STORMWATER MANAGEMENT ORDINANCE

ORDINANCE NO._____

McKEES ROCKS BOROUGH
ALLEGHENY COUNTY, PENNSYLVANIA

Adopted at a Public Meeting Held on, _____2018

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ARTICLE I - GENERAL PROVISIONS

Section 101. Short Title

This Ordinance shall be known and may be cited as the "McKees Rocks Borough Stormwater Management Ordinance."

Section 102. Statement of Findings

The governing body of the Borough finds that:

A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases runoff volumes, flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases nonpoint source pollution of water resources.

B. A comprehensive program of stormwater management (SWM), including regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety, and welfare and the protection of people of the Commonwealth, their resources, and the environment.

C. Stormwater is an important water resource that provides groundwater recharge for water supplies and supports the base flow of streams.

D. The use of green infrastructure (GI) and low impact development (LID) are intended to address the root cause of water quality impairment by using systems and practices which use or mimic natural processes to:

1) infiltrate and recharge,
2) evapotranspire, and/or
3) harvest and use precipitation near where it falls to earth.

Green infrastructure practices and LID contribute to the restoration or maintenance of pre-development hydrology.

E. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES) program.

Section 103. Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within the Borough and its watershed by minimizing the harms and maximizing the benefits described in Section 102 of this Ordinance, through provisions designed to:

A. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of this Commonwealth.

B. Preserve natural drainage systems.

C. Manage stormwater runoff close to the source, reduce runoff volumes and mimic predevelopment hydrology.

D. Provide procedures and performance standards for stormwater planning and management.

E. Maintain groundwater recharge to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

F. Prevent scour and erosion of stream banks and streambeds.

G. Provide proper operation and maintenance of all stormwater best management practices (BMPs) that are implemented within the Borough.

H. Provide standards to meet NPDES permit requirements.

Section 104. Statutory Authority

The Borough is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, The Pennsylvania Municipalities Planning Code, as amended, and/or the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, The Stormwater Management Act.

Section 105. Applicability

All Regulated Activities and all activities that may affect stormwater runoff, including land development and earth disturbance activity, are subject to regulation by this Ordinance.

Section 106. Enactment and Effective Date

This Ordinance is hereby enacted as an Ordinance of the Borough of McKees Rocks, Allegheny County, Pennsylvania, and shall take effect immediately upon final passage by Borough Council and approval by the Mayor.

Section 107. Repealer

Any other ordinance provision(s) or regulation of the Borough that is inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only, including, but not limited to, the Borough of McKees Rocks Subdivision and Land Development Ordinance ("SALDO") and other references to and requirements for stormwater, stormwater facilities, and regulated stormwater activities.

Section 108. Severability

In the event that a court of competent jurisdiction declares any section or provision of this Ordinance invalid, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

Section 109. Compatibility with Other Requirements

Approvals issued and actions taken under this Ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulation or ordinance.

A. All regulated earth disturbance activities are subject to permit requirements by the DEP under regulations at 25 Pa.Code, Chapter 102.

B. Work within surface waters of the commonwealth, including wetlands and natural drainage ways, is subject to permit by the DEP under 25 Pa.Code, Chapter 105.

C. Any stormwater management facility that would be located on a state highway right-of-way, or require access from a state highway, shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

Section 110. Erroneous Permit

Any permit or authorization issued or approved based on false, misleading or erroneous information provided by an Applicant is void without the necessity of any proceedings for revocation. Any work undertaken or use established pursuant to such permit or other authorization is unlawful. No action may be taken by Borough Council, a board, agency, commission, agent, or employee of the Borough purporting to validate such a violation.

Section 111. Liability Disclaimer

The granting of any approval under this stormwater management ordinance, or compliance with this ordinance, shall not constitute any guarantee or warranty of any kind by the Borough, of the practicability or safety of any structure, use, or other plan proposed, and shall create no liability upon or cause of action against the Borough or its representatives for any damage that may result pursuant thereto.

Section 112. Waivers

A. If the Borough, by and through the Borough Engineer, determines that any requirement under this Ordinance cannot be achieved for a particular regulated activity, the Borough may, after an evaluation of alternatives, approve measures other than those in this Ordinance, subject to Section 110, paragraph C, pursuant to the process described in this Section. **The proposed area of disturbance shall be less than one (1) acre.**

B. The request for a modification or waiver shall originate with the Applicant, shall be in writing, and shall accompany the Stormwater Management Site Plan submitted to the Borough. The request shall provide the facts on which the request is based, the provisions of the Ordinance involved, and the proposed modification. The Borough Engineer shall review the request to determine if it meets the requirements of the Ordinance, including paragraph C below, and make a recommendation to Borough Council or its appointed hearing officer. Borough Council may grant the waiver or modification after a Local Agency hearing as provided in paragraph E below.

C. Waivers or modifications of the requirements of this Ordinance may be approved by the Borough if enforcement will exact undue hardship because of unique physical circumstances or conditions peculiar to the land in question, provided that the modifications will not be contrary or detrimental to the public interest and will achieve the intended outcome, and that the purpose of the Ordinance is preserved. Hardship must be due to such unique physical circumstances or conditions and not to circumstances or conditions generally created by the provisions of the Stormwater Management Ordinance. Cost or financial burden shall not be considered a hardship. Modifications shall not substantially or permanently impair the appropriate use or development of adjacent property. A request for modifications shall be in writing and accompany the Stormwater Management Site Plan submission, as directed in Section 110, paragraph B above.

D. Under no circumstances may the Borough grant a waiver or modification of any regulated stormwater activity involving earth disturbance greater than or equal to one (1) acre. Such requests are beyond the jurisdiction of the Borough.

E. Consideration of waivers or requests for modification shall be filed with the Borough Manager, along with any hearing fee adopted by Council by Resolution. Hearings are not public, unless specifically requested to be public by the Applicant in writing at the time he/she/it files a request for waiver and/or modification from this Ordinance. Borough Council may appoint a third-party hearing officer to conduct the local agency hearing and make a recommendation to Council, who shall act upon the recommendation at a public meeting. Appeals from Borough Council determinations must

be filed with the Court of Common Pleas of Allegheny County, consistent with relevant law and local procedural rules.

Section 113. Version of Regulations and Standards

Any reference to a statute, regulation or standard, shall be interpreted to refer to the latest or most current version of that document.

ARTICLE II – DEFINITIONS

For the purposes of this Ordinance, certain terms and words used herein shall be interpreted as follows:

A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.

B. The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.

C. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

These definitions do not necessarily reflect the definitions contained in pertinent regulations or statutes, and are intended for this Ordinance only.

Act 167 - The Borough is empowered to regulate land use activities that affect runoff and surface and groundwater quality and quantity by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Storm Water Management Act."

Agricultural Activity – Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

Applicant – A landowner, developer, or other person who has filed an application to the Borough for approval to engage in any regulated activity at a project site that is located within the Borough.

Best Management Practice (BMP) – Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from regulated activities, to meet state water quality requirements, to promote groundwater recharge, and to otherwise meet the purposes of this Ordinance. Stormwater BMPs are commonly grouped into one of two broad categories or measures: "structural" or "non-structural." In this Ordinance, non-structural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with stormwater runoff, whereas structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat stormwater runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices, from large-scale retention ponds and constructed wetlands, to small-scale underground treatment systems, infiltration facilities, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, riparian or forested buffers, sand filters, detention basins, and manufactured devices. Structural stormwater BMPs are permanent appurtenances to the project site.

Borough – McKees Rocks Borough, Allegheny County, Pennsylvania.

Borough Engineer – See Designated Plan Reviewer.

Conservation District – A conservation district, as defined in Section 3(c) of the Conservation District Law (3 P. S. § 851(c)) that has the authority under a delegation agreement executed with DEP to administer and enforce all or a portion of the regulations promulgated under 25 Pa. Code 102.

Design Storm – The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24 hours) used in the design and evaluation of stormwater management systems. Also see Return Period.

Designated Plan Reviewer – A Qualified Professional as defined herein, or organization such as the Allegheny County Conservation District, that has been designated by the Borough to be the reviewer of SWM Site Plans for the Borough.

Detention Basin – An impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely in a designed period after a rainfall event, and to become dry until the next rainfall event.

Detention Volume – The volume of runoff that is captured and released into the waters of the Commonwealth at a controlled rate.

DEP – The Pennsylvania Department of Environmental Protection.

Development Site (Site) – See Project Site.

Disturbed Area – An unstabilized land area where an earth disturbance activity is occurring or has occurred.

Earth Disturbance Activity – A construction or other human activity which disturbs the surface of the land, including, but not limited to: clearing and grubbing; grading; excavations; embankments; road maintenance; building construction; and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials.

Erosion – The natural process by which the surface of the land is worn away by water, wind, or chemical action.

Existing Condition – The dominant land cover during the 5-year period immediately preceding a proposed regulated activity.

FEMA – Federal Emergency Management Agency.

Floodplain – Any land area susceptible to inundation by water from any natural source or delineated by applicable FEMA maps and studies as being a special flood hazard area. Also includes areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania DEP Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

Floodway – The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year floodway, it is assumed--absent evidence to the contrary--that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

Forest Management/Timber Operations – Planning and activities necessary for the management of forestland. These include conducting a timber inventory, preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation, and reforestation.

Green Infrastructure – Systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater on the site where it is generated.

Groundwater – Water beneath the earth's surface that supplies wells and springs and is within the saturated zone of soil and rock.

Groundwater Recharge – The replenishment of existing natural underground water supplies from precipitation or overland flow.

Hydrologic Soil Group (HSG) – Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSGs (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The NRCS defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D (NRCS[1,2]).

Impervious Surface (Impervious Area) – A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) shall include, but not be limited to: roofs; additional indoor living spaces, patios, garages, storage sheds and similar structures; and any new streets or sidewalks. Decks, parking areas, and driveway areas are counted as impervious areas if they directly prevent infiltration.

Invasive Species – DCNR defines invasive plants as those species that are not native to the state, grow aggressively, and spread and displace native vegetation. For a list of invasive species, see http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010314.pdf.

Infiltration – Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

Land Development (Development) – Inclusive of any or all of the following meanings: (i) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving (a) a group of two or more buildings or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features; (ii) any subdivision of land; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Low Impact Development (LID) – Site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater. LID can be applied to new development, urban retrofits, and revitalization projects. LID utilizes design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large-scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost-effective landscape features located on-site.

Municipality – A city, borough, township or other similar general purpose unit of government, excluding county government.

Native Vegetation – Plant species that have historically grown in Pennsylvania and are not invasive species as defined herein.

NRCS – USDA Natural Resources Conservation Service (previously SCS).

Peak Discharge – The maximum rate of stormwater runoff from a specific storm event.

Pervious Area – Any area not defined as impervious.

Project Site – The specific area of land where any regulated activities in the Borough are planned, conducted, or maintained.

Qualified Professional – Any person licensed by the Pennsylvania Department of State or otherwise qualified under Pennsylvania law to perform the work required by this Ordinance.

Regulated Activities – Any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated Earth Disturbance Activity – Activity involving earth disturbance subject to regulation under 25 Pa. Code 92, 25 Pa. Code 102, or the Clean Streams Law.

Release Rate – The percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.

Release Rate District – A watershed or portion of a watershed for which a release rate has been established by an adopted Act 167 Stormwater Management Plan.

Retention Volume/Removed Runoff – The volume of runoff that is captured and not released directly into the surface waters of this Commonwealth during or after a storm event.

Return Period – The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average once every 25 years; or stated in another way, the probability of a 25-year storm occurring in any one year is 0.04 (i.e., a 4% chance).

Riparian Buffer – A permanent vegetated area of trees and shrubs located adjacent to streams, lakes, ponds and wetlands.

Runoff – Any part of precipitation that flows over the land.

Sediment – Soils or other materials transported by surface water as a product of erosion.

State Water Quality Requirements – The regulatory requirements to protect, maintain, reclaim, and restore water quality under Title 25 of the Pennsylvania Code and the Clean Streams Law.

Stormwater – Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

Stormwater Management Facility – Any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to: detention and retention basins; open channels; storm sewers; pipes; and infiltration facilities.

Stormwater Management Site Plan – The plan prepared by the developer or the developer's representative indicating how stormwater runoff will be managed at the development site in accordance with this Ordinance. **Stormwater Management Site Plan** will be designated as **SWM Site Plan** throughout this Ordinance.

Stream - A channel or conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Subdivision – As defined in The Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247.

USDA – United States Department of Agriculture.

Waters of this Commonwealth – Any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

Watercourse – See Stream.

Watershed – Region or land area drained by a river, watercourse, or other surface water of this Commonwealth to a downstream point.

Wetland – Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.

ARTICLE III – STORMWATER MANAGEMENT STANDARDS

Section 301. General Requirements

A. For all regulated activities, unless preparation of an SWM Site Plan is specifically exempted in Section 302:

1. Preparation and implementation of an approved SWM Site Plan is required.
2. No regulated activities shall commence until the Borough issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.

B. SWM Site Plans approved by the Borough, in accordance with Section 406, shall be on site throughout the duration of the regulated activity.

C. These standards apply to the landowner and any person engaged in regulated activities.

D. For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual[4]), No. 363-2134-008, as amended and updated.

E. Impervious areas:

1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.
2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
3. For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this Ordinance; except that the volume controls in Section 303 and the peak rate controls of Section 304 do not need to be retrofitted to existing impervious areas that are not being altered by the proposed regulated activity.

F. Stormwater flows onto adjacent or downstream property shall not be created, increased, decreased, relocated, impeded, or otherwise altered without written notification of the affected property owner(s). Notification shall include a description of the proposed development and the stormwater flows that are being created, increased, decreased, relocated, impeded, or otherwise altered. Adjacent property shall at a minimum include any property having a shared boundary with the subject property of the SWM Site Plan, however, if in the judgement of the Borough Engineer additional properties are being affected, additional notifications may be required. Proof of notification (signed postal receipt for example) shall be included as part of the SWM Plan submission to the Borough. Such stormwater flows shall be subject to the requirements of this Ordinance.

G. All regulated activities shall include such measures as necessary to:

1. Protect health, safety, and property.
2. Meet the water quality goals of this Ordinance by implementing measures to:

    a. Minimize disturbance to floodplains, wetlands, and wooded areas.
    b. Maintain or extend riparian buffers.
    c. Avoid erosive flow conditions in natural flow pathways.
    d. Minimize thermal impacts to waters of this Commonwealth.
    e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.

3. Incorporate methods described in the *Pennsylvania Stormwater Best Management Practices Manual* (BMP Manual[3]). If methods other than green infrastructure and LID methods are proposed to achieve the volume and rate controls required under this Ordinance, the SWM Site Plan must include a detailed justification, acceptable to the Borough Engineer, demonstrating that the use of LID and green infrastructure is not practicable.

H. Infiltration BMPs should be dispersed throughout the project site at strategic locations, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.

I. Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm.

J. The design storm precipitation depths to be used in the analysis of peak rates of discharge shall be as obtained in PennDOT's Drainage Manual, Publication 584, Appendix 7A; or obtained from the latest version of the Precipitation-Frequency Atlas of the United States, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14[5] can be accessed at: http://hdsc.nws.noaa.gov/hdsc/pfds/.

K. For all regulated activities, SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law, and the Storm Water Management Act.

L. Various BMPs and their design standards are listed in the BMP Manual[3].

M. The Borough may, after consultation with DEP, approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including, but not limited to, the Clean Streams Law.

Section 302. Exemptions

A. Regulated activities that result in cumulative earth disturbances less than one (1) acre are exempt from the requirements in Section 401 of this ordinance except as provided in paragraph B below.

B. Earth disturbances between one-quarter (0.25) acre (10,890 square feet) and one (1) acre of earth disturbance must submit a SWM Site Plan to the Borough which shall consist of the following items and related supportive material needed to determine compliance with Sections 303 through 305. The applicant can use the protocols in the Small Project Stormwater Management Site Plan per Appendix C.

1. General description of proposed stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.
2. An erosion and sediment control plan (including all reviews and letters of adequacy from the Conservation District when required).
3. Limits of earth disturbance, including the type and amount of impervious area that is proposed; proposed structures, roads, paved areas, and buildings; and a statement, signed by the Applicant, acknowledging that any revision to the approved drainage plan must be approved by the Borough, and that a revised erosion and sediment control plan must be submitted to the Conservation District for approval when required, or to the Borough.
4. All stormwater management facilities must be located on a plan and described in detail; and all calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

C. Agricultural activity is exempt from the SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.

D. Forest management and timber operations are exempt from the SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.

E. Roadway resurfacing and maintenance projects, which do not increase impervious area, and underground infrastructure projects are exempt from the provisions of this Ordinance, provided the activities meet the requirements of all other Municipal, State, and Federal requirements.

F. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 301.D. through J.

G. The Borough may deny or revoke any exemption pursuant to this Section at any time for any project that the Borough believes may pose a threat to public health and safety or the environment.

H. Voluntary Green Stormwater Infrastructure (GSI) retrofit projects that are solely intended to better manage runoff from existing development and are not part of new development or redevelopment, are exempt from the stormwater management provisions of this Ordinance. This does not exempt such projects from any other municipal, state, or federal regulation.

Section 303. Volume Controls

The green infrastructure and low impact development practices provided in the BMP Manual[3] shall be utilized for all regulated activities wherever possible. Water volume controls shall be implemented using the *Design Storm Method* in Subsection A or the *Simplified Method* in Subsection B below. Water volume controls shall be implemented using the Design Storm Method in Subsection A or the Simplified Method in Subsection B below, or alternative design criteria as allowed by PA Code Title 25, Chapter 102.

A. The *Design Storm Method* (CG-1 in the BMP Manual[3]) is applicable as a method to any size of regulated activity. This method requires detailed modeling based on site conditions. The following shall be incorporated into the CG-1 method:

1. Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year 24-hour duration precipitation.
2. At least the first one inch of runoff from the net increase in impervious surfaces shall be permanently removed from the runoff flow, i.e., it shall not be released into the surface waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration. If the developer provides justification that the listed removal options are not feasible, and the Borough Engineer agrees, runoff shall be detained in a facility designed for a 24 to 72 hour dewatering time in an area with a dedicated stormwater system (not contributory to a combined sewer system) and shall be detained in a facility designed for a 72 hour dewatering time in an area contributory to a combined sewer system before discharge to local stormwater systems or the environment.
3. For modeling purposes:

    a. Existing (pre-development) non-forested pervious areas must be considered meadow in good condition.
    b. For sites that discharge to separate storm sewer systems, 20% of existing impervious area, when present, shall be considered meadow in good condition in the model for existing conditions.
    c. For sites that discharge to combined sanitary sewer/storm sewer systems, 30% of existing impervious area, when present, shall be considered meadow in good condition in the model for existing conditions, except for sites within the Ella Street Drainage Basin, which shall be 40%.

B. The *Simplified Method* (CG-2 in the BMP Manual[3]) provided below is independent of site conditions and should be used if the *Design Storm Method* is not followed. This method is not applicable to regulated activities greater than one acre or for projects that require design of stormwater storage facilities. For new impervious surfaces:

1. Stormwater facilities shall capture at least the first two (2) inches of runoff from the net increase in impervious surfaces.
2. At least the first one inch of runoff from the net increase in impervious surfaces shall be permanently removed from the runoff flow, i.e., it shall not be released into the surface waters of this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration. If the developer provides justification that the listed removal options are not feasible, and the Borough Engineer agrees, runoff shall be detained in a facility designed for a 24 hour dewatering time in an area with a dedicated stormwater system (not contributory to a combined sewer system) and shall be detained in a facility designed for a 72 hour dewatering time in an area contributory to a combined sewer system before discharge to local stormwater systems or the environment.
3. Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first 0.5 inch of the permanently removed runoff should be infiltrated.
4. This method is exempt from the requirements of Section 304, Rate Controls.

C. Applicants shall select volume control techniques, or a combination of techniques, which are most suitable to control stormwater runoff from the development site. Not all volume control methods may be suitable or advisable at a particular development site. The applicant shall consider factors such as contributing area, infiltration rate of soil, depth to bedrock, seasonal high water table, proximity to well heads, erodibility of soils, wildlife habitat, effects on nearby structures, and maintenance requirements.

D. All infiltration facilities shall be set back at least 15-feet from all structures with sub-grade elements (e.g. basements and foundation walls).

Section 304. Rate Controls

Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storm events. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the pre-development analysis for 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement. Peak flows should be computed using the methods included in the Chapter titled "Stormwater Calculations and Methodology" of the PADEP Stormwater Management BMP Manual.

A. Applicants shall select runoff control techniques, or a combination of techniques, which are most suitable to control stormwater runoff from the development site. Not all stormwater control methods may be suitable or advisable at a particular development site. The applicant shall consider factors such as contributing area, seasonal high water table, erodibility of soils, wildlife habitat, and maintenance requirements.

B. Detention facilities shall be equipped with an outlet structure to provide discharge control of the designated storm events. Provisions shall also be made to safely pass the 100-year storm runoff through an emergency overflow, without breaching or otherwise damaging the facilities.

C. Sites with detention facilities with embankments greater than 10-feet in height shall be accompanied by a geotechnical report with recommendations for embankment construction. All embankments shall be constructed with proper compaction and seepage controls and in

accordance with "Grading" requirements specified in the Subdivision and Land Development Ordinance.

D. Other considerations, which should be incorporated into the design of detention facilities, include:

1. Inflow and outflow structures shall be designed and installed to prevent erosion, and the bottoms of detention facilities should be protected from soil erosion.
2. Control and removal of debris shall be a design consideration.
3. Interior side slopes shall not exceed a ratio of 2.5:1 horizontal to vertical.
4. Restriction of access to facilities (fence, wall, etc.) may be required, depending on the depth, slope, and location of the facility.
5. Outflow structures shall be constructed with non-clogging/childproof trash racks over all openings exceeding 12-inches in diameter and with anti-vortex devices over circular risers or standpipes.
6. The minimum freeboard shall be 1-foot.
7. Landscaping for the facility shall be provided, which harmonizes with the surrounding area.
8. Facilities shall be located to facilitate maintenance, including an accessible route into the facility, and considering frequency and type of equipment that will be required.

Section 305. Collection/Conveyance Facilities

A. All sites shall be graded to provide positive drainage away from and around building structures in order to reduce the potential for flooding damage.

B. Collection/conveyance facilities should not be installed parallel to and directly at the top or bottom of major embankments in order to avoid the possibility of failing or causing the embankment to fail.

C. Collection/conveyance facilities shall be designed to carry the 25-year storm peak flow rate from the contributing drainage area and convey it to the nearest suitable outlet such as a rate control facility, an existing storm sewer, or a natural watercourse.

1. The minimum pipe size shall be 15" diameter and the minimum grade shall be 1%, unless approved by the Borough Engineer.
2. Where a proposed storm sewer connects with an existing storm sewer, the applicant shall demonstrate that sufficient capacity exists in the downstream system to handle the additional flows.

D. Where drainage swales or open channels are used, they shall be suitably lined to prevent erosion and designed to avoid excessive velocities.

E. Storm sewer outfalls shall be suitably lined and equipped with energy dissipation devices to prevent erosion.

1. Where applicable, storm sewer outfalls shall meet the requirements of PADEP Chapter 105 for stream encroachments.

F. See Appendix A for standard stormwater construction details. The details in Appendix A may be amended by Resolution of Council from time to time. Additional construction standards are as follows:

1. For pipe sizes of 24 inches or less, there shall be a maximum spacing of 400 feet between manholes or catch basins. For pipe sizes larger than 24 inches, there shall be a maximum spacing of 600 feet between manholes or catch basins. All points of abrupt change in alignment or grade, and all changes in pipe size shall have a manhole or catch basin.
2. Trench bedding and backfill shall be per the Borough's standard construction detail.

3. Utilize pipe anchors when the storm pipe gradient exceeds 20%.
4. Catch basin located in paved areas shall have bicycle safe grates.

Section 306. Riparian Buffers

A. In order to protect and improve water quality, a Riparian Buffer Easement shall be created and recorded as part of any subdivision or land development that encompasses a Riparian Buffer. The intent of this ordinance in establishing a Riparian Buffer is to protect and improve stream water quality. The Riparian Buffer is intended to slow overland flow to the stream through the presence of native grasses, trees and shrubs, allowing infiltration/groundwater recharge; causing deposition of sediment, nutrients, pesticides, and other pollutants in the buffer rather than in the stream; and reducing erosion by providing stream bank stabilization. The trees provide shade for streams; keeping waters cooler and reducing evaporation.

B. Except as required by PA Code Title 25 Chapter 102, the Riparian Buffer Easement shall be required for all streams (as defined in Article II) with a contributing watershed area of greater than 10 acres. The Riparian Buffer Easement shall be measured to be a minimum of 35 feet from the top of the streambank (on each side).

C. Minimum Management Requirements for Riparian Buffers.

1. No use or construction within the Riparian Buffer shall be permitted that is inconsistent with the intent of the Riparian Buffer as described in Section 305.A.
2. Existing native vegetation shall be protected and maintained within the Riparian Buffer Easement.
3. Whenever practicable, invasive vegetation shall be actively removed and the Riparian Buffer Easement shall be planted with native trees, shrubs and other vegetation to create a diverse native plant community appropriate to the intended ecological context of the site.

D. The Riparian Buffer Easement shall be enforceable by the Borough and shall be recorded in the Allegheny County Recorder of Deeds Office, so that it shall run with the land and shall limit the use of the property located therein. The easement shall allow for the continued private ownership and shall count toward the minimum lot area required by Zoning.

E. Any permitted use within the Riparian Buffer Easement shall be conducted in a manner that will maintain the extent of the existing 100-year floodplain, improve or maintain the stream stability, and preserve and protect the ecological function of the floodplain.

F. Stormwater drainage pipes shall be permitted within the Riparian Buffer Easement, but they shall cross the Easement in the shortest practical distance. Other structural stormwater management facilities are not permitted within the Riparian Buffer Easement.

G. The following conditions shall apply when public and/or private recreation trails are permitted by the Borough within Riparian Buffers:

1. It is preferred that trails be designed to be permeable and for non-motorized use only; however, impermeable trails are permitted provided they have adequate drainage
2. Trails shall be designed to have the least impact on native plant species and other sensitive environmental features.

H. Septic drainfields and sewage disposal systems shall not be permitted within the Riparian Buffer Easement and shall comply with setback requirements established under 25 Pa. Code Chapter 73.

I. Underground utilities shall be permitted within the Riparian Buffer Easement; however, work shall be performed to minimize disturbance area and removal of trees. Restoration within the Riparian Buffer Easement shall be with native species of trees, grasses, and other plantings. One tree shall

be planted for each tree removed and the restoration shall be designed by a Registered Professional with the requisite experience. Aboveground utilities shall only be permitted to cross the Easement perpendicular to the Easement or in the shortest practical distance. Existing utilities may remain and be maintained as required.

ARTICLE IV – STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. Plan Requirements

Appropriate sections from the Borough's Subdivision and Land Development Ordinance, and other applicable local ordinances, shall be followed in preparing the SWM Site Plans.

The Borough shall not approve any SWM Site Plan that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Article, when a SWM Site Plan is found to be deficient, the Borough may either disapprove the submission and require a resubmission, or in the case of minor deficiencies, the Borough may accept submission of modifications.

The following items shall be included in the SWM Site Plan:

A. Provisions for permanent access or maintenance easements for all physical SWM BMPs, such as ponds and infiltration structures, as necessary to implement the Operation and Maintenance (O&M) Plan discussed in paragraph C.10 below.

B. The following signature block for the Borough:

"The Borough Engineer, on this date, (Signature date), has reviewed and hereby certifies that the SWM Site Plan meets all design standards and criteria of the McKees Rocks Borough Stormwater Management Ordinance No. (number assigned to ordinance), except where waivers have been granted as noted on the Plan. The review is based on a survey and plan prepared by others and assumes that all information is correct and valid as submitted."

C. The SWM Site Plan shall provide the following information:

1. General Format: The SWM Site Plan shall be drawn to a scale of not less than 1 inch=200 feet. All sheets shall contain a title block, name and address of applicant and engineer, scale, north arrow, legend, and date of preparation.
2. The overall stormwater management concept for the project, and including.

    a. Methods for collecting, conveying, and storing stormwater runoff.
    b. Information on the exact type, location, sizing, design, and construction of all proposed facilities and the relationship to the existing watershed drainage system.

3. A determination of site conditions in accordance with the BMP Manual3. A detailed site evaluation shall be completed for projects proposed in environmentally sensitive areas, such as brownfields.
4. Stormwater runoff design computations and documentation as specified in this Ordinance, or as otherwise necessary to demonstrate that the maximum practicable measures have been taken to meet the requirements of this Ordinance, including the recommendations and general requirements in Section 301, and including.

    a. Drainage area delineations – Pre- and Post-Development drainage areas used in computing the runoff calculations.
    b. Land Cover – Existing and proposed land cover classifications used in computing the runoff calculations.
    c. Soils – An overlay of the soil types, boundaries, and classifications used in computing the runoff calculations.
    d. Time of Concentration Path delineations – Existing and proposed flow paths used in computing the runoff calculations.

5. Expected project time schedule.

6. A soil erosion and sediment control plan, where applicable, as prepared for and submitted to the approval authority.
7. The effect of the project (in terms of runoff volumes, water quality, and peak flows) on surrounding properties and aquatic features and on any existing stormwater conveyance system that may be affected by the project.
8. Plan and profile drawings of all SWM BMPs, including drainage structures, pipes, open channels, and swales.
9. SWM Site Plan shall show the locations of existing and proposed on-lot wastewater facilities and water supply wells, property boundaries, existing and proposed topography, natural features, flood plain boundaries, point(s) of interest, utilities, and potential utility conflicts.
10. The SWM Site Plan shall include an O&M Plan for all existing and proposed physical stormwater management facilities. This plan shall address long-term ownership and responsibilities for O&M including type and schedule/frequency of maintenance activities, personnel and equipment requirements, estimated annual maintenance costs, and method of financing continuing O&M.
11. A justification, acceptable to the Borough Engineer, must be included in the SWM Site Plan if BMPs other than green infrastructure methods and LID practices are proposed to achieve the volume, rate, and water quality controls under this Ordinance.
12. Professional Certification: The SWM Site Plan and stormwater runoff design computations must be prepared and sealed by a registered professional, with training and expertise in hydrology and hydraulics.
13. A list of any approvals/permits related to stormwater management that will be required from other government agencies. Proof of approvals may be requested by the Borough Engineer.

Section 402. Plan Submission

Copies of the SWM Site Plan shall be submitted as follows:

- One copy to the Borough.
- One copy to the Borough Engineer.
- One copy to the Allegheny County Sanitary Authority (in areas with combined sewer systems).
- One (or more) copies to the Allegheny County Conservation District (when required/requested).

If the proposed plan has a direct impact on stormwater runoff in an adjacent municipality, an additional copy of the plan may be requested for review by the adjacent municipality.

Section 403. Plan Review

A. The Borough has designated the Borough Engineer as the Designated Plan Reviewer of SWM Site Plans for the Borough, and shall be understood to be the reviewer where indicated as the Borough within this Ordinance.

B. SWM Site Plans shall be reviewed by the Borough for consistency with the provisions of this Ordinance.

C. The Borough shall notify the applicant in writing within 45 days whether the SWM Site Plan is approved or disapproved or requires additional documentation. If the SWM Site Plan involves a Subdivision and Land Development Plan, the notification shall occur within the time period allowed by the Municipalities Planning Code (90 days). If a longer notification period is provided by other statute, regulation, or ordinance, the Applicant will be so notified by the Borough.

D. For any SWM Site Plan that proposes to use any BMPs other than green infrastructure and LID practices to achieve the volume and rate controls required under this Ordinance, the Borough will not approve the SWM Site Plan unless it determines that green infrastructure and LID practices are not practicable.

E. If the Borough disapproves the SWM Site Plan, the Borough will state the reasons for the disapproval in writing. The Borough also may approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing.

F. The applicable review fee, in accord with Article VI, must accompany a resubmission of a disapproved SWM site plan.

G. Borough determinations on SWM Site Plans shall be made by Borough Council at public meetings under the Sunshine Law.

Section 404. Modification of Plans

A modification to a submitted SWM Site Plan that involves a change in SWM BMPs or techniques, or that involves the relocation or redesign of SWM BMPs, or that is necessary because soil or other conditions are not as stated on the SWM Site Plan, as determined by the Borough Engineer, shall require a resubmission of the modified SWM Site Plan in accordance with this Article.

Section 405. Resubmission of Disapproved SWM Site Plans

A disapproved SWM Site Plan may be resubmitted, with the revisions addressing the Borough's concerns, to the Borough in accordance with this Article. The applicable review fee, in accord with Article VI, must accompany a resubmission of a disapproved SWM Site Plan.

Section 406. Authorization to Construct and Term of Validity

The Borough's approval of an SWM Site Plan authorizes the regulated activities contained in the SWM Site Plan for a maximum term of validity of 5 years following the date of approval. The Borough may specify a term of validity shorter than 5 years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the Borough signs the approval for an SWM Site Plan. If an approved SWM Site Plan is not completed according to Section 407 within the term of validity, then the Borough may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Borough shall be resubmitted in accordance with Section 405 of this Ordinance.

Section 407. Record Drawings, Completion Certificate, and Final Inspection

A. The Applicant and/or Developer shall be responsible for providing record drawings of all SWM BMPs included in the approved SWM Site Plan. The record drawings and an explanation of any discrepancies with the construction plans shall be submitted to the Borough.

B. The record drawing submission shall include a certification of completion signed by a qualified professional verifying that all permanent SWM BMPs have been constructed according to the approved plans and specifications. The latitude and longitude coordinates for all permanent SWM BMPs must also be submitted, at the central location of the BMPs. If any licensed qualified professionals contributed to the construction plans, then a licensed qualified professional must sign the completion certificate.

C. The Borough may conduct inspections during construction as it deems appropriate. If inspections performed by the Borough reveal deficiencies from the submitted and approved SWM Site Plan, the Borough may request corrective actions. Any corrective action shall be at the cost of the stormwater facility owner. Failure to make corrections as directed shall constitute a violation of this Ordinance, subject to penalties as described herein.

D. After receipt of the completion certification by the Borough, the Borough may conduct a final inspection.

ARTICLE V – OPERATION AND MAINTENANCE

Section 501. Responsibilities of Developers and Landowners

A. The Borough, upon recommendation of the Borough Engineer, shall make the final determination on the continuing maintenance responsibilities, prior to final approval of the SWM Site Plan. The Borough may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the Borough will accept the facilities. The Borough reserves the right to reject or accept the ownership and operating responsibility for any portion of the stormwater management controls.

B. Facilities, areas, or structures used as SWM BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.

C. The O&M Plan shall be recorded as a restrictive deed covenant that runs with the land.

D. The Borough may take enforcement actions against an Applicant and/or landowner for any failure to satisfy the provisions of this Article.

Section 502. Operation and Maintenance Agreements

A. Prior to final approval of the SWM Site Plan, the landowner shall sign and record an Operation and Maintenance (O&M) Agreement (see Appendix B) covering all stormwater control facilities which are to be privately owned.

1. The landowner, successor and assigns shall maintain all facilities in accordance with the approved maintenance schedule in the O&M Agreement.
2. The landowner shall convey to the Borough conservation easements to assure access for periodic inspections by the Borough and maintenance, as necessary.
3. The landowner shall keep on file with the Borough the name, address, and telephone number of the person or company responsible for maintenance activities; in the event of a change, new information shall be submitted by the owner to the Borough within ten (10) working days of the change.

B. The landowner is responsible for operation and maintenance (O&M) of the SWM BMPs. If the landowner fails to adhere to the O&M Agreement, the Borough may perform the services required and charge the landowner appropriate fees. Nonpayment of fees may result in a lien against the property.

C. The Operation and Maintenance (O&M) Agreement shall be subject to the review and approval of the Borough's solicitor.

Section 503. Municipal Stormwater Maintenance Fund

In conjunction with the Operation and Maintenance (O&M) Agreement, the landowner shall pay a specified amount to the Municipal Stormwater Maintenance Fund to help defray the cost of periodic inspections and maintenance. The amount of the deposit shall be determined as follows:

A. If the facility is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the Borough for a period of ten (10) years, as estimated by the Borough Engineer. After that time period, inspections will be done at the expense of the Borough.

B. If the facility is to be owned and maintained by the Borough, the deposit shall cover the estimated cost for maintenance and inspections for a period of ten (10) years, as estimated in the approved O&M Plan. After that time period, maintenance and inspections will be done at the expense of the Borough.

C. If a stormwater facility is proposed that also serves as a recreation facility, the Borough may waive or reduce the amount of the deposit based on the value of the land for public recreation purposes.

Section 504. Performance Guarantee

For SWM Site Plans that involve subdivision and land development, the Applicant shall provide a financial guarantee to the Borough for the timely installation and proper construction of all stormwater management controls as required by the approved SWM Site Plan and this Ordinance in accordance with the provisions of Sections 509, 510, and 511 of the Pennsylvania Municipalities Planning Code.

ARTICLE VI – FEES AND EXPENSES

Section 601. General

The Borough may include all costs incurred into the review fee charged to an Applicant. The review fee may include, but not be limited to, costs for the following:

A. Administrative/clerical processing.

B. Review of the SWM Site Plan.

C. Review of a SWM Site Plan resubmission.

D. Attendance at meetings.

E. Inspections.

Fees may be adopted and amended by Resolution of Council from time to time.

ARTICLE VII – PROHIBITIONS

Section 701. Prohibited Discharges and Connections

A. Any drain or conveyance, whether on the surface or subsurface, that allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter a regulated small MS4 or to enter the surface waters of this Commonwealth is prohibited.

B. No person shall allow, or cause to allow, discharges into a regulated small MS4, or discharges into waters of this Commonwealth, which are not composed entirely of stormwater, except (1) as provided in paragraph C below and (2) discharges authorized under a state or federal permit.

C. The following discharges are authorized unless they are determined to be significant contributors to pollution of a regulated small MS4 or to the waters of this Commonwealth:

1. Discharges or flows from firefighting activities.
2. Discharges from potable water sources including water line flushing and fire hydrant flushing, if such discharges do not contain detectable concentrations of Total Residual Chlorine (TRC).
3. Non-contaminated irrigation water, water from lawn maintenance, landscape drainage and flows from riparian habitats and wetlands.
4. Diverted stream flows and springs.
5. Non-contaminated pumped ground water and water from foundation and footing drains and crawl space pumps.
6. Non-contaminated HVAC condensation and water from geothermal systems.
7. Residential (i.e., not commercial) vehicle wash water where cleaning agents are not utilized.
8. Non-contaminated hydrostatic test water discharges, if such discharges do not contain detectable concentrations of TRC.
9. Dechlorinated swimming pool and hot tub discharges, as long as the PADEP guidelines for swimming pool water discharge are followed.

D. In the event that the Borough or DEP determines that any of the discharges identified in Subsection C significantly contribute pollutants to a regulated small MS4 or to the waters of this Commonwealth, the Borough or DEP will notify the responsible person(s) to cease the discharge.

Section 702. Roof Drains and Sump Pumps

Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs wherever feasible.

Section 703. Alteration of SWM BMPs

No person shall modify, remove, fill, landscape, or alter any SWM BMPs, facilities, areas, drainage easements, or structures that were installed as a requirement of this Ordinance without the written approval of the Borough.

ARTICLE VIII – ENFORCEMENT AND PENALTIES

Section 801. Right of Entry

Upon presentation of proper credentials, the Borough or its designated agent may enter at reasonable times upon any property within the Borough to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Ordinance.

Section 802. Inspection

A. The landowner or the owner's designee (including the Borough for dedicated and owned facilities) shall inspect SWM BMPs, facilities and/or structures installed under this Ordinance according to the following frequencies, at a minimum, to ensure the BMPs, facilities and/or structures continue to function as intended:

1. Annually for the first 5 years.
2. Once every 3 years thereafter.
3. During or immediately after the cessation of a 10-year or greater storm.

B. Inspections should be conducted during or immediately following precipitation events. A written inspection report shall be created to document each inspection. The inspection report shall contain the date and time of the inspection, the individual(s) who completed the inspection, the location of the BMP, facility or structure inspected, observations on performance, and recommendations for improving performance, if applicable. Inspection reports shall be submitted to the Borough within 30 days following completion of the inspection.

Section 803. Enforcement

A. It shall be unlawful for a person to undertake any regulated activity except as provided in an approved SWM Site Plan, unless specifically exempted in Section 302.

B. It shall be unlawful to violate Section 703 of this Ordinance.

C. Inspections regarding compliance with the SWM Site Plan are a responsibility of the Borough.

Section 804. Suspension and Revocation

A. Any approval or permit issued by the Borough pursuant to this Ordinance may be suspended or revoked for:

1. Non-compliance with or failure to implement any provision of the approved SWM Site Plan or O&M Agreement.
2. A violation of any provision of this Ordinance or any other applicable law, ordinance, rule, or regulation relating to the Regulated Activity.
3. The creation of any condition or the commission of any act during the Regulated Activity which constitutes or creates a hazard, nuisance, pollution, or endangers the life or property of others.

B. A suspended approval may be reinstated by the Borough when:

1. The Borough has inspected and approved the corrections to the violations that caused the suspension.
2. The Borough is satisfied that the violation has been corrected.

C. An approval that has been revoked by the Borough cannot be reinstated. The applicant may apply for a new approval under the provisions of this Ordinance.

D. If a violation causes no immediate danger to life, public health, or property, at its sole discretion, the Borough may provide a limited time period for the owner to correct the violation. In these cases, the Borough will provide the owner, or the owner's designee, with a written notice of the violation and the time period allowed for the owner to correct the violation. If the owner does not correct the violation within the allowed time period, the Borough may revoke or suspend any, or all, applicable approvals and permits pertaining to any provision of this Ordinance.

E. In the event that a landowner's approval or permit is suspended or revoked by the Borough, he/she/it shall have the right to appeal to Borough Council pursuant to the Local Agency Law. Such appeal must be in writing and filed with the Borough Manager within ten (10) days from the date of the suspension or revocation. Appeals must be accompanied by the requisite appeal fee adopted by Council by Resolution and amended in the same manner from time to time. The appeal must provide the facts on which the appeal is based and the provisions of the Ordinance involved. Hearings are not public, unless specifically requested to be public by the landowner in writing at the time he/she/it files the appeal. Borough Council may appoint a third-party hearing officer to conduct the local agency hearing and make a recommendation to Council, who shall act upon the recommendation at a public meeting. Appeals from Borough Council determinations must be filed with the Court of Common Pleas of Allegheny County, consistent with relevant law and local procedural rules.

Section 805. Penalties

A. Anyone violating the provisions of this Ordinance shall be guilty of a summary offense, and upon conviction, shall be subject to a fine not to exceed $1,000 for each violation, recoverable with costs. Each day that the violation continues shall be a separate offense and penalties shall be cumulative. The Borough shall not be required to notice the landowner or responsible party daily of continuing violations.

B. In addition, the Borough may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity for the enforcement of this Ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

Section 806. Appeals

A. Any person aggrieved by any action of the Borough or its designee, relevant to the provisions of this Ordinance, may appeal to the Borough within 30 days of that action.

B. Such appeal must be in writing and filed with the Borough Manager within ten (10) days from the date of the suspension or revocation. Appeals must be accompanied by the requisite appeal fee adopted by Council by Resolution and amended in the same manner from time to time. The written appeal must provide the facts on which the appeal is based and the provisions of the Ordinance involved. Hearings are not public, unless specifically requested to be public by the landowner in writing at the time he/she/it files the appeal. Borough Council may appoint a third-party hearing officer to conduct the local agency hearing and make a recommendation to Council, who shall act upon the recommendation at a public meeting.

C. Any person aggrieved by any decision of the Borough, relevant to the provisions of this Ordinance, may appeal to the County Court of Common Pleas in the county where the activity has taken place within 30 days of the Borough's decision.

ARTICLE IX – REFERENCES

1. U.S. Department of Agriculture, National Resources Conservation Service (NRCS). *National Engineering Handbook.* Part 630: Hydrology, 1969-2001. Originally published as the *National Engineering Handbook*, Section 4: Hydrology. Available from the NRCS online at: http://www.nrcs.usda.gov/.

2. U.S. Department of Agriculture, Natural Resources Conservation Service. 1986. *Technical Release 55: Urban Hydrology for Small Watersheds*, 2nd Edition. Washington, D.C.

3. Pennsylvania Department of Environmental Protection. No. 363-0300-002 (December 2006), as amended and updated. *Pennsylvania Stormwater Best Management Practices Manual.* Harrisburg, PA.

4. Pennsylvania Department of Environmental Protection. No. 363-2134-008 (March 31, 2012), as amended and updated. *Erosion and Sediment Pollution Control Program Manual.* Harrisburg, PA.

5. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center. 2004-2006. *Precipitation-Frequency Atlas of the United States, Atlas 14*, Volume 2, Version 3.0, Silver Spring, Maryland. Internet address: http://hdsc.nws.noaa.gov/hdsc/pfds/.

THIS ORDINANCE adopted by the Council of McKees Rocks Borough at a duly assembled public meeting held this _____ day of _____, 2018.

(This Ordinance shall take effect immediately.)

ATTEST:_____
(Borough Manager)

McKees Rocks Borough Council:_____
(Council President)

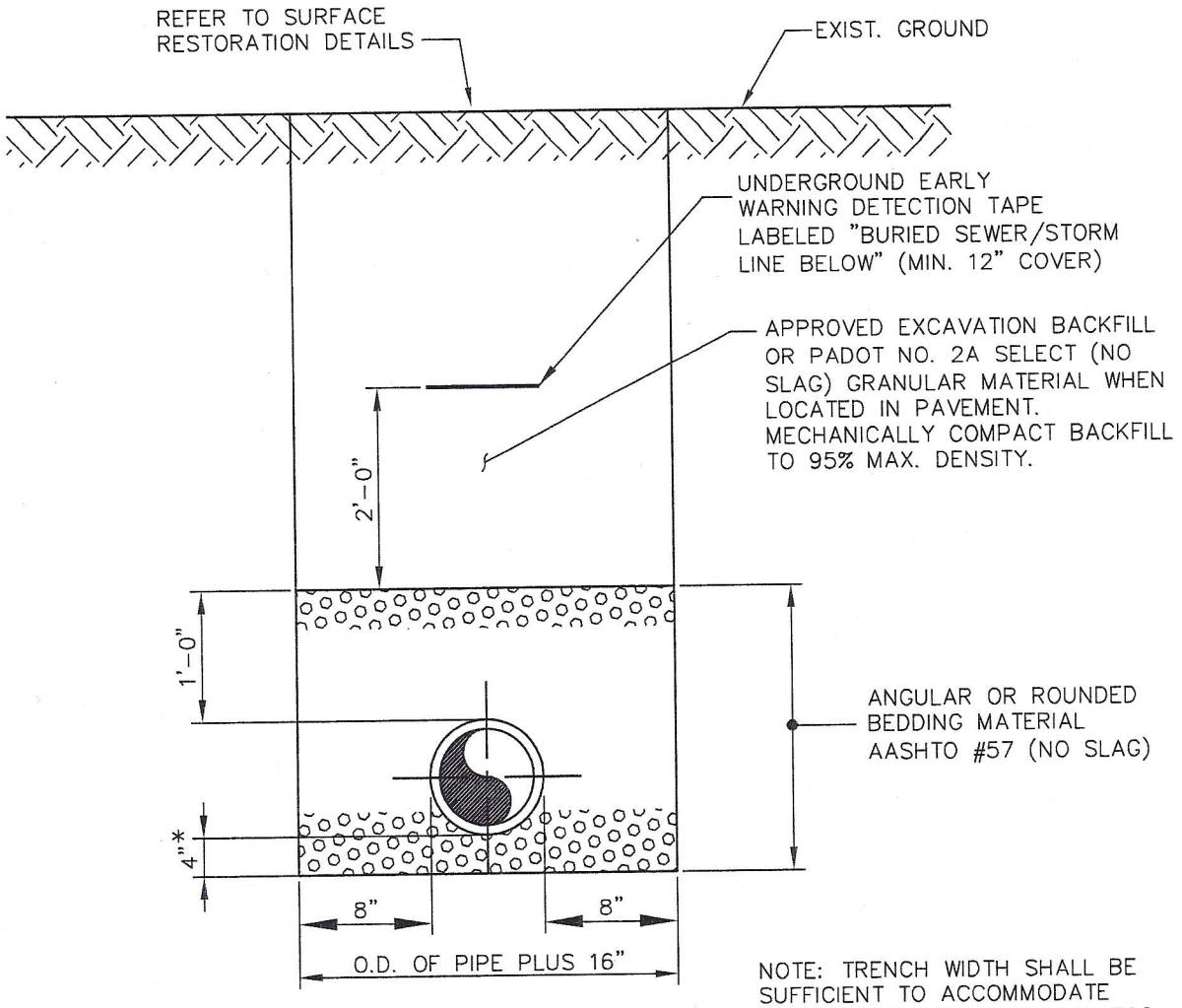
_____
(Mayor)

APPENDIX A

STORMWATER MANAGEMENT DETAILS

McKEES ROCKS BOROUGH
STORMWATER MANAGEMENT DETAILS

MRSD-ST01 – Standard Trench Excavation Detail
MRSD-ST02 – Standard Manhole Frame and Cover
MRSD-ST03 – 48" Precast Concrete Storm Manhole
MRSD-ST04 – Manhole Castings in Paved Areas
MRSD-ST05 – Standard Inlet Box Detail
MRSD-ST06 – Inlet Top Repair/Adjustment



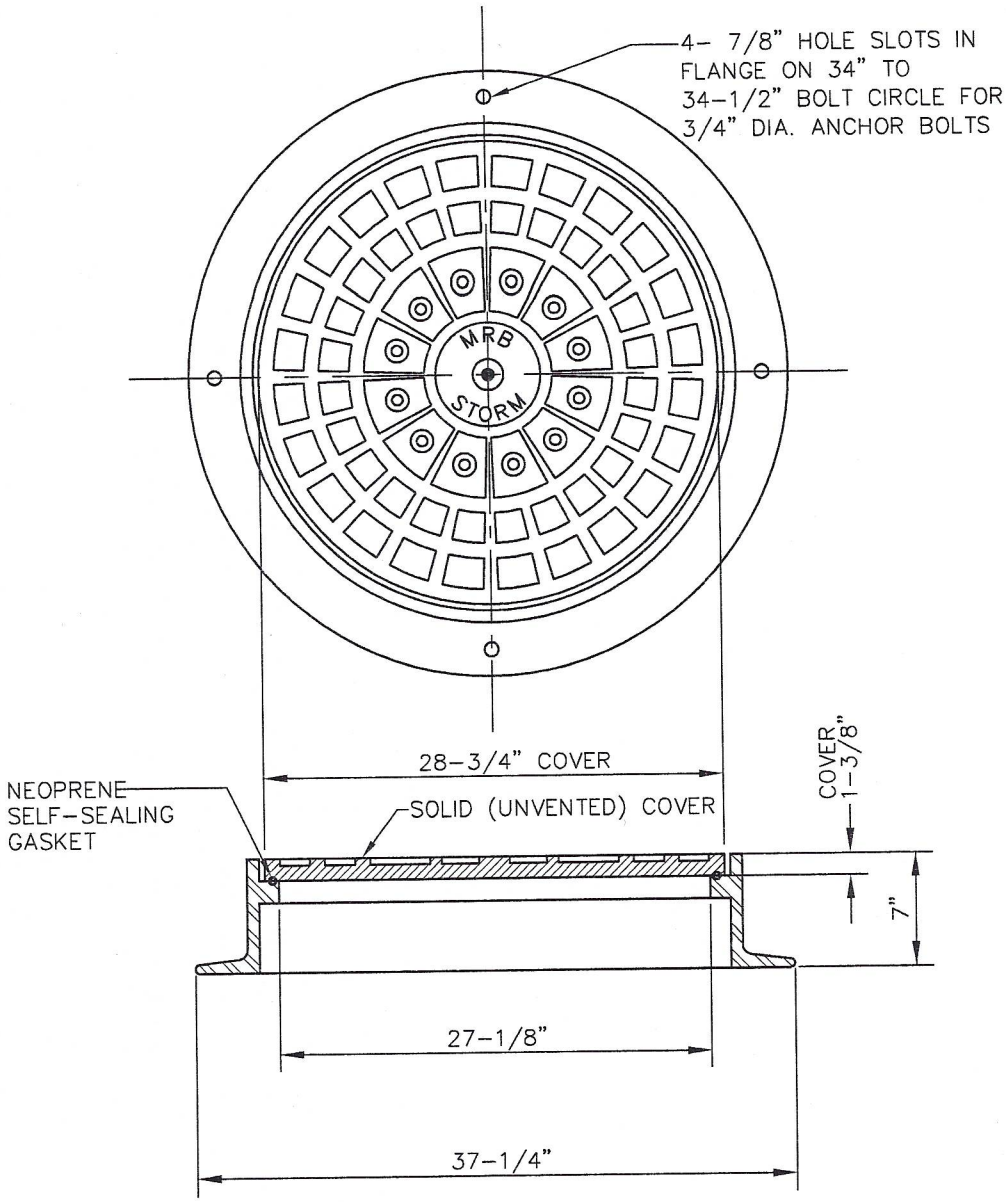
* = INCREASE TO 6" DEPTH IN ROCK OR UNSUITABLE MATERIAL AS DIRECTED

NOTE: TRENCH WIDTH SHALL BE SUFFICIENT TO ACCOMMODATE SHORING EQUIPMENT REGARDLESS OF MAXIMUM PAY WIDTH

STANDARD TRENCH EXCAVATION DETAIL

SCALE: N.T.S.

MCKEES ROCKS BOROUGH	
STANDARD TRENCH EXCAVATION DETAIL	
NIRA Consulting Engineers, Inc.	
DATE: AUGUST, 2018	FILE: MRSD-ST01



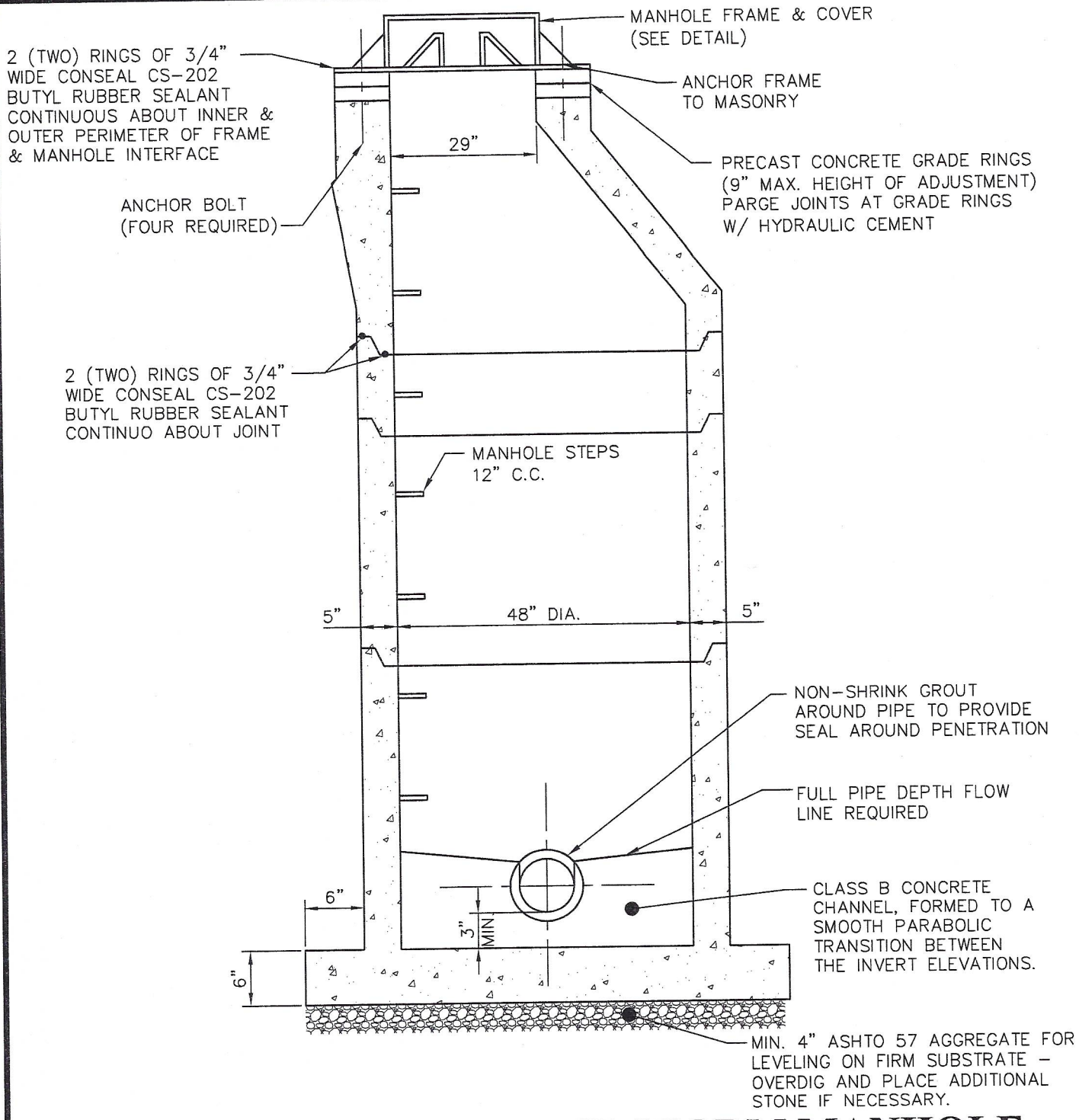
NOTES:

1. MANHOLE FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS CATALOG NO. 1890, NEENAH FOUNDRY R-1753-A, SYRACUSE PATTERN NO. 1045 OR APPROVED EQUAL. LID SHALL HAVE SELF-SEALING GASKET. LID SHALL BE SOLID WITH NO VENT HOLES.
2. COVER SHALL BE STAMPED AS SHOWN IN PLAN VIEW OR AS OTHERWISE NOTED.

STANDARD MANHOLE FRAME AND COVER

SCALE: N.T.S.

MCKEES ROCKS BOROUGH	
STANDARD MANHOLE FRAME AND COVER	
NIRA Consulting Engineers, Inc.	
DATE: AUGUST, 2018	FILE: MRSD-ST02



48" PRECAST CONCRETE STORM MANHOLE

SCALE: N.T.S.

NOTES:

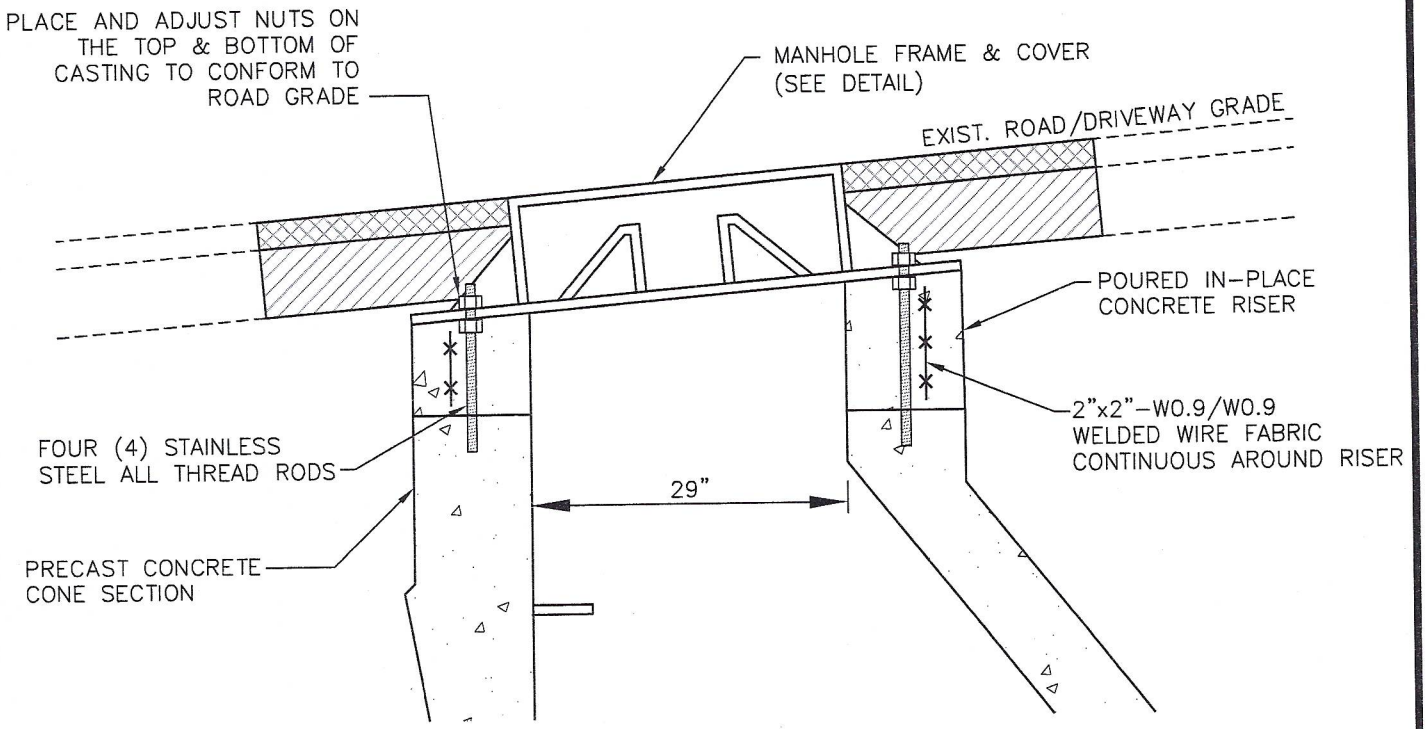
1. PRECAST CONCRETE MANHOLES TO CONFORM TO ASTM C-478.
2. INCREASE MH DIA. TO 5'-0" FOR PIPE SIZES 30" AND LARGER.
3. MANHOLE STEPS SHALL BE STEEL, ENCASED IN POLYPROPYLENE PLASTIC, STEPS SHALL MEET REQUIREMENTS, ASTM D4101-82. THE STEEL SHALL BE A DEFORMED 1/2" DIA. REINFORCING ROD, GRADE 60 CONFORMING TO ASTM A-615. STEPS SHALL BE 15 7/16" WIDE.
4. MANHOLE DEPTHS IN EXCESS OF 20-FT REQUIRE A 5'-0" MANHOLE WITH SAFETY PLATFORM.

MCKEES ROCKS BOROUGH

48" PRECAST CONCRETE STORM MANHOLE

NIRA Consulting Engineers, Inc.

DATE: AUGUST, 2018 | FILE: MRSD-ST03



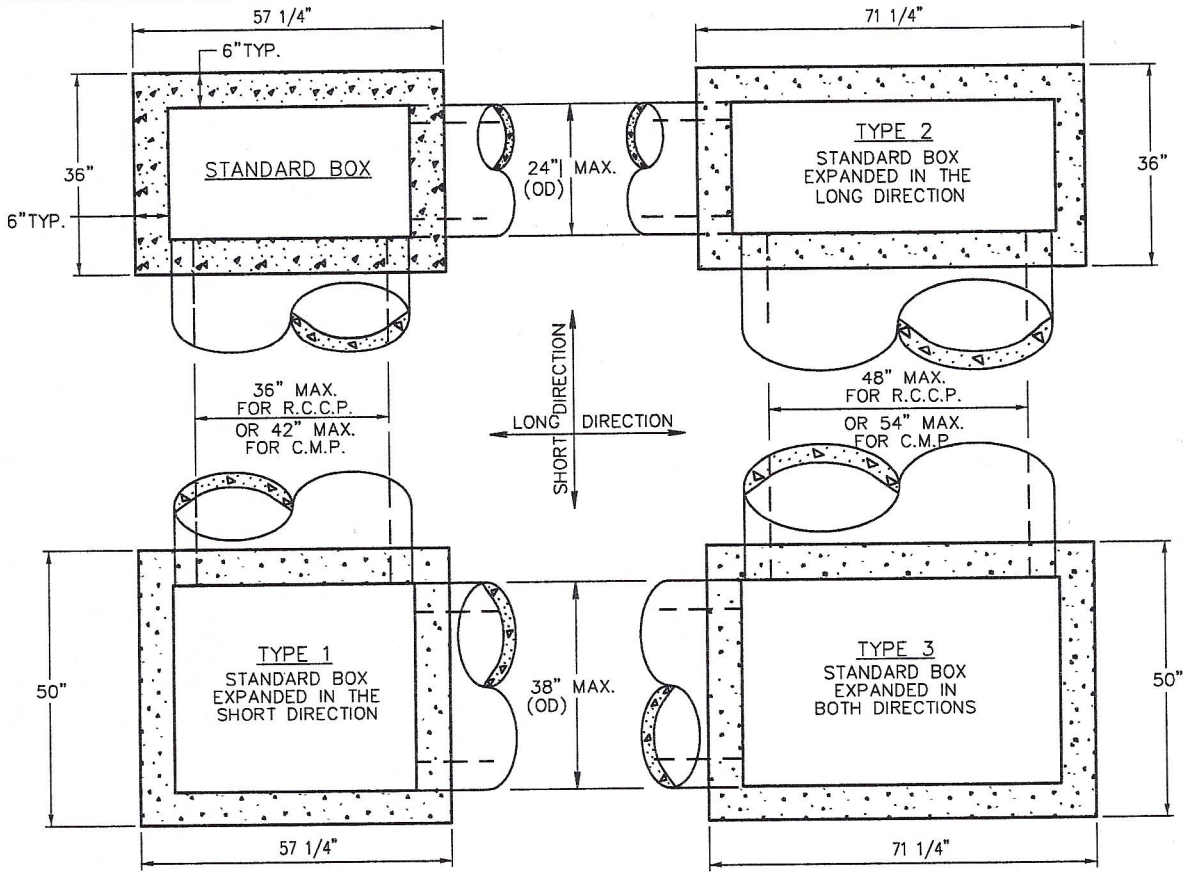
NOTES:

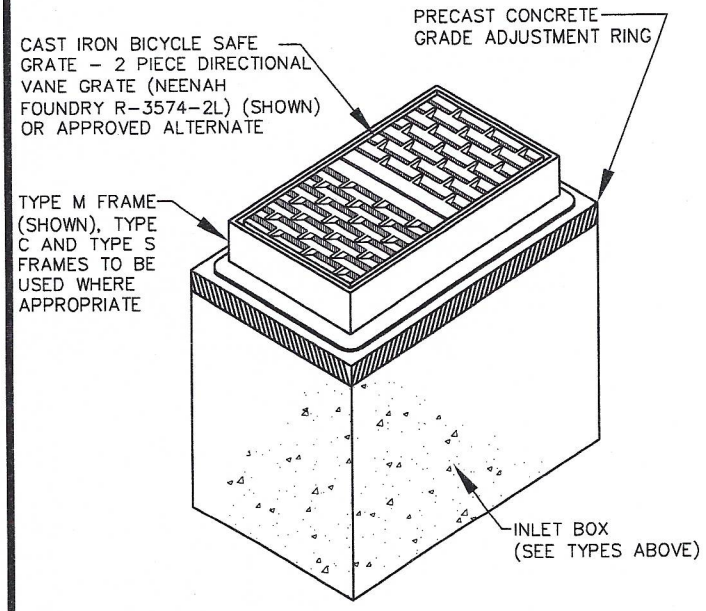
1. MANHOLE COVERS LOCATED WITHIN PAVED AREAS WILL BE LEVEL, FLUSH AND ON THE SAME GRADE AS THE NEW FINISHED SURFACE COURSE.
2. ALL WORK MUST BE COMPLETED ACCORDING TO PADOT PUBLICATION 408 SPECIFICATIONS, WHICH WOULD INCLUDE SECTION 606, GRADE ADJUSTMENTS OF EXISTING MISCELLANEOUS STRUCTURES.

MANHOLE CASTINGS IN PAVED AREAS

SCALE: N.T.S.

MCKEES ROCKS BOROUGH	
MANHOLE CASTINGS IN PAVED AREAS	
NIRA Consulting Engineers, Inc.	
DATE: AUGUST, 2018	FILE: MRSD-ST04





NOTES

1. CONSTRUCT INLET BOXES IN ACCORDANCE WITH THE REQUIREMENTS OF PENNDOT PUBLICATION 408, SECTION 714, FOR PRECAST CONCRETE UNITS.
2. ONLY PRECAST INLET BOXES SUPPLIED BY A MANUFACTURER LISTED IN PENNDOT BULLETIN 15 SHALL BE PERMITTED.
3. PROVIDE STANDARD INLET BOXES AND GRADE ADJUSTMENT SLABS WITH A 24"x45-¼" OPENING TO ACCOMODATE STANDARD TOP COMPONENTS.
4. INLETS THAT EXCEED THE HEIGHT OF 9'-0" SHALL REQUIRE A SPECIAL DETAIL AND DESIGN FOR THE INLET WALLS AND BASE. CONSTRUCT INLETS THAT EXCEED 5 FEET IN HEIGHT WITH STEPS SIMILAR TO MANHOLES.
5. LOCATE PIPE OR PIPES, AS INDICATED, WITH THE INLET BOTTOM SHAPED TO CHANNEL THE FLOW TOWARD THE OUTLET PIPE.
6. PLACE 2A COARSE AGGREGATE BACKFILL MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 703.2 IN 6-INCH MAX. LAYERS, COMPACTED TO 95% MAXIMUM DENSITY.
7. FOR PIPE DIAMETERS LARGER THAN 48" R.C.C.P. OR 54" C.M.P. IN THE LONG DIRECTION OR LARGER THAN 36" IN THE SHORT DIRECTION, A SPECIAL DETAIL AND DESIGN IS REQUIRED.
8. TYPE M INLET CONCRETE TOP UNITS WILL ONLY BE PERMITTED WHEN USED IN REINFORCED OR PLAIN CEMENT CONCRETE PAVEMENTS.

STANDARD INLET BOX DETAIL

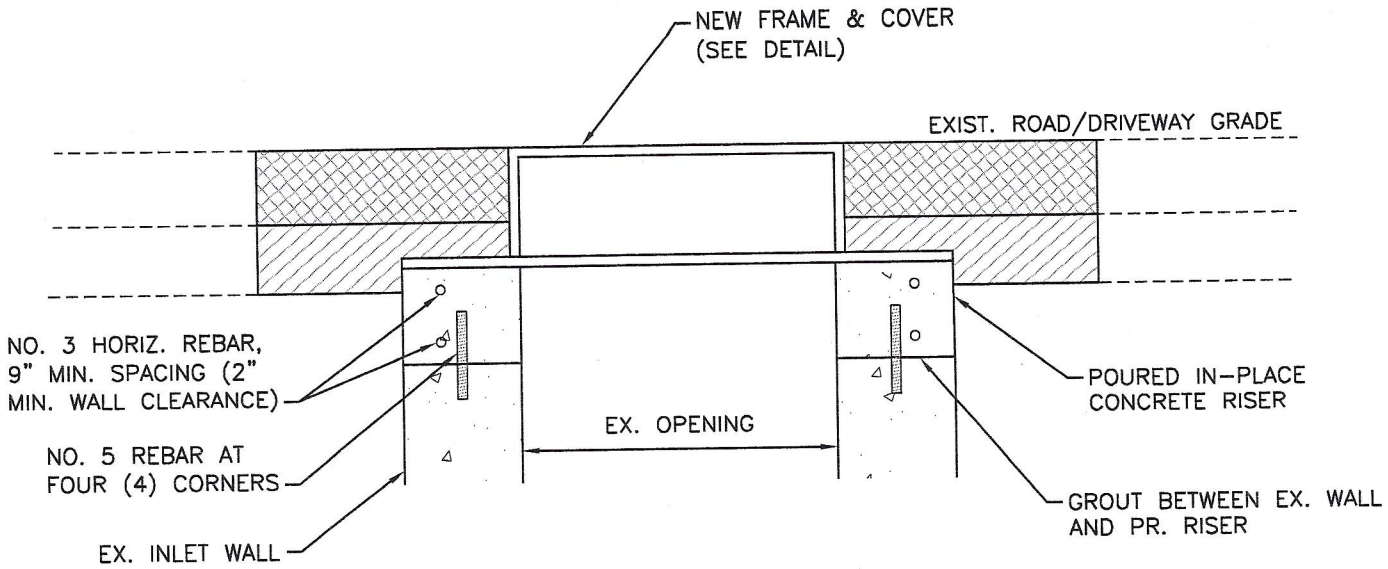
SCALE: N.T.S.

MCKEES ROCKS BOROUGH

STANDARD INLET BOX DETAIL

NIRA Consulting Engineers, Inc.

DATE: AUGUST, 2018 | FILE: MRSD-ST05



NOTES:

1. REMOVE EXISTING FRAME/GRATE. SAWCUT AND REMOVE TOP OF EX. INLET STRUCTURE TO A DEPTH AS SPECIFIED BUT NO LESS THAN REQUIRED TO SET NEW FRAME/GRATE. POUR NEW CONCRETE RISER. SET FRAME/GRATE.
2. PLACE 2A COARSE AGGREGATE BACKFILL MATERIAL IN 6-INCH LAYERS MAX, COMPACTED TO 95% MAXIMUM DENSITY.

INLET TOP REPAIR/ADJUSTMENT

SCALE: N.T.S.

MCKEES ROCKS BOROUGH	
INLET TOP REPAIR/ADJUSTMENT	
NIRA Consulting Engineers, Inc.	
DATE: AUGUST, 2018	FILE: MRSD-ST06

APPENDIX B

OPERATION AND MAINTENANCE (O&M) AGREEMENT

OPERATION AND MAINTENANCE (O&M) AGREEMENT
for
Stormwater Management Best Practices (SWM BMPs)

THIS AGREEMENT, made and entered into this day of _____, 20_____, by and between _____ (hereinafter the "Landowner"), and the Borough of McKees Rocks, Allegheny County, Pennsylvania (hereinafter "Municipality");

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _____ County, Pennsylvania, Deed Book _____ at page _____, (hereinafter "Property").

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the SWM BMP Operation and Maintenance (O&M) Plan approved by the Municipality (hereinafter referred to as the "O&M Plan") for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by the Municipality, provides for management of stormwater within the confines of the Property through the use of BMPs; and

WHEREAS, the Municipality, and the Landowner, their successors and assigns, agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water quality require that on-site SWM BMPs be constructed and maintained on the Property; and

WHEREAS, the Municipality requires, through the implementation of the SWM Site Plan, that SWM BMPs as required by said SWM Site Plan and the McKees Rocks Borough Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, successors, and assigns.

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

1. The Landowner shall construct the BMPs in accordance with the plans and specifications identified in the SWM Site Plan.

2. The Landowner shall operate and maintain the BMPs as shown on the SWM Site Plan in good working order in accordance with the specific operation and maintenance requirements noted on the approved O&M Plan.

3. The Landowner hereby grants permission to the Municipality, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Whenever possible, the Municipality shall notify the Landowner prior to entering the property.

4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.

5. In the event the Municipality, 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 shall reimburse the Municipality for all expenses (direct and indirect) incurred, within 30 days of receipt of invoice from the Municipality, including but not limited to fees of engineers, attorneys or other professional consultants used by the Municipality. Landowner agrees that upon failure to reimburse the Municipality as required herein, the Municipality may lien the property or bring action in assumpsit against Landowner for all such unreimbursed costs and that in either case Landowner shall be liable for all court costs and attorney's fees of the Municipality incurred in connection with such lien or action in assumpsit.

6. The intent and purpose of this Agreement is to ensure the proper maintenance of the on-site BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.

7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Municipality from all damages, accidents, casualties, occurrences, or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Municipality.

8. In addition to the maintenance and inspection requirements of the Landowner, as detailed in the O&M Plan, the Municipality intends to inspect the BMPs at a minimum of once every three years to ensure their continued functioning. The cost for such inspections will be covered by the Municipal Stormwater Maintenance Fund as defined in the McKees Rocks Borough Stormwater Management Ordinance.

This Agreement shall be recorded at the Office of the Recorder of Deeds of Allegheny County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, their administrators, executors, assigns, heirs, and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For the Municipality:

_____

For the Landowner:

_____

ATTEST:

_____ (City, Borough, Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the county and state aforesaid, whose commission expires on the _____ day of _____, 20_____, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day _____, 20_____, has acknowledged the same before me in my said county and state.

GIVEN UNDER MY HAND THIS _____ day of _____, 20_____.

_____ _____

NOTARY PUBLIC **(SEAL)**

APPENDIX C

SMALL PROJECT STORMWATER MANAGEMENT SITE PLAN

SMALL PROJECT STORMWATER MANAGEMENT SITE PLAN

This small project stormwater site plan has been developed to assist those proposing residential projects to meet the requirements of the *Allegheny County Stormwater Management Plan* Model Ordinance without having to hire professional services to draft a formal stormwater management plan. This small project site plan is only permitted for projects with earth disturbances between one-quarter (0.25) acre and one (1) acre of earth disturbance (Section 302.B) and using *The Simplified Method* (CG-2 in the BMP Manual[3]) for Volume Control as described in Section 303.B. Additional information can be found in Chapter 6 of the Pennsylvania Stormwater Best Management Practices Manual

A. What is an applicant required to submit?

All requirements of Section 302.B including a brief description of the proposed stormwater facilities, including types of materials to be used, total square footage of proposed impervious areas, volume calculations, and a simple sketch plan showing the following information:

- Location of proposed structures, driveways, or other paved areas with approximate surface area in square feet.
- Location of any existing or proposed onsite septic system and/or potable water wells showing proximity to infiltration facilities.
- County Conservation District erosion and sediment control "Adequacy" letter as may be required by Municipal, County or State regulations.

B. Determination of Required Volume Control and Sizing Stormwater Facilities

By following the simple steps outlined below in the provided example, an applicant can determine the runoff volume that is required to be controlled and how to choose the appropriate stormwater facility to permanently remove the runoff volume from the site. Impervious area calculations must include all areas on the lot proposed to be covered by roof area or pavement which would prevent rain from naturally percolating into the ground, including impervious surfaces such as sidewalks, driveways, parking areas, patios or swimming pools. Sidewalks, driveways or patios that are designed and constructed to allow for infiltration are not included in this calculation.

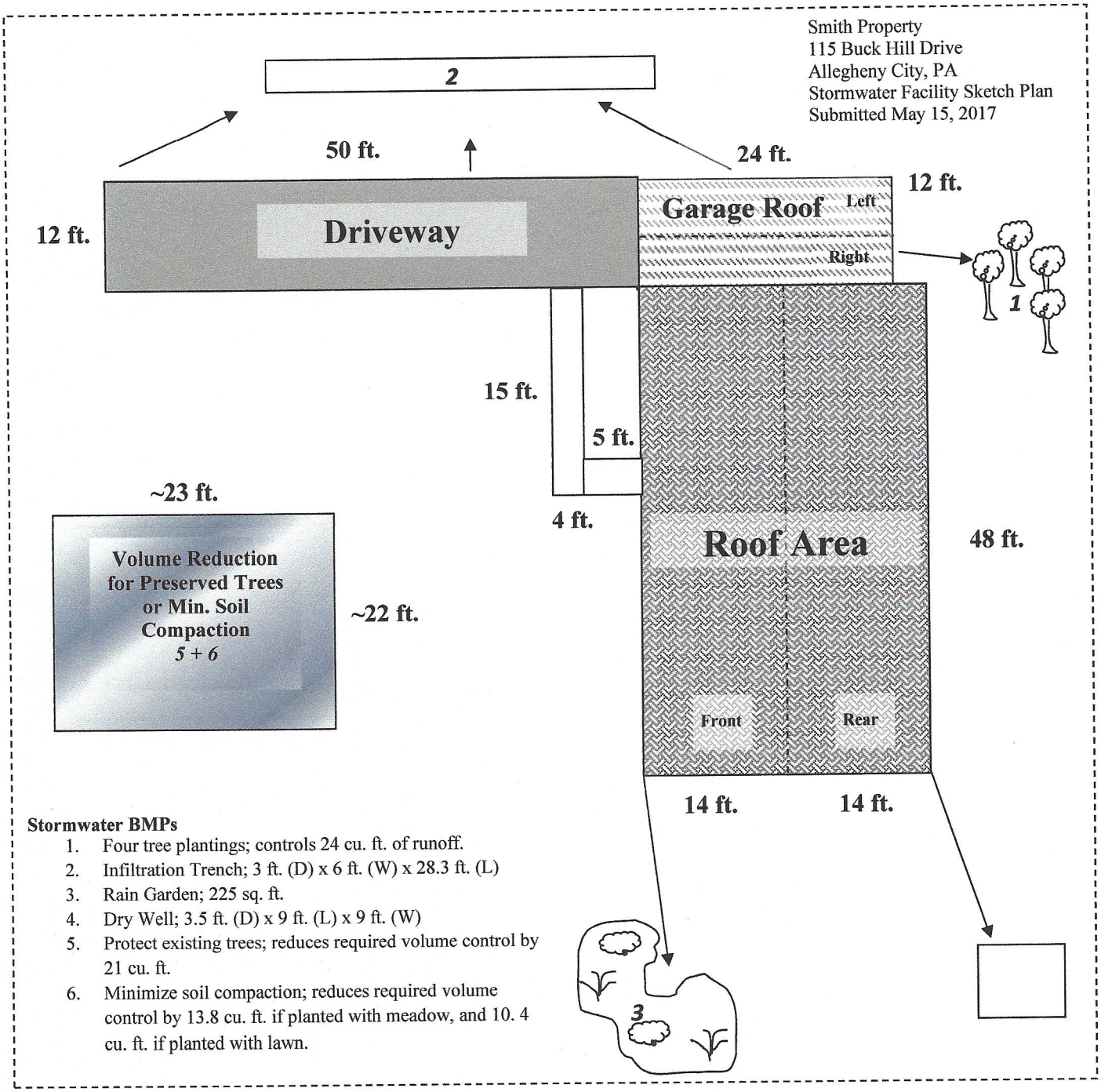
Site Plan Example: Controlling runoff volume from a proposed home site

Step 1: Determine Total Impervious Surfaces

Impervious Surface			Area (sq. ft.)
House Roof (Front)	14 ft. x 48 ft.	=	672 sq. ft.
House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.
Garage Roof (Left)	6ft. x 24 ft.	=	144 sq. ft.
Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq. ft.
Driveway	12 ft. x 50 ft.	=	1000 sq. ft.
Walkway	4 ft. x 20 ft.	=	80 sq. ft.

	Total Impervious		3000 sq. ft.

Figure 1: Sample Site Sketch Plan



Step 2: Determine Required Volume Control (cubic feet) using the following equation:

Volume (cu. ft.) = (Total impervious area in square feet x 2 inches of runoff) /12 inches

(3,000 sq. ft. x 2 inches of runoff) /12 inches = 500 cu. ft.

Example continued:

Step 3: Sizing the Selected Volume Control BMP

Several Best Management Practices (BMPs), as described below, are suitable for small stormwater management projects. However, their application depends on the volume required to be controlled, how much land is available, and the site constraints. Proposed residential development activities can apply both nonstructural and structural BMPs to control the volume of runoff from the site. A number of different volume control BMPs are described below. Note that Figure 1 is an example of how these BMPs can be utilized in conjunction to control the total required volume on one site.

Structural BMPs

1. Infiltration Trench

An Infiltration Trench is a linear stormwater BMP consisting of a continuously perforated pipe at a minimum slope in a stone-filled trench. During small storm events, infiltration trenches can significantly reduce volume and serve in the removal of fine sediments and pollutants. Runoff is stored between the stones and infiltrates through the bottom of the facility and into the soil matrix. Runoff should be pretreated using vegetative buffer strips or swales to limit the amount of coarse sediment entering the trench which can clog and render the trench ineffective. In all cases, an infiltration trench should be designed with a positive overflow.

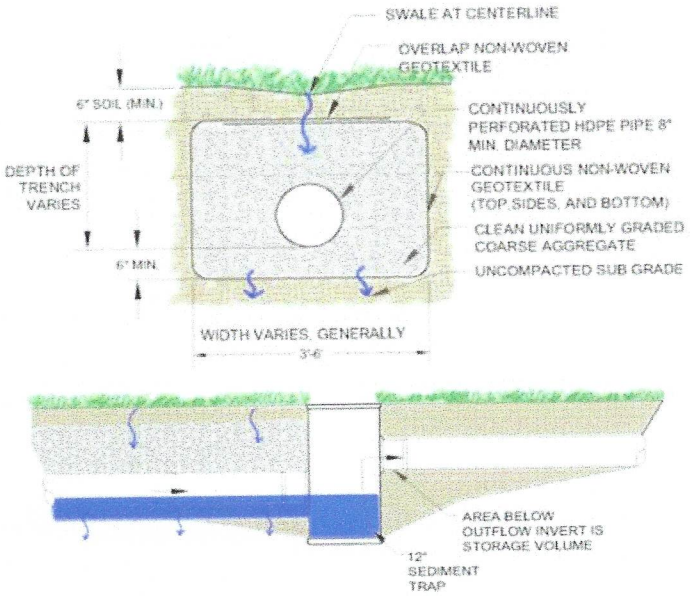
Design Considerations:

- Although the width and depth can vary, it is recommended that Infiltration Trenches be limited in depth to not more than six (6) feet of stone.
- Trench is wrapped in nonwoven geotextile (top, sides, and bottom).
- Trench needs to be placed on uncompacted soils.
- Slope of the Trench bottom should be level or with a slope no greater than 1%.
- A minimum of 6" of topsoil is placed over trench and vegetated.
- The discharge or overflow from the Infiltration Trench should be properly designed for anticipated flows.
- Cleanouts or inlets should be installed at both ends of the Infiltration Trench and at appropriate intervals to allow access to the perforated pipe.
- Volume of facility = Depth x Width x Length x Void Space of the gravel bed (assume 40%).

Maintenance:

- Catch basins and inlets should be inspected and cleaned at least two times a year.
- The vegetation along the surface of the infiltration trench should be maintained in good condition and any bare spots should be re-vegetated as soon as possible.
- Vehicles should not be parked or driven on the trench and care should be taken to avoid soil compaction by lawn mowers.

Figure 2: Infiltration Trench Diagram



Source: PA BMP Guidance Manual, Chapter 6, page 42.

Figure 3: Example of Infiltration Trench Installation

Source: PA BMP Guidance Manual, Chapter 6, Page 46.

Sizing Example for Infiltration Trench

1. Determine Total Impervious Surface to drain to Infiltration Trench:

Garage Roof (Left)	6 ft. x 24 ft.	=	144 sq. ft.
Driveway	12 ft. x 50 ft.	=	1000 sq. ft.
Walkway	4 ft. x 20 ft.	=	80 sq. ft.

2. Determine the required infiltration volume:
   (1224 sq. ft. x 2 inches of runoff)/12 ft. = 204 cu. ft. / 0.4* = 510 cu. ft.
   (*0.4 assumes 40% void ratio in gravel bed)

3. Sizing the infiltration trench facility:
   Volume of Facility = Depth x Width x Length

   Set Depth to 3 feet and determine required surface area of trench.

   510 cu. ft. / 3 ft. = 170 sq. ft.

   The width of the trench should be greater than 2 times its depth (2 x D), therefore in this example the trench width of 6 feet selected.

   Determine trench length: L = 170 sq. ft. / 6 ft. = 28.3 ft.

   Final infiltration trench dimensions: 3 ft. (D) x 6 ft. (W) x 28.3 ft. (L)

2. Rain Garden

A Rain Garden is a planted shallow depression designed to catch and filter rainfall runoff. The garden captures rain from a downspout or a paved surface. The water sinks into the ground, aided by deep rooted plants that like both wet and dry conditions. The ideal location for a rain garden is between the source of runoff (roofs and driveways) and the runoff destination (drains, stream, low spots, etc.).

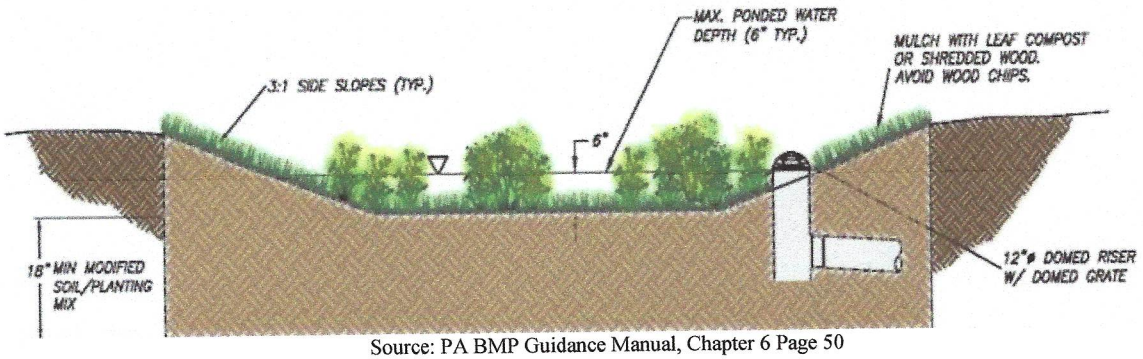
Design Considerations:

- A maximum of 3:1 side slope is recommended.
- The depth of a rain garden can range from 6 - 8 inches. Ponded water should not exceed 6 inches.
- The rain garden should drain within 72 hours.
- The garden should be at least 10-20 feet from a building's foundation and 25 feet from septic system drainfields and wellheads.
- If the site has clay soils, soil should be amended with compost or organic material.
- Choose native plants. See http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf for a native plant list. To find native plant sources go to www.pawildflower.org.
- At the rain garden location, the water table should be at least 2' below the soil level. If water stands in an area for more than one day after a heavy rain you can assume it has a higher water table and is not a good choice for a rain garden.

Maintenance:

- Water plants regularly until they become established.
- Inspect twice a year for sediment buildup, erosion and vegetative conditions.
- Mulch with hardwood when erosion is evident and replenish annually.
- Prune and remove dead vegetation in the spring season.
- Weed as you would any garden.
- Move plants around if some plants would grow better in the drier or wetter parts of the garden.

Figure 4: Rain Garden Diagram



Source: PA BMP Guidance Manual, Chapter 6 Page 50

Sizing Example for Rain Garden

1. Pick a site for the rain garden between the source of runoff and a low lying area, a.k.a., a drainage area.

2. Perform an infiltration test to determine the depth of the rain garden:
   - Dig a hole 8″ x 8″
   - Fill with water and put a popsicle stick at the top of the water level.
   - Measure how far it drains down after a few hours (ideally 4 hours).
   - Calculate the depth of water that will drain out over 24 hours.

3. Determine total impervious surface area to drain to rain garden:

House Roof (Front)	14 ft. x 48 ft.	=	672 sq. ft.

4. Sizing the rain garden:
   For this example, let's say the infiltration test determined 6″ of water drained out of a hole in 24 hours. The depth of the rain garden should be set to the results of the infiltration test so 6″ is the depth of the rain garden. The sizing calculation below is based on controlling 1″ of runoff. First divide the impervious surface by the depth of the rain garden.

   672 sq. ft. / 6 (depth of rain garden in inches) = 112 sq. ft.

   In order to control 2″ of runoff volume, the rain garden area is multiplied by 2.

   112 sq. ft. * 2 = 224 sq. ft.

   The rain garden should be about 225 sq. ft. in size and 6″ deep.

3. Dry Well (a.k.a., Seepage Pit)

A Dry Well, sometimes called a Seepage Pit, is a subsurface storage facility that temporarily stores and infiltrates stormwater runoff from the roofs of structures. By capturing runoff at the source, Dry Wells can dramatically reduce the increased volume of stormwater generated by the roofs of structures. Roof

leaders connect directly into the Dry Well, which may be either an excavated pit filled with uniformly graded aggregate wrapped in geotextile, or a prefabricated storage chamber or pipe segment. Dry Wells discharge the stored runoff via infiltration into the surrounding soils. In the event that the Dry Well is overwhelmed in an intense storm event, an overflow mechanism (surcharge pipe, connection to a larger infiltration are, etc.) will ensure that additional runoff is safely conveyed downstream.

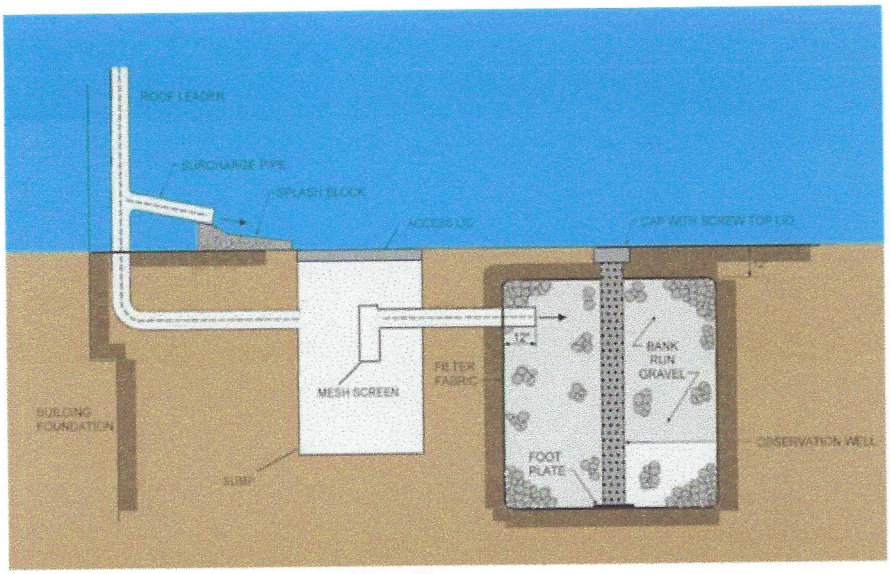
Design Considerations:

- Dry Wells typically consist of 18 to 48 inches of clean washed, uniformly graded aggregate with 40% void capacity (AASHTO No. 3, or similar). "Clean" gravel fill should average one and one-half to three (1.5 – 3.0) inches in diameter.
- Dry Wells are not recommended when their installation would create a significant risk for basement seepage or flooding. In general, 10 - 20 feet of separation is recommended between Dry Wells and building foundations.
- The facility may be either a structural prefabricated chamber or an excavated pit filled with aggregate.
- Depth of dry wells in excess of three-and-a-half (3.5) feet should be avoided unless warranted by soil conditions.
- Stormwater dry wells must never be combined with existing, rehabilitated, or new septic system seepage pits. Discharge of sewage to stormwater dry wells is strictly prohibited.
- As shown in Figure 5, the installation should include a surcharge or overflow pipe.

Maintenance:

- Dry wells should be inspected at least four (4) times annually as well as after large storm events.
- Remove sediment, debris/trash, and any other waste material from a dry well.
- Regularly clean out gutters and ensure proper connections to the dry well.
- Replace the filter screen that intercepts the roof runoff as necessary.

Figure 5: Dry Well Diagram



Source: PA BMP Guidance Manual, Chapter 6, Page 65.

Sizing Example for Dry Wells:

1. Determine contributing impervious surface area:

House Roof (Rear)	14 ft. x 48 ft.	=	672 sq. ft.

2. Determine required volume control:

   (672 sq. ft. x (2 inches of runoff / 12 inches/ft.) = 112 cu. ft.

   112 cu ft. / 0.4 = 280 cu. ft. (assuming the 40% void ratio in the gravel bed)

3. Sizing the dry well:

   Set the depth to 3.5 ft.; Set the width equal to the length for a square chamber.

   3.5 ft. x L x L = 280 cu. ft.; LxL = 280 cu. ft. / 3.5 ft.; thus LxL= 80 sq. ft.; L=9 (approx)

   Dimensions = 3.5 ft. (D) x 9 ft. (L) x 9 ft. (W)

Non-Structural BMPs

1. Tree Plantings and Preservation

Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Tree roots and leaf litter also create soil conditions that promote the infiltration of rainwater into the soil. In addition, trees and forests reduce pollutants by taking up nutrients and other pollutants from soils and water through their root systems. A development site can reduce runoff volume by planting new trees or by preserving trees which existed on the site prior to development. The volume reduction calculations either determine the cubic feet to be directed to the area under the tree canopy for infiltration or determine a volume reduction credit which can be used to reduce the size of any one of the planned structural BMPs on the site.

Tree Considerations:

- Existing trees must have at least a 4" trunk caliper or larger.
- Existing tree canopy must be within 100 ft. of impervious surfaces.
- A tree canopy is classified as the continuous cover of branches and foliage formed by a single tree or collectively by the crowns of adjacent trees.
- New tree plantings must be at least 6 ft. in height and have a 2" trunk caliper.
- All existing and newly planted trees must be native to Pennsylvania. See http://www.dcnr.state.pa.us/forestry/commontr/commontrees.pdf for a guide book titled *Common Trees of Pennsylvania* for a native tree list.
- When using trees as volume control BMPs, runoff from impervious areas should be directed to drain under the tree canopy.

Determining the required number of planted trees to reduce the runoff volume:

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 ft.

2. Calculate the required control volume:
   (144 sq. ft. x 2 inches of runoff) / 12 inches = 24 cu. ft.

3. Determine the number of tree plantings:

   - A newly planted deciduous tree can reduce runoff volume by 6 cu. ft.
   - A newly planted evergreen tree can reduce runoff volume by 10 cu. ft.

   24 cu. ft. / 6 cu. ft. = 4 Deciduous Trees

Determining the volume reduction for preserving existing trees:

1. Calculate approximate area of the existing tree canopy:

   ~22 sq. ft. x ~23 sq. ft. = 500 sq. ft.

2. Measure distance from impervious surface to tree canopy: 35 ft.

3. Calculate the volume reduction credit by preserving existing trees:

   - For Trees within 20 feet of impervious cover:
     Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft. x 1 inch) / 12
   - For Trees beyond 20 feet but not farther than 100 feet from impervious cover:
     Volume Reduction cu. ft. = (Existing Tree Canopy sq. ft. x 0.5 inch) / 12

   (500 sq. ft. x 0.5 inches) / 12 = 21 cu. ft.

   This volume credit can be utilized in reducing the size of any one of the structural BMPs planned on the site. For example, the 21 cu. ft. could be subtracted from the required infiltration volume when sizing the infiltration trench;

   510 cu. ft. – 21 cu. ft. = 489 cu. ft.

   489 cu. ft. / 3 ft. (Depth) = 163 / 6 ft. (Width) = 27.1 ft. (Length)

   Using the existing trees for a volume credit would decrease the length of the infiltration trench to 27.1 ft. instead of 28.3 ft.

2. Minimize Soil Compaction and Replant with Lawn or Meadow

When soil is overly compacted during construction it can cause a drastic reduction in the permeability of the soil and rarely is the soil profile completely restored. Runoff from vegetative areas with highly

compacted soils similarly resembles runoff from an impervious surface. Minimizing soil compaction and re-planting with a vegetative cover like meadow or lawn, not only increases the infiltration on the site, but also creates a friendly habitat for a variety of wildlife species.

Design Considerations:

- Area shall not be stripped of topsoil.
- Vehicle movement, storage, or equipment/material lay down shall not be permitted in areas preserved for minimum soil compaction.
- The use of soil amendments and additional topsoil is permitted.
- Meadow should be planted with native grasses. Refer to *Meadows and Prairies: Wildlife-Friendly Alternatives to Lawn* at http://pubs.cas.psu.edu/FreePubs/pdfs/UH128.pdf for reference on how to properly plant the meadow and for a list of native species.

Determining the volume reduction by minimizing soil compaction and planting a meadow:

1. Calculate approximate area of preserved meadow:
   ~22 sq. ft. x ~23 sq. ft. = 500 sq. ft.

2. Calculate the volume reduction credit by minimizing the soil compaction and planting a lawn/meadow:

   - For Meadow Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/3 inch of runoff) / 12

     (500 sq. ft. x 1/3 inch of runoff) / 12 = 13.8 cu. ft.

   - For Lawn Areas: Volume Reduction (cu. ft.) = (Area of Min. Soil Compaction (sq. ft.) x 1/4 inch of runoff) / 12

     (500 sq. ft. x 1/4 inch of runoff) / 12 = 10.4 cu. ft.

This volume credit can be used to reduce the size of any one of the structural BMPs on the site. See explanation under the volume credit for preserving existing trees for details.

Alternative BMP to Capture and Reuse Stormwater

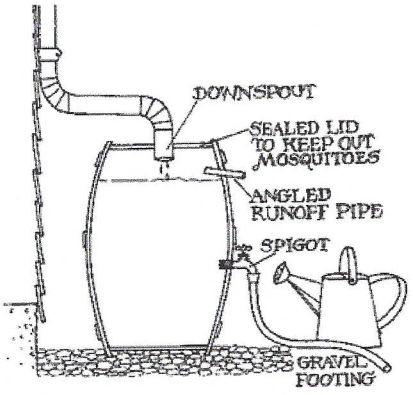
Rain Barrels

Rain barrels are large containers that collect drainage from roof leaders and temporarily store water to be released to lawns, gardens, and other landscaped areas after the rainfall has ended. Rain barrels are typically between 50 and 200 gallons in size. It is not recommended for rain barrels to be used as a volume control BMP because infiltration is not guaranteed after each storm event. For this reason, a rain barrel is not utilized in the site plan example. However, the information is included to provide an alternative for a homeowner to utilize when considering capture and reuse stormwater methods.

Design Considerations:

- Rain barrels should be directly connected to the roof gutter/spout.
- There must be a means to release the water stored between storm events to provide the necessary storage volume for the next storm.
- When calculating rain barrel size, rain barrels are typically assumed to be 25% full because they are not always emptied before the next storm.
- Use screens to filter debris and cover lids to prevent mosquitoes.
- An overflow outlet should be placed a few inches below the top with an overflow pipe to divert flow away from structures.
- It is possible to use a number of rain barrels jointly for an area.

Figure 6: Rain Barrel Diagram and Examples



Sources: (top picture) http://www.citywindsor.ca/DisplayAttach.asp?AttachID=12348
(bottom picture on left) http://repurposinglife.blogspot.com/2009/05/rainwater-harvesting.html
(bottom picture on right) http://www.floridata.com/tracks/transplantedgardener/Rainbarrels.cfm

Sizing Example for a Rain Barrel

1. Determine contributing impervious surface area:

Garage Roof (Right)	6 ft. x 24 ft.	=	144 sq. ft.

2. Determine the amount of rainfall to be captured by the Rain Barrel. A smaller storm, no more than 2", is recommended to calculate the runoff to be captured. This example chose the 1" storm event.

3. Calculate the volume to be captured and reused:
(144 sq. ft. x 1 inch of runoff) / 12 inches = 12 cu. ft.

4. Size the rain barrel:

   1 cu. ft. = 7. 48 gallons

   12 cu. ft. x 7.48 = 90 gallons

   90 gallons x (0.25*) = 22.5 gallons (*assuming that the rain barrel is always at least 25% full)

   90 gallons + 22.5 gallons = 112 gallons
   The rain barrel or barrels should be large enough to hold at least 112 gallons of water.

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