Register Volume No: 64, No: 235, Page Number: 68721-68851

CFR Title: 40, Part: 9, 122, 123, 124 Published: 12/08/1999

Water and Environmental Technologies, PC March 2003. Storm Water Management Program for the Butte MS4.

APPENDIX A
FIGURES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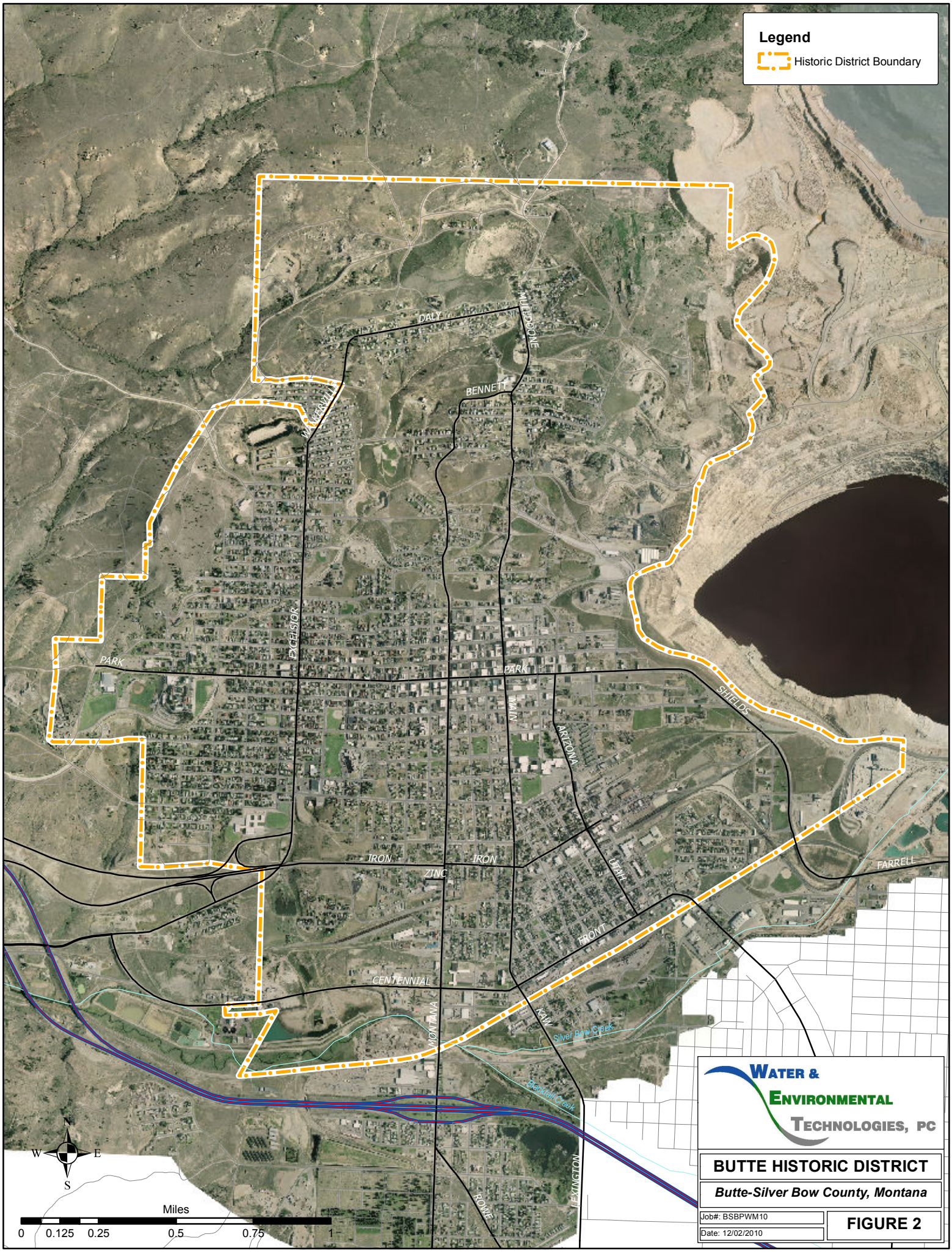
Butte
JEFFERSON
SILVER BOW
BEAVERHEAD
MADISON
90
15
43
2
DALY
WALKERVILLE
EXCELSIOR
PARK
MAIN
ARIZONA
SHIELDS
FARRELL
IRON
MONTANA
UTAH
FRONT
CENTENNIAL
Silver Bow Creek
KAW
LEXINGTON
DEWEY
ROWE
HOLMES
HARRISON
ELIZABETH WARREN
MOUNT HIGHLAND
Basin Creek
I90
HIGHWAY 2
CONTINENTAL
Legend
Urban Limit Boundary
N
W
E
S
Miles
0 0.25 0.5 1 1.5 2
WATER & ENVIRONMENTAL TECHNOLOGIES, PC
BUTTE URBAN AREA
Butte-Silver Bow County, Montana
Job#: BSBPWM10
Date: 12/02/2010
FIGURE 1


Legend
Historic District Boundary
DALY
MUDDOONE
BENNETT
MCKINLEY
EXCELSIOR
PARK
PARK
MAIN
ARIZONA
SHIELDS
IRON
IRON
ZINC
UTAH
FARRELL
FRONT
CENTENNIAL
MONTANA
KAW
Silver Bow Creek
Blacktail Creek
NORTHWEST
ROWE
N
W
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Miles
0
0.125
0.25
0.5
0.75
1
WATER & ENVIRONMENTAL TECHNOLOGIES, PC
BUTTE HISTORIC DISTRICT
Butte-Silver Bow County, Montana
Job#: BSBPWM10
Date: 12/02/2010
FIGURE 2

APPENDIX B
EXAMPLE MAINTENANCE AGREEMENT

STORM WATER MANAGEMENT/BMP MAINTENANCE AGREEMENT

BUTTE-SILVER BOW COUNTY
Department of Public Works
(406) 497-6515

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, by and between (Insert Full Name of Owner)

_____
hereinafter called the "Landowner", and the City-County of Butte-Silver Bow, Montana, hereinafter called the "City-County".

WITNESSETH, that WHEREAS, the Landowner is the owner of certain real property described as:

_____ (Butte-Silver Bow County tax parcel number/Geocode)

with a physical address of:

_____ hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and WHEREAS, the Site Plan/Subdivision Plan known as _____, (Name of Plan/Development) hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the City-County, provides for construction of storm water facilities within the confines of the property; and

WHEREAS, the City-County and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of Butte-Silver Bow County, Montana, require that on-site storm water management/BMP facilities be constructed and maintained on the Property; and

WHEREAS, the City-County requires that on-site storm water management/BMP facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site storm water management/BMP facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan and Chapter 32 of Title 13 of the Butte-Silver Bow Municipal Code entitled “Storm Water Management”.

2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the storm water management/BMP facilities. This includes all pipes and channels built to convey storm water to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the storm water. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions. Adherence to a maintenance plan

provided by an Engineer that defines procedures necessary to maintain good working condition is acceptable to the City-County.

3. The Landowner, its successors and assigns, shall inspect the storm water management/BMP facility annually to ensure functionality. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structures, pond areas, access roads, etc. Deficiencies shall be noted in the inspection report.

4. The Landowner, its successors and assigns, hereby grant permission to the City-County, its authorized agents and employees, to enter upon the Property and to inspect the storm water management/BMP facilities, provided the City-County gives reasonable notice. The purpose of inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. The City-County shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.

5. The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the storm water management/BMP facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.

6. In the event the Landowner, its successors and assigns, fails to maintain the storm water management/BMP facilities in good working condition acceptable to the City-County, the City-County may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the City-County to erect any structure of permanent nature on the land of the Landowner outside of the easement for the storm water management/BMP facilities. It is expressly understood and agreed that the City-County is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the City-County.

7. In the event the City-County pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the City-County upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the County hereunder.

8. This Agreement imposes no liability of any kind whatsoever on the City-County and the Landowner agrees to hold the City-County harmless from any liability in the event the storm water management/BMP facilities fail to operate properly.

9. This Agreement shall be recorded among the land records of Silver Bow County, Montana, and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.

OWNER(S):

_____	_____
Name / Title	Name / Title
_____	_____
Address	Address
_____	_____

STATE OF MONTANA)
) ss.
County of Silver Bow)

I certify that I know or have satisfactory evidence that _____ is / are the person(s) who appeared before me, and said person(s) acknowledged that he / she / they signed this instrument and acknowledged it to be his / her / their free and voluntary act for the uses and purposes mentioned in the instrument.

Witness my hand and official seal hereto affixed the day and year first above written.

_____
Notary Public in and for the State of Montana,
residing in _____.

Dated in Butte, Montana, this _____ day of _____, 20_____.

City County

_____
Chief Executive

Approved By:

_____
Public Works Department