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## **CITY OF MIDDLETOWN, OHIO**

# **EROSION, SEDIMENT, AND POST-CONSTRUCTION STORM WATER CONTROL RULES & REGULATIONS**

**2019 Revision**

## **Table of Contents**

|  |    |
|--|----|
| CHAPTER 1: PURPOSE.....  | 1  |
| CHAPTER 2: DEFINITIONS AND ACRONYMS .....                                    | 1  |
| CHAPTER 3: DISCLAIMER OF LIABILITY .....                                     | 3  |
| CHAPTER 4: APPLICABILITY AND SUBMITTAL PROCEDURES .....                      | 4  |
| CHAPTER 5: CONFORMANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS .....       | 6  |
| CHAPTER 6: EROSION, SEDIMENT, AND POST-CONSTRUCTION STORM WATER CONTROL PLAN | 7  |
| CHAPTER 7: EROSION AND SEDIMENT CONTROL REQUIREMENTS .....                   | 11 |
| CHAPTER 8: POST-CONSTRUCTION STORM WATER CONTROL REQUIREMENTS .....          | 19 |
| CHAPTER 9: FEES AND BONDS .....  | 32 |
| CHAPTER 10: VIOLATIONS .....   | 32 |
| APPENDIX A: CHAPTER 1050 STORM WATER.....                                    | X  |

# EROSION, SEDIMENT, AND POST-CONSTRUCTION STORM WATER CONTROL RULES & REGULATIONS

## CHAPTER 1: PURPOSE

The purpose of this regulation is to establish technically feasible and economically reasonable standards to achieve a level of erosion and sediment control and post-construction storm water management that will minimize damage to property and degradation of water resources and wetlands and will promote and maintain the health and safety of the citizens of the City of Middletown (City).

(A) This regulation shall:

1. Allow development while minimizing increases in downstream flooding, erosion, and sedimentation; and
2. Reduce water quality impacts to receiving water resources and wetlands that may be caused by new development or redevelopment activities.

(B) This regulation applies to land used or being developed, either wholly or partially, for new or relocated projects involving highways, underground cables, or pipelines; subdivisions; industrial, commercial, institutional, or residential projects; building activities on farms; redevelopment activities; general grading; and all other uses that are not specifically exempted in (C).

(C) This regulation applies to activities in (B) that disturb more than one (1) acre of land.

(D) General soil disturbing activities of more than one-tenth (1/10) acre and one (1) acre, are addressed under separate requirements within this regulation.

## CHAPTER 2: DEFINITIONS AND ACRONYMS

For the purpose of this chapter, the words and phrases shall be defined as follows, unless the context clearly indicates or requires a different meaning.

### ***DEFINITIONS***

Acre: A measurement of area equaling 43,560 square feet.

Controls: Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters of the State. Controls also include treatment requirements, operating procedures, and practices to control runoff, flooding, stream erosion, habitat degradation, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

City of Middletown: Throughout this regulation, this shall refer to the City, its designated representatives, boards, or commissions.

Construction Entrance: The permitted points of ingress and egress (access) to areas of soil disturbance regulated under this regulation.

Construction General Permit: The current Ohio EPA General Permit Authorization for Storm Water Discharges Associated with Construction Activity Under the NPDES.

Cut: An excavation that reduces an existing elevation, as in road or foundation construction.

Development Area: A parcel or contiguous parcels owned by one person or persons, or operated as one common plan of development, and used or being developed for commercial, industrial, residential, institutional, or other soil disturbance or alteration that changes runoff characteristics.

Director of Public Works & Utilities: The Director of Public Works & Utilities or duly authorized

representative.

Disturbed Area: An area of land subject to erosion due to the removal of vegetative cover and/or soil disturbing activities.

Drainage: The removal of excess surface water or groundwater from land by surface or subsurface drains.

Erosion: The process by which the land surface is worn away by the action of wind, water, ice, gravity, or any combination of those forces.

Erosion and Sediment Control: The control of soil material, both mineral and organic, to minimize the removal of soil material from the land surface and to prevent its transport out of a disturbed area by means of wind, water, ice, gravity, or any combination of those forces.

Erosion, Sediment, and Post-Construction Storm Water Control Plan (ESPSC Plan): The written document meeting the requirements of this regulation, prepared as an integral part of a Project's Construction Plans, that sets forth the plans and practices to be used to (a) minimize soil erosion, (b) prevent off-site disposal of soil sediment by containing sediment on-site or by-passing sediment-laden runoff through sediment control measures during and after development, and (c) manage the quantity and quality of storm water long-term after construction is complete.

Final Stabilization: All soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of at least 80% cover for the area has been established or equivalent stabilization measures, such as the use of mulches or geotextiles, have been employed.

Larger Common Plan of Development or Sale: A contiguous area where multiple separate and distinct soil disturbance activities may be taking place at different times on different schedules under one plan.

NPDES: National Pollutant Discharge Elimination System. A regulatory program in the Federal Clean Water Act that prohibits the discharge of pollutants into surface waters of the United States without a permit.

Owner: Means the owner of any facility or activity subject to regulation under the NPDES Program

Person: Any individual, corporation, firm, trust, commission, board, public or private partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, other legal entity, or an agent thereof.

Phasing: Clearing a parcel of land and/or performing soil disturbing activities in distinct sections, with the stabilization of each section before the clearing of the next.

Professional Engineer: A Professional Engineer registered in the State of Ohio.

Rainwater and Land Development Manual (RLDM): Ohio's standards for storm water management, land development, and urban stream protection. The most current edition of these standards and any provisional practices that post-date the most recent standards shall be used with this regulation.

Runoff: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and is eventually conveyed to water resources or wetlands.

Sediment: The soils or other surface materials that are or have been transported or deposited by the action of wind, water, ice, gravity, or any combination of those forces, as a product of erosion.

Sedimentation: The deposition or settling of sediment.

Riparian Buffer: A designated transition area around water resources or wetlands that is left in a natural, usually vegetated, state so as to protect the water resources or wetlands from runoff pollution. Soil disturbance activities in this area are restricted or prohibited as required in this regulation.

Soil Disturbing Activity: Clearing, grubbing, grading, excavating, filling, or other alteration of the earth's surface where natural or human made ground cover is destroyed and which may result in, or contribute to, erosion and sediment pollution.

Soil & Water Conservation District: An entity organized under Chapter 1515 of the Ohio Revised Code

referring to either to the Soil and Water Conservation District Board or its designated employee(s). Hereafter referred to as the SWCD.

Stabilization: The use of storm water controls, such as seeding and mulching, that reduce or prevent soil erosion by water, wind, ice, gravity, or a combination of those forces.

Storm Water: Storm water runoff, snow melt and surface runoff and drainage

Surface Waters of the State: All streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.

Unstable Soils: A portion of land surface or area which is identified by the City Engineering and Environmental Services Director as prone to slipping, sloughing, or landslides, or is identified by the U.S. Department of Agriculture Natural Resource Conservation Service methodology as having low soil strength.

Water Resource: Any public or private body of water including lakes and ponds, as well as streams, gullies, ditches, swales, or ravines that have banks and a defined bed where terrestrial vegetation cannot establish roots, and a definite direction of flow, either continuously or intermittently flowing.

Surface Waters of the State: All streams, lakes, reservoirs, ponds, marshes, wetlands or other waterways which are situated wholly or partially within the boundaries of the state, except those private waters which do not combine or effect a junction with natural surface or underground waters. Waters defined as sewerage systems, treatment works or disposal systems in Section 6111.01 of the ORC are not included.

Wetland: Those areas that are inundated or saturated by surface or ground water 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 (40 CFR 232, as amended).

## ACRONYMS

The following acronyms are defined for the purposes of this regulation (not including equation terms which are defined in the appropriate chapter and section):

CBO: Chief Building Official

CGP: Ohio EPA Construction General Permit

CFR: Code of Federal Regulations

ESPSC: Erosion, Sediment and Post-Construction Storm Water Control Plan

Ohio EPA: Ohio Environmental Protection Agency

OAC: Ohio Administrative Code

ODNR: Ohio Department of Natural Resources

ORC: Ohio Revised Code

SWCD: Soil and Water Conservation District

SWP3: Storm Water Pollution Prevention Plan

## CHAPTER 3: DISCLAIMER OF LIABILITY

(A) Compliance with the provisions of this regulation shall not relieve any person from responsibility from damage to any person otherwise imposed by law. The provisions of this regulation are promulgated to promote the health and safety of the public and are not designed for the benefit of any individual or for the benefit of any particular parcel of property.

(B) Erosion, Sediment, and Post-Construction Stormwater (ESPSC) Plan approval does not constitute assurance that the proposed controls will perform in the manner indicated by the design. The responsibility of the proper functioning, operation and maintenance of the controls remains with the owner. The owner shall be responsible for providing any additional means or methods necessary to meet the intent of these regulations.

## **CHAPTER 4: APPLICABILITY AND APPLICATION PROCEDURES**

(A) SOIL DISTURBING ACTIVITY AREAS OF ONE (1) ACRE OR MORE OF LAND OR LESS THAN ONE (1) ACRE AND PART OF A LARGER COMMON PLAN OF DEVELOPMENT OR SALE.

An ESPSC Plan including all of the elements and criteria specified in this regulation is required for all soil disturbing activity areas of one (1) acre of land or more, or less than one (1) acre if part of a larger common plan of development or sale. Applicable soil disturbing activities include clearing, grading, excavating, grubbing and/or filling activities. The following requirements apply:

1. The owner may submit a stand-alone, approvable Storm Water Pollution Prevention Plan (SWP3) prepared in accordance with the most current version of the Construction General Permit (CGP) in lieu of an ESPSC Plan. An approvable SWP3 shall comply with all requirements of Section III.G of the CGP. In situations of conflict between Ohio EPA requirements and City requirements, the most restrictive shall prevail.
2. Two (2) sets of the ESPSC Plan (or approvable SWP3), and supporting data required by this regulation shall be submitted to the Director of Public Works & Utilities as an integral part of the submission of the subdivision project's Construction Plans or a single-lot project's Development Plans,
3. ESPSC Plan (or SWP3) approval by the Director of Public Works & Utilities is required prior to the submittal of a Notice of Intent (NOI) to Ohio EPA to obtain authorization to discharge to surface waters of the state under the Construction General Permit.
4. Submittal of the NOI and appropriate fee to Ohio EPA shall be at least 21 days prior to the commencement of any soil disturbing activities.
5. Submittals of the ESPSC Plan (or SWP3) to the City shall be made as follows:
  - (a) For subdivisions: With submittal of a subdivision Project's Construction Plans (see Chapter 1206.13) to the Engineering and Environmental Services Director.
  - (b) For other soil disturbance activities: With submittal of single lot Project's Development Plans to the Director of Planning and Community Development.

(B) DEVELOPMENT AREAS DISTURBING BETWEEN ONE/TENTH ACRE AND ONE ACRE OF LAND.

An abbreviated ESPSC plan, limited to the following requirements for erosion and sediment control measures during soil disturbing activities, shall be submitted for all soil disturbance activity areas of less than one (1) acre and more than one-tenth (1/10) acre that are not part of a larger common plan of development. The required erosion and sediment controls for these sites are the following:

1. Construction Entrances. Construction entrances shall be built and shall serve as the only permitted points of ingress and egress to the development area. These entrances shall be built of a stabilized pad of aggregate stone or recycled concrete or cement sized greater than 2" in diameter, placed over a geotextile fabric, and constructed in conformance with specifications in the most recent edition of the Rainwater and Land Development Manual (RLDM).

2. Concrete Truck Wash Out. The washing of excess concrete material into a street, catch basin, or other public facility, or into a water resource or wetland, shall not occur. A designated area for concrete washout shall be made available. Concrete washouts shall be installed and maintained in conformance with specifications in the most recent edition of the Rainwater and Land Development Manual (RLDM).
3. Street Sweeping. Streets directly adjacent to construction entrances and receiving traffic from the development area shall be cleaned weekly to remove sediment tracked off-site. If applicable, the catch basins on these streets nearest to the construction entrances shall also be cleaned weekly.
4. Stabilization. The development area shall be stabilized as detailed in Table 1.

**Table 1 Stabilization Plan for Disturbing Less than One Acre of Land**

| Area requiring stabilization   | Time frame to apply erosion controls  |
|--|---|
| Any disturbed area within 50 feet of a stream and not at final grade.  | Within two (2) days of the most recent disturbance if that area will remain idle for more than 14 days. |
| For all soil disturbance activities, any disturbed area, including soil stockpiles that will be dormant for more than 14 days but less than one year, and not within 50 feet of a stream.  | Within seven (7) days of the most recent disturbance within the area.                                   |
| Disturbed areas that will be idle over winter.   | Prior to onset of winter weather.   |
| <b>NOTE:</b> Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques shall be employed. These techniques may include mulching or erosion matting. |   |

5. Sediment Barriers and Diversions. Sheet flow runoff from denuded areas shall be intercepted by sediment barriers or diversions to protect adjacent properties, water resources, and wetlands from sediment transported via sheet flow. Sediment barriers and diversions shall be installed and maintained in conformance with specifications in the most recent edition of the Rainwater and Land Development Manual (RLDM).
6. Inlet Protection. Erosion and sediment control practices, such as boxed inlet protection, shall be installed to minimize sediment-laden water entering active storm drain systems. Straw or hay bales are not acceptable forms of inlet protection.
7. Inspection and Maintenance. All controls on the development area shall be inspected at least once every seven calendar days and within 24 hours after any storm event greater than one-half inch of rain per 24-hour period. Maintenance shall occur as detailed below:
  - (a) When practices require repair or maintenance. If the inspection reveals that a control practice is in need of repair or maintenance, with the exception of a sediment-settling pond, it shall be repaired or maintained within three (3) days of the inspection. Sediment settling ponds shall be repaired or maintained within 10 days of the inspection.
  - (b) When practices fail to provide their intended function. If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the ESPSC Plan shall be amended, and the new control practice shall be installed within 10 days of the inspection.

- (c) When practices depicted on the ESPSC Plan are not installed. If the inspection reveals that a control practice has not been implemented in accordance with the schedule, the control practice shall be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control practice is not needed, the record shall contain a statement of explanation as to why the control practice is not needed.
- 8. Long-term Maintenance Plan. Maintenance plans shall describe how pollutants collected within structural post-construction storm water controls will be disposed of in accordance with local, state and federal regulations. Maintenance plans should also identify who will be responsible for maintenance once construction has completed and the permit has expired or notice of termination has been given.
- 9. Chapters 6 and 7 of this regulation shall not apply to these sites.
- 10. Sites shall be in conformance with specifications in the most recent edition of the City of Middletown's Manual of Design for Public Improvements.
- 11. Two (2) sets of these abbreviated ESPSC plans shall be submitted to the City as follows:
  - (a) For single family home construction. With submittal of the plot plan to the CBO.
  - (b) For general clearing projects disturbing more than 1/10th of an acre and less than once acre of land: Twenty-one (21) working days prior to any soil disturbing activities.

(C) The City shall review the plans submitted and approve or return for revisions with comments and recommendations for revisions within twenty-one (21) working days after receipt of the plan. General clearing projects will receive any comments within twenty-one (21) working days after plan receipt. A plan rejected because of deficiencies shall receive a narrative report stating specific problems and the procedures for filing a revised plan. At the time the City receives a revised plan, another twenty-one (21) day review period shall begin.

(D) ESPSC Plans for individual sublots, only required for those sublots that do not discharge storm water runoff into a central sediment basin for a subdivision and/or common plan of development, will not be approved by the City unless the larger common plan of development or sale containing the subplot is in compliance with these regulations. If there is an individual lot transfer of coverage, each new owner shall submit an individual lot NOT application form to Ohio EPA at least 7 days prior to the date they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous owner. Transfer of permit coverage is not granted until an approval letter from the Ohio EPA is received by the new owner.

(E) Soil disturbing activities shall not begin and building permits shall not be issued without an ESPSC Plan approved by the City and Ohio EPA authorization to discharge storm water associated with construction activity under the current NPDES CGP. Proof of conformance with these requirements shall be a copy of the Ohio EPA Director's Authorization Letter for the NPDES Permit, or a letter from the site owner explaining why the NPDES Permit is not applicable.

(F) Approvals issued by the City in accordance with this regulation shall remain valid for one (1) year from the date of approval. Should the project extend beyond one (1) year, the owner shall re-apply for coverage.

(G) A copy of the approved ESPSC Plan shall be maintained on-site or in a location easily accessible by the applicant and the City.

**CHAPTER 5: CONFORMANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS**

(A) Approvals issued in accordance with this regulation do not relieve the site owner of responsibility for obtaining all other necessary permits and/or approvals from federal, state, and/or county agencies. If requirements vary, the most restrictive requirement shall prevail.

(B) Soil disturbing activities regulated under this regulation shall not begin until all necessary state and federal permits have been granted to the site owner. These permits may include, but are not limited to, the following:

1. Section 401 of the Clean Water Act. Proof of conformance shall be a copy of the Ohio EPA Water Quality Certification application, public notice, or project approval, or a letter from the site owner verifying that a qualified professional has surveyed the site and found no waters of the United States. Such a letter shall be noted on site plans submitted to the Director of Public Works & Utilities. Wetlands, and other Waters of the United States, shall be delineated by protocols accepted by the Ohio EPA at the time of application of this regulation.
2. Ohio EPA Isolated Wetland Permit. Proof of conformance shall be a copy of Ohio EPA's Isolated Wetland Permit application, public notice, or project approval, or a letter from the site owner verifying that a qualified professional has surveyed the site and found no isolated wetlands. Such a letter shall be noted on site plans submitted to the Director of Public Works & Utilities. Isolated wetlands shall be delineated by protocols accepted by the Ohio EPA at the time of application of this regulation.
3. Section 404 of the Clean Water Act. Proof of conformance shall be a copy of the U.S. Army Corps of Engineers Individual Permit application, if an Individual Permit is required for the development project, public notice, or project approval. If an Individual Permit is not required, the site owner shall submit proof of conformance with the U.S. Army Corps of Engineer's Nationwide Permit Program. This shall include one of the following:
  - (a) A letter from the site owner verifying that a qualified professional has surveyed the site and found no Waters of the State. Such a letter shall be noted on site plans submitted to the Director.
  - (b) A site plan showing that any proposed fill of waters of the United States conforms to the general and specific conditions specified in the applicable Nationwide Permit. Wetlands, and other Waters of the State, shall be delineated by protocols accepted by the US Army Corps of Engineers at the time of application of this regulation.
4. Ohio Dam Safety Law. Proof of conformance shall be a copy of the Ohio Department of Natural Resources (ODNR) Division of Water permit application, a copy of the project approval letter from the ODNR Division of Water, or a letter from the site owner explaining why the Ohio Dam Safety Law is not applicable.
5. Applicable flood plain regulations. Soil disturbance activity must comply with all applicable flood plain regulations.
6. Applicable ground water protection laws. Soil disturbance activity must comply with all applicable ground water protection laws.

## CHAPTER 6: EROSION, SEDIMENT, AND POST-CONSTRUCTION STORM WATER CONTROL PLAN

(A) The ESPSC Plan shall describe in detail the type, location, and dimensions of temporary and permanent structural and non-structural erosion and sediment controls, temporary non-sediment pollution controls, and permanent post-construction storm water controls incorporated into the site design and a rationale for their selection. The rationale for selection of post-construction control(s) shall:

1. Identify how these controls will address flooding within the site as well as flooding that may be caused by the development upstream and downstream of the site; and
2. Demonstrate that these controls minimize anticipated impacts on channel and floodplain morphology, hydrology and water quality of the water resource(s) and floodplain(s).

Items that are included in the improvement plan may be incorporated by reference.

(B) The site owner shall submit an ESPSC Plan in accordance with the requirements of Chapter 4.

(C) The ESPSC Plan shall be certified by a professional engineer or a certified professional erosion and sediment control specialist.

(D) The ESPSC Plan shall incorporate measures as recommended by the most current edition of RLDM and shall include the following information:

1. Site description:
  - (a) A description of the nature and type of the soil disturbance activity (e.g. residential, shopping mall, highway, etc.).
  - (b) Total area of the site and the area of the site that is expected to be disturbed (i.e., grubbing, clearing, excavation, filling or grading, including off-site borrow areas).
  - (c) A measure of the impervious area and percent imperviousness created by the soil disturbing and/or construction activity including existing, new, and total impervious area after construction activity completion.
  - (d) A description of all planned erosion and sediment controls, non-sediment controls, and post-construction controls and their associated pretreatment practices for long-term storm water management being installed on the project site.
  - (e) Storm water calculations, including the volumetric runoff coefficients for both the pre-construction and post-construction site conditions, and resulting water quality volume; design details for post-construction storm water facilities and pretreatment practices such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3; and if applicable, explanation of the use of existing post-construction facilities. Ohio EPA recommends the use of data sheets (see Ohio's Rainwater and Land Development manual and Ohio EPA resources for examples).
  - (f) Existing data describing the soil and, if available, the quality of any known pollutant discharge from the site potentially resulting from previous contamination caused by prior land uses.
  - (g) A description of prior land uses at the site.

- (h) A description or representation (e.g., photographs) of the condition of any on-site streams (e.g., prior channelization, bed instability or headcuts, channels on public maintenance, or natural channels).
- (i) An implementation schedule which describes the sequence of major soil-disturbing operations (e.g., designation of vegetative preservation areas, grubbing, excavating, grading, utilities, and infrastructure installation) and the implementation of erosion and sediment controls to be employed during each operation of the sequence.
- (j) The location and name of the immediate receiving stream or surface water(s) and the first subsequent receiving water(s).
- (k) The aerial extent and description of wetlands or other special aquatic sites at or near the site which will be disturbed, or which will receive discharges from disturbed areas of the project.
- (l) For subdivided developments where the ESPSC Plan does not call for a centralized sediment control capable of controlling multiple individual lots, a detailed drawing of individual parcels with their erosion, sediment, or long-term storm water control practices and/or a detailed drawing of a typical individual lot showing standard individual lot erosion and sediment control practices. Where applicable, include designated erosion and sediment control practices for steep slopes, stream banks, drainage ways and riparian zones.
- (m) Descriptions of good housekeeping practices for managing non-sediment runoff including those related to storage and disposal of construction materials and construction activity generated waste and debris.
- (n) Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants associated with the development area and the best management practices to address pollutants in these storm water discharges.
- (o) A cover page or title identifying the name and location of the site, the name and contact information of construction site operator(s), the name and contact information for the person authorizing and amending the ESPSC Plan, preparation date, and the estimated dates that soil disturbance activities will start and be complete.
- (p) A log documenting grading and stabilization activities as well as amendments to the ESPSC Plan that occur after soil disturbance activities begin.
- (q) Site map showing:
  - (i) Limits of soil-disturbing activity of the site, including offsite spoil and borrow areas.
  - (ii) Soil types should be depicted for all areas of the site, including locations of unstable or highly erodible and/or known contaminated soils.
  - (iii) Existing and proposed contours. This shall include a delineation of drainage watersheds tributary to each storm water management control before, during and after major grading activities as well as the total off-site and on-site size of each drainage watershed in acres and the pre-construction and post-construction runoff coefficient for each area

- (iv) The location and delineated boundaries for any required riparian buffers.
- (v) Other setbacks and areas protected from soil disturbing activities on or within 200 feet of the site, including but not limited to conservation easements or areas designated as open space, preserved vegetation or otherwise protected from earth disturbing activities. Include a description of any associated temporary or permanent fencing or signage
- (vi) Surface water locations including springs, wetlands, streams, lakes, water wells, etc., on or within 200 feet of the site, including the boundaries of wetlands or stream channels and first subsequent named receiving water(s) the site owner intends to fill or relocate for which the site owner is seeking approval from the Army Corps of Engineers and/or Ohio EPA.
- (vii) Existing and planned locations of buildings, roads, parking facilities, and utilities and approximate depth to each
- (viii) Existing and proposed property boundaries and individual lot numbers.
- (ix) The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during the course of site development.
- (x) Sediment traps and basins, including their sediment storage and dewatering (detention) volume and contributing drainage area. Ohio EPA recommends the use of data sheets (see Ohio EPA's Rainwater and Land Development manual and website for examples) to provide data for all sediment traps and basins noting important inputs to design and resulting parameters such as their contributing drainage area, disturbed area, detention volume, sedimentation volume, practice surface area, dewatering time, outlet type and dimensions.
- (xi) The location of permanent post-construction storm water management controls (new and existing), including pretreatment practices, to be used to control pollutants in storm water after construction operations have been completed along with the location of existing and planned drainage features including catch basins, culverts, ditches, swales, surface inlets and outlet structures
- (xii) Areas designated for bulk storage of construction related materials and storage areas for liquids including, but not limited to, form release oils, pesticides, herbicides, fertilizer, fuel, paint, and cleaning solutions/solvents.
- (xiii) Areas designated for the storage or disposal of solid, sanitary and toxic wastes, including dumpster areas, areas designated for cement truck washout, and vehicle fueling.
- (xiv) The location of designated temporary and permanent construction entrances where the vehicles will ingress and egress the construction site.
- (xv) The location of any in-stream activities including areas of proposed floodplain fill, floodplain excavation, stream restoration and temporary or permanent stream crossings.

2. A soils engineering report. The Director of Public Works & Utilities may require the ESPSC Plan to include a Soils Engineering Report based upon his/her determination that the conditions of the soils are unknown or unclear so that additional information is required to protect against erosion or other hazards. This report shall be based on adequate and necessary test borings and shall contain all the information listed below. Recommendations included in the report and approved by the Director of Public Works & Utilities shall be incorporated in the grading plans and/or other specifications for site development.
  - (a) Data regarding the nature, distribution, strength, and erodibility of existing soils.
  - (b) If applicable, data regarding the nature, distribution, strength, and erodibility of the soil to be placed on the site.
  - (c) Conclusions and recommendations for grading procedures.
  - (d) Conclusions and recommended designs for interim soil stabilization devices and measures, and for permanent soil stabilization after soil disturbance activities are completed.
  - (e) Design criteria for corrective measures when necessary.
  - (f) Opinions and recommendations covering the stability of the site.

## **CHAPTER 7: EROSION AND SEDIMENT CONTROL REQUIREMENTS**

### **(A) OVERVIEW**

1. All development and soil disturbance activity subject to these regulations shall be provided with erosion and sedimentation control practices during all phases of soil disturbance. The standards outlined herein are general guidelines and shall not limit the right of the City to impose additional, more stringent requirements, nor shall the standards limit the right of the City to waive individual requirements.
2. The ESPSC Plan shall contain a description of the controls appropriate for each construction operation and the site owner shall implement such controls. The ESPSC Plan shall clearly describe for each major soil disturbance activity the appropriate control measures; the general sequence during the construction process under which the measures will be implemented; and the contractor responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization).
3. The ESPSC Plan shall identify the subcontractors engaged in activities that could impact storm water runoff. The ESPSC Plan shall contain signatures from all identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the ESPSC Plan.
4. It is recommended that the storm water controls used to satisfy the conditions of these regulations should meet the standards and specification of the most current edition of Ohio's Rainwater and Land Development Manual and associated Provisional Practices or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

### **(B) PRESERVATION MEASURES.**

1. The ESPSC Plan shall make use of stormwater controls that preserve the existing natural condition as much as feasible. Such stormwater controls may include preserving riparian

areas, existing vegetation, riparian buffer strips, and existing soil profile; phasing of construction operations in order to minimize the amount of disturbed land at any one time; and designation of tree preservation areas or other protective clearing or grubbing practices.

2. The site owner shall leave undisturbed a minimum buffer on either side of water resources, as required under any specified buffer requirements established by the City or the Director of Public Works & Utilities.

**(C) STABILIZATION CONTROLS.**

1. The ESPSC Plan shall make use of temporary and permanent stabilization controls that provide cover over disturbed soils. A description of stabilization controls designed to re-establish vegetation or suitable cover on disturbed areas after completion of soil disturbance activities shall be included in the ESPSC Plan.
2. The ESPSC Plan shall provide specifications for temporary and permanent stabilization of all disturbed areas of the site and provide guidance as to which method of stabilization will be employed for any time of the year. Stabilization controls may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, the use of construction entrances, and the use of alternative ground cover.
3. Stabilization controls shall meet the following requirements:
  - (a) Site Stabilization. Disturbed areas shall be stabilized as specified in Tables 2 and 3 below.

**Table 2 Permanent Stabilization**

| <b>Area requiring permanent stabilization</b>   | <b>Time frame to apply erosion controls</b>                     |
|---|---|
| Any area that will lie dormant for one (1) year or more   | Within seven (7) days of the most recent disturbance.           |
| Any area within 50 feet of a surface water of the state and at final grade (for disturbances allowed within the stream buffer.) | Within two (2) days of reaching final grade.                    |
| Any other area at final grade   | Within seven (7) days of reaching final grade within that area. |

**Table 3 Temporary Stabilization**

| <b>Area requiring temporary stabilization</b>  | <b>Time frame to apply erosion controls</b>  |
|--|--|
| Any disturbed area within 50 feet of a surface water of the state and not at final grade (for disturbances allowed within the required stream buffer.)                                       | Within two (2) days of the most recent disturbance if that area will remain idle for more than 14 days.  |
| For all construction activities, any disturbed area, including soil stockpiles that will be dormant for more than 14 days but less than one year, and not within the required stream buffer. | Within seven (7) days of the most recent disturbance within the area.<br>For residential subdivisions, disturbed areas shall be stabilized at least seven (7) days prior to transfer of permit coverage for the individual lot(s). |
| Disturbed areas that will be idle over winter  | Prior to onset of winter weather – follow the guidelines outlined in the Rainwater and Land Development Manual for dormant seeding specifications.   |

*Note: Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques shall be employed. These techniques may include*

*mulching or erosion matting.*

(b) Permanent stabilization of conveyance channels. Site owners shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding, mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques, or rock check dams, all as defined in the most recent edition of Rainwater and Land Development or the Field Office Technical Guide at: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/>.

(D) RUNOFF CONTROLS.

1. The ESPSC Plan shall incorporate temporary and permanent concentrated flow controls to prevent erosion. Such controls may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils, and protective grading practices. These controls shall divert runoff away from disturbed areas and steep slopes where practicable. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural and physical and biological characteristics and functions are maintained and protected.

(E) TEMPORARY SEDIMENT CONTROLS.

1. The ESPSC Plan shall include a description of temporary sediment controls that shall store runoff, allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Temporary sediment controls shall be used to trap sediment from a site remaining disturbed for more than 14 days. Such controls may include: sediment settling ponds, sediment barriers, storm drain inlet protection, and earth diversion dikes or channels which direct runoff to a sediment settling pond. All temporary sediment controls shall be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a temporary sediment control unless used in conjunction with a sediment settling pond.
2. Temporary sediment controls presented in the ESPSC Plan shall meet the following requirements:
  - (a) Timing. Temporary sediment controls shall be functional throughout the course of soil disturbing activities. Sediment basins and perimeter sediment barriers shall be implemented prior to soil disturbing activities and within seven (7) days from the start of grubbing. They shall continue to function until the up-slope development area is stabilized with permanent cover. As construction progresses and the topography is altered, appropriate controls shall be constructed, or existing controls altered to address the changing drainage patterns.
  - (b) Sediment settling ponds. Concentrated or collected storm water runoff and runoff from drainage areas that exceed the design capacity of sediment barrier(s) or inlet protection. The following requirements apply to sediment settling ponds:
    - (i) Sediment settling ponds are required for all inlets receiving drainage of one (1) or more acres.
    - (ii) Alternative controls may be considered for approval by the Director of Public Works & Utilities and Ohio EPA if the owner can demonstrate that the equivalent control is as effective as a sediment settling pond.

- (iii) The sediment-settling pond volume consists of a dewatering zone and a sediment storage zone. The dewatering zone volume shall be at least 67 cubic yards of storage per acre of total contributing drainage area with a minimum 48-hour drain time. The volume of the sediment storage zone shall be calculated using either of the following methods:
  - a. Method 1: The volume of the sediment storage zone shall be 1000 ft<sup>3</sup> per disturbed acre within the watershed of the basin, or
  - b. Method 2: The volume of the sediment storage zone shall be the volume necessary to store the sediment as calculated with RUSLE or similar generally accepted erosion prediction model.
- (iv) Specific information shall be provided for the sediment settling ponds/traps, including the size and type of skimmer or equivalent dewatering device. Calculations shall demonstrate that the outlet has been designed to achieve the 48-hour drawdown time. Specifications shall be provided for the geo-textile fabric and riprap for the emergency overflows for each settling pond/trap. The riser shall be wrapped first with a welded wire fencing and then with filter fabric.
- (v) When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by soil disturbance activity shall be included unless runoff from these areas is diverted away from the sediment settling pond and is not co-mingled with sediment-laden runoff. The depth of the sediment-settling pond shall be less than or equal to five feet. The configuration between the inlets and the outlet of the basin shall provide at least two units of length for each one unit of width (> 2:1 length/width ratio).
- (vi) When designing sediment settling ponds, the site owner shall consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. The use of a combination of sediment and erosion control measures in order to maximize pollutant removal is encouraged.
- (vii) Accumulated sediment shall be removed from the sediment storage zone once it exceeds 50 percent of the minimum required sediment storage design capacity and prior to the conversion to the post-construction practice unless suitable storage is demonstrated based upon over-design.
- (viii) If feasible, sediment settling ponds shall be dewatered at the pond surface using a skimmer or equivalent device.

(c) Sediment Barriers and Diversions. Sheet flow runoff from denuded areas shall be intercepted by sediment barriers or diversions to protect adjacent properties, water resources, and wetlands from sediment transported via sheet flow. Where intended to provide sediment control, sediment barriers shall be placed on a level contour and shall be capable of temporarily ponding runoff. For most applications, standard silt fence may be substituted with a 12-inch diameter sediment barrier. The relationship between the maximum drainage areas to silt fence for a particular slope range is shown in **Table 4** below. Note that placing sediment barriers in parallel series does not extend the size of the drainage area. Storm water diversion practices shall be used to keep runoff away

from disturbed areas and steep slopes. Such devices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

**Table 4 Maximum Drainage Area to Sediment Barrier Based on Slope**

| <b>Maximum drainage area (in acres) to 100 linear feet of sediment barrier</b> | <b>Range of slope for a particular drainage area (percent)</b> |
|--|--|
| 0.5  | <2%  |
| 0.25   | ≥ 2% but < 20%   |
| 0.125  | ≥ 20% but < 50%  |

- (d) Inlet Protection. Temporary sediment controls, such as boxed inlet protection, shall be installed to minimize sediment-laden water entering active storm drain systems. Straw or hay bales are not acceptable forms of inlet protection. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.
- (e) Off site tracking of sediment and dust control. Temporary controls shall be implemented to ensure sediment is not tracked off-site and that dust is controlled. These temporary controls shall include, but are not limited to, the following:
  - (i) Construction entrances shall be built and shall serve as the only permitted points of ingress and egress to the development area. These entrances shall be built of a stabilized pad of aggregate stone or recycled concrete or cement sized greater than 2" in diameter, placed over a geotextile fabric, and constructed in conformance with specifications in the most recent edition of the Rainwater and Land Development Manual.
  - (ii) Streets directly adjacent to construction entrances and receiving traffic from the development area shall be cleaned weekly to remove sediment tracked off-site. If applicable, the catch basins on these streets nearest to the construction entrances shall also be cleaned weekly.
  - (iii) Based on site conditions, the Director of Public Works & Utilities may require additional temporary controls for off-site tracking and dust. These additional controls may include:
    - a. Silt fence or snow fence installed around the perimeter of the development area to ensure that all vehicle traffic adheres to designated construction entrances.
    - b. Designated wheel equipment and vehicle washing areas. No detergents may be used to wash vehicles or equipment onsite. Wash water from these areas shall be directed to a designated sediment trap, the sediment-settling pond, or an alternative control that provides equivalent treatment prior to discharge.
    - c. Site owners shall take all necessary measures to comply with applicable regulations regarding fugitive dust control. Director of Public Works & Utilities may require dust controls including the use of water trucks to wet disturbed areas, tarping stockpiles, temporary stabilization of disturbed areas, and regulation of the speed of vehicles on the site.

(f) Stream Protection. Soil disturbance activities and vehicles shall avoid impacts adjacent to and within water resources and wetlands. If the site owner is authorized to disturb areas within the required buffer for a water resource or wetland, the following conditions shall be addressed in the ESPSC Plan:

- (i) All erosion and sediment controls, permanent post-construction storm water controls, and stream crossings shall be designed as specified in the most recent edition of Ohio's RLDM.
- (ii) Temporary sediment controls shall be designed and implemented on site to protect water resources or wetlands from the impacts of sediment runoff.
- (iii) No temporary sediment controls (e.g., the installation of silt fence or a sediment settling pond in-stream) shall be placed within a water resource or wetland.
- (iv) Where stream crossings for roads or utilities are necessary and permitted, the project shall be designed such that the number of stream crossings and the width of the disturbance within the required buffer for a water resource or wetland are minimized.
- (v) Temporary stream crossings shall be constructed if water resources or wetlands will be crossed by construction vehicles during construction.
- (vi) Construction of bridges, culverts, or sediment control structures shall not place soil, debris, or other particulate material into or close to the water resources or wetlands in such a manner that it may slough, slip, or erode.
- (vii) Soil disturbance activities immediately adjacent to surface waters of the state shall, if feasible, provide and maintain a permanent 50-foot, undisturbed natural buffer around surface waters of the state, direct storm water to vegetated areas to increase sediment removal, and maximize storm water infiltration. If it is infeasible to provide and maintain an undisturbed 50-foot natural buffer, temporary stabilization requirements shall be applied within two days of the most recent disturbance and permanent stabilization shall be applied within two (2) days of reaching final grade.

(g) Modifying Controls. If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the site owner shall replace or modify the control for site conditions.

(F) NON-SEDIMENT POLLUTANT CONTROLS.

1. Other than sediment, no solid or liquid waste, including building materials, shall be discharged in storm water runoff. The site owner shall implement site controls to prevent the discharge of non-sediment pollutants – including concrete truck washout, stucco, paint, form release oils, curing compounds, other construction materials, vehicle fuel, oils or other vehicle fluids directly to the City drainage channels, storm sewer, water resources, or wetlands. The ESPSC Plan shall describe practices that include but are not limited to the following:
  - (a) Construction Site Materials Storage. Methods to minimize the exposure of building materials, building products, landscape materials, fertilizers, pesticides, herbicides, detergents and sanitary waste to precipitation, storm water runoff, and snow melt.

Appropriate practices could include indoor storage facilities, outdoor covered storage areas surrounded by barriers, berms, or dikes to provide protection from runoff, and location of storage areas away from storm sewer systems and water resources.

- (b) Construction Site Waste Materials. A covered dumpster shall be made available for the proper storage and disposal of construction site waste materials, garbage, plaster, drywall, grout, or gypsum.
- (c) Concrete Truck Wash Out. The washing of excess concrete material into a street, catch basin, or other public facility, or into a water resource or wetland, shall not occur. A designated area for concrete washout shall be made available. Wash waters will be treated in a sediment basin, or an alternative control that provides equivalent treatment, prior to discharge.
- (d) Fuel Tank Storage. All fuel tanks and drums shall be stored in a marked storage area. A dike shall be constructed around this storage area with a minimum capacity equal to 110% of the volume of the largest container in the storage area.
- (e) Toxic or Hazardous Waste Disposal. Any toxic or hazardous waste shall be disposed of properly.
- (f) Contaminated Soils. Runoff from contaminated sites shall not be discharged from the site. Appropriate controls include, but are not limited to:
  - (i) The use of berms, trenches and pits to collect contaminated runoff and prevent discharges.
  - (ii) Pumping runoff into a sanitary sewer (with prior approval of the sewer owner/operator) or into a container for transport to an appropriate treatment/disposal facility.
  - (iii) Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the contaminated soils or sediment.
- (g) Owners should consult with Ohio EPA Division of Surface Water prior to seeking coverage under the CGP when soil disturbance activities are planned on a site with contaminated soils.

#### (G) COMPLIANCE WITH OTHER REQUIREMENTS.

The ESPSC Plan shall be consistent with applicable State and/or local waste disposal, sanitary sewer, or septic system regulations, including provisions prohibiting waste disposal by open burning, and shall provide for the proper disposal of contaminated soils located within the soil disturbance activity area.

#### (H) TRENCH AND GROUND WATER CONTROL.

There shall be no sediment-laden or turbid discharges to water resources or wetlands resulting from dewatering activities. All dewatering will be performed using a skimmer or equivalent device that draws water from the surface. If trench or ground water contains sediment, it shall pass through a sediment-settling pond or other equally effective sediment control device, prior to being discharged from the soil disturbance activity site. Alternatively, sediment may be removed by settling in place or by dewatering into a sump pit, filter bag or comparable practice. Ground water which does not contain sediment or other pollutants is not required to be treated prior to discharge. However, care shall be taken when

discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.

(I) MAINTENANCE OF EROSION AND SEDIMENT CONTROLS.

All temporary erosion and sediment storm water control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All temporary sediment control practices shall be maintained in a functional condition until all up-slope areas they control are permanently stabilized, as determined by the Director of Public Works & Utilities. The erosion and sediment controls shall be designed to minimize maintenance requirements. The applicant shall provide a description of maintenance procedures needed to ensure the continued performance of control practices and shall ensure a responsible party and adequate funding to conduct maintenance, all as determined by the Director of Public Works & Utilities. The person(s) or entity responsible for the continued maintenance of temporary and permanent erosion control measures shall, prior to any earth disturbance, be identified to the satisfaction of the City.

(J) INSPECTIONS OF TEMPORARY SEDIMENT AND EROSION CONTROLS

1. All temporary sediment and erosion controls on the site shall be inspected at least once every seven calendar days and by the end of the next calendar day, excluding weekends and holidays unless work is scheduled, after any storm event greater than one-half inch of rain per 24-hour period. The site owner shall assign qualified inspection personnel to conduct these inspections to ensure that the controls are functional and to evaluate whether the ESPSC Plan is adequate, or whether additional controls are required. Qualified inspection personnel are individuals with knowledge and experience in the installation and maintenance of sediment and erosion controls.
2. These inspections shall meet the following requirements:
  - (a) Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of or the potential for, pollutants entering the drainage system.
  - (b) Erosion and sediment control measures identified in the ESPSC Plan shall be observed to ensure that they are operating correctly.
  - (c) Discharge locations shall be inspected to determine whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters.
  - (d) Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.
  - (e) Following each inspection, a report shall be completed and signed by the qualified inspector or their designee. The inspection report will, at a minimum, include the following items:
    - (i) the inspection date;
    - (ii) names, titles, and qualifications of personnel making the inspection;
    - (iii) weather information for the period since the last inspection (or since commencement of soil disturbance activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;

- (iv) weather information and a description of any discharges occurring at the time of the inspection;
- (v) location(s) of discharges of sediment or other pollutants from the site;
- (vi) location(s) of controls that need to be maintained;
- (vii) location(s) of controls that failed to operate as designed or proved inadequate for a particular location;
- (viii) location(s) where additional controls are needed that did not exist at the time of inspection; and
- (ix) corrective action required including any changes to the SWP3 necessary and implementation dates.

3. The site owner shall maintain for three (3) years following the final stabilization of the site a record summarizing the results of these inspections, names(s) and qualifications of personnel making the inspections, the date(s) of inspections, major observations relating to the implementation of the ESPSC Plan and a certification as to whether the facility is in compliance with the ESPSC Plan and identify any incidents of non-compliance.
4. The Director of Public Works and Utilities may inspect all controls for soil disturbing activities, including erosion and sediment control devices and facilities while a development site, when subject to this regulation, is under construction. When facilities are not constructed according to approved plans, the Director of Public Works & Utilities has the explicit authority to compel compliance with the approved plan and the objectives and standards of this regulation. Prior to final inspection, the developer's engineer shall provide the site grading plan documenting the intended site final grades.
5. When inspections reveal the need for repair, replacement, or installation of temporary erosion and sediment controls or off-site spills of site materials have occurred, the following procedures shall be followed:
  - (a) When practices require repair or maintenance. If an inspection reveals that a control is in need of repair or maintenance, with the exception of a sediment-settling pond, it shall be repaired or maintained within three (3) days of the inspection. Sediment settling ponds shall be repaired or maintained within 10 days of the inspection.
  - (b) When practices fail to provide their intended function. If an inspection reveals that a control fails to perform its intended function as detailed in the ESPSC Plan and that another, more appropriate control is required, the ESPSC Plan shall be amended, and the new control shall be installed within 10 days of the inspection.
  - (c) When controls depicted on the ESPSC Plan are not installed. If an inspection reveals that a control has not been implemented in accordance with the schedule, the control shall be implemented within 10 days from the date of the inspection. If the inspection reveals that the planned control is not needed, the record shall contain a statement of explanation as to why the control is not needed.
6. When off-site spills of site material occur. The owner shall be responsible for promptly removing all soil, miscellaneous debris and other materials that may become spilled, dumped or otherwise deposited on any public thoroughfares during transport to and from the development site, and taking precautions to inhibit the deposition of sediment or other materials into any sewer system or natural watercourse. In addition, the owner shall assume responsibility and all costs for removing any sediment or other construction site

related materials deposited in downstream drainage ways or facilities deemed objectionable by the City to the proper functioning of these downstream areas.

7. It shall be the responsibility of the site owner to provide notification to the City 48 hours prior to commencement of initial site earth-disturbance. In addition, the site owner shall provide notification to the City, at least 48 hours prior to any work within or across a stream channel or stream buffer area. Furthermore, within 45 days after site final stabilization has been achieved, it shall be the responsibility of the site owner to inform the Director of Public Works & Utilities that site activities are complete.

## **CHAPTER 8: POST-CONSTRUCTION STORM WATER CONTROL REQUIREMENTS**

### **(A) OVERVIEW**

1. Post-construction storm water controls manage storm water after construction is complete. The purpose of post-construction storm water controls is to provide for the continual control of storm water quality and quantity from the site that may adversely impact surface waters of the state and/or adjacent properties. Adverse impacts that are the target of this effort include erosion from increased velocity and quantity of water, sedimentation from the movement of soil, or deposition of pollutants in storm water runoff resulting from contact with impervious surfaces such as roadways, sidewalks, roofs, and parking lots.
2. Control of storm water discharges can be accomplished through the use of structural and/or nonstructural practices. Examples of post-construction storm water controls include, but are not limited to: open space, trees, vegetation, and riparian corridor preservation; extended detention basins and wetlands; underground storage with and without underdrains; bioretention areas; infiltration trenches and basins; and permeable pavement. Use of green infrastructure practices is encouraged.
3. This regulation provides requirements addressing the quality and quantity of storm water runoff associated with construction and soil disturbing activities. It is the owner's responsibility to ensure compliance with other related City code requirements related to storm sewers, drainage and floodplain management.

### **(B) POST-CONSTRUCTION STORM WATER CONTROL REQUIREMENTS**

1. A permanent post-construction storm water control system, including associated pre-treatment, erosion control, runoff reduction, and conveyance components, is required for all sites disturbing one or more acres of land or smaller sites that are part of a larger plan of development that disturbs one or more acres of land.
2. The permanent post-construction storm water control system shall provide long-term management of storm water quality and quantity so that receiving stream's physical, chemical, and biological characteristics are protected and stream functions are maintained.
3. The post-construction stormwater control system may not be installed within a surface water of the state unless authorized through an approved CWA 401 water quality certificate, a CWA 404 permit, or Ohio EPA non-jurisdictional wetlands/stream program approval.
4. Design of post-construction storm water control systems shall be practical and provide for sustainable long-term operation. Control systems sized to meet the design and performance criteria in these regulations but that do not provide sustainable long-term operation do not, in fact, satisfy the requirements of these regulations and shall not be approved as part of an ESPSC Plan.

5. The design criteria for effective post-construction storm water control systems in this regulation reduce peak flows, velocities, and pollutant loads as necessary to achieve receiving water objectives through runoff reduction of a portion of the storm water volume in combination with extended detention of remaining storm water volume over 24 to 48 hours.
6. The ESPSC Plan shall contain a description of the structural and non-structural post-construction storm water control systems that will be installed and used during and after construction of the site and the rationale for the selection of each control as it relates to meeting the post-construction requirements of this regulation. The rationale shall address the anticipated impacts on the channel and floodplain morphology, hydrology, water quality and adjacent and downstream properties.
7. The controls chosen shall be compatible with site and soil conditions.
8. Detailed drawings and maintenance plans shall be provided for the post-construction storm water control system as part of the ESPSC Plan.
  - (a) The design of post-construction storm water control systems shall consider public safety as a design factor.
  - (b) The ESPSC Plan shall contain detailed drawings for each post-construction control and associated pre-treatment, runoff reduction, and conveyance control to be employed on the site. Each detailed drawing shall be to scale with dimensions and elevations showing storage volumes, sizes of contributing drainage areas, outlet details – plan and profile views, drain times, outlet protection devices, and velocity dissipation devices/practices. The use of Ohio EPA data sheets is recommended for presenting this information (see Ohio's RLDM and Ohio EPA resources for examples).
  - (c) Maintenance plans shall describe how pollutants collected within structural post-construction storm water controls will be disposed of in accordance with local, state and federal regulations.
9. Calculations presented as a separate report shall be provided with the ESPSC Plan for projected storm water flows, volumes, and timing into and through all post-construction storm water control systems (see Chapter 8, Sections F). Calculations shall address the following topics:
  - (a) Each calculation shall describe the underlying assumptions and hydrologic and hydraulic methods and parameters, under pre- and post-construction land use conditions, for flood control, water resource protection, and water quality.
  - (b) Storm water calculations shall include the area weighted volumetric runoff coefficients and resulting water quality volume (WQv) under both pre-construction and post-construction site conditions and resulting WQv for the catchment tributary to each post-construction storm water control system. Calculations shall follow protocols described in Chapter 8, Sections E and F.
  - (c) Calculations shall demonstrate compliance with local storm water quantity management requirements. Quantity-based criteria and methodology are presented in Chapter 8, Section M and in compliance with applicable local codes.

- (d) Calculations shall demonstrate that off-site storm water has been considered in the calculations and indicate that no adverse impacts are conveyed downstream of the site.
- 10. The post-construction storm water management control practices and methods used to satisfy the requirements of the ESPSC Plan shall incorporate measures as recommended by the most current edition of the Ohio Rainwater and Land Development Manual published by the Ohio EPA and the Water Environment Federation (WEF) Manual of Practice 23/ASCE Manual and Report on Engineering No. 87 (or more current version), or other technical references approved by the Engineering and Environmental Services Director of Public Works & Utilities.

#### (C) APPLICABILITY OF POST-CONSTRUCTION STORM WATER CONTROL SYSTEMS

- 1. Large Soil Disturbance Activities. For all soil disturbance activities that will disturb two or more acres of land or will disturb less than two acres, but is a part of a larger common plan of development or sale which will disturb two or more acres of land, the post construction control(s) chosen shall be able to manage storm water runoff for protection of the stream channels, stream erosion control, and improved water quality, as outlined in sections B, E and F in this chapter. The controls chosen shall be sized to treat the WQv, as outlined in Section (E) of this chapter, and comply with Ohio Water Quality Standards in OAC Chapter 3745-1
- 2. Small Soil disturbance Activities. For all soil disturbance activities that will disturb one or more, but less than two acres of land and is not a part of a larger common plan of development or sale which will disturb one or more acres of land, post-construction storm water control requirements shall be satisfied through Section (G) of this chapter.
- 3. Linear Construction Projects. Linear projects (e.g., pipeline or utility line installation) which do not result in the installation of impervious surfaces are not required to include post-construction storm water controls in the ESPSC Plan. However, linear construction projects shall be designed to minimize the number of stream crossings and the width of disturbance and achieve final stabilization of the disturbed area as defined in Chapter 7.

#### (D) STORM WATER QUALITY REQUIREMENTS

- 1. When a proposed soil-disturbing activity will occur on one (1) acre or more or is part of a larger plan of development disturbing one (1) acre or more of soil, structural post-construction storm water control systems shall be capable of treating the WQv and drain down over a prescribed number of hours. The WQv is the volume of storm water runoff that shall be captured by the post-construction storm water control.
- 2. Selected post-construction storm water controls designed according to these regulations shall be able to control storm water runoff as necessary to protect stream channels, provide stream erosion control, and improve water quality.
- 3. Structural (designed) post-construction storm water controls shall be incorporated into the permanent conveyance system for the site.
- 4. Methods for controlling increases in the rate and volume of storm water may include, but are not limited to, the following:
  - (a) Preserving of designated open space, conservation areas, and vegetated areas; delineation and protection of riparian buffer zones; protection of uncompacted soils; and soil restorations.

- (b) Detaining storm water in surface or subsurface storage facilities with inlet and outlet features designed to manage precipitation events.
- (c) Enhancing infiltration/evapotranspiration of storm water where practical through installation of infiltration controls in areas where site soils are suitable, retaining topsoil for all areas to be revegetated, or providing good filtration areas with proper emergency overflow facilities.
- (d) Retarding storm water flow and rate through the use of runoff reduction controls that increase friction (e.g., allowing runoff to flow across vegetated swales rather than through traditional street gutters and conveyance); intercept storm water where it falls (e.g., vegetated roofs or permeable pavement); and disconnecting impervious surfaces where practical.
- (e) Installing post-construction storm water controls including grading and construction of terraces or diversions to slow storm water by diffusion, or use of grade control structures, such as check dams, to provide a level of control in flow paths and/or existing drainage systems.

5. Post-construction storm water control systems shall include pre-treatment controls and erosion controls at each inlet and outlet.
6. Pre-treatment controls shall be employed at each inlet to a post-construction storm water control and may be placed at other locations within the site to prevent floating materials and coarse sediment, such as litter, debris, trash, oil, and yard waste from discharging into a post-construction storm water control. Pre-treatment controls are intended to preserve the infiltration and storage capacity of the post-construction storm water control, increase its functional life, prevent scour/erosion at inlets, and simplify removal of collected sediment, debris, and other materials. Acceptable pre-treatment controls include:
  - (a) Forebays and micropools.
  - (b) Vegetated swales.
  - (c) Vegetated filter strips (sheet flow runoff only).
  - (d) Manufactured treatment devices.
  - (e) Deep sump trap or catch basin.
7. Post-construction storm water control systems shall be designed according to the methodology included in the RLDM or in standards as accepted by the Director of Public Works & Utilities

#### (E) PERFORMANCE STANDARDS

1. The post-construction storm water controls chosen shall be sized to treat the WQv and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1.
2. The WQv shall be equivalent to the volume of runoff from a 0.9-inch rainfall and shall be determined using the following equations:

$$WQv = Rv \cdot P \cdot A / 12 \quad (\text{Equation 1})$$

where:

$WQv$  = water quality volume in acre-feet;  
 $Rv$  = volumetric runoff coefficient calculated using Equation 2  
 $P$  = 0.9-inch precipitation depth; and  
 $A$  = area draining into the control in acres

$$Rv = 0.05 + 0.9 \cdot i \quad (\text{Equation 2})$$

where

$i$  = fraction of post-construction impervious surface

See **Table 5** for volumetric runoff coefficient values based on land use type.

3. The post-construction storm water controls chosen shall be sized to treat the  $WQv$  and comply with Ohio's Water Quality Standards in OAC Chapter 3745-1.
4. Where the land use will be mixed, the runoff coefficient shall be calculated using a weighted average. For example, if 60% of the contributing drainage area to the storm water treatment structure is Low Density Residential, 30% is High Density Residential and 10% is Open Space, the runoff coefficient is calculated as  $(0.6)(0.3) + (0.3)(0.5) + (0.1)(0.2) = 0.35$ .
5. An additional volume equal to twenty (20) percent of the  $WQv$  shall be incorporated into the control for sediment storage and/or reduced infiltration capacity.
6. Erosion controls and permanent stabilization shall be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

**Table 5 Volumetric Runoff Coefficients Based on Land Use Types**

## (F) STANDARD POST-CONSTRUCTION STORM WATER CONTROL SYSTEMS

Post-construction storm water controls and associated drain times approved for use by Ohio EPA are presented in **Tables 6a and 6b**.

1. Both a permanent pool and an extended detention storage volume above the permanent pool, each sized at  $1.0 * WQv$ , shall be provided for detention storage basins.
2. Post-construction storm water controls shall be designed such that the drain time is long enough to provide treatment, but short enough to provide storage available for successive rainfall events and avoid creation of nuisance conditions. (See drain times for standard post-construction controls in Tables 6a and 6b.)

**Table 6a Extended Detention Controls for Post-Construction Storm Water Control Systems**

| County Zoning District (or Equivalent)  |  | Imperviousness Fraction           | Volumetric Runoff Coefficient (Rv) |
|---|--|-----------------------------------|------------------------------------|
| Name  | Characteristics  |                                   |                                    |
| ----  | Parks, cemeteries, golf courses, lawns, playgrounds or unimproved land | 0.05                              | 0.10                               |
| “AA”  | Residence District > 43,561 sq. ft. lot                                | 0.20                              | 0.23                               |
| “A”   | Residence District 17,501 to 43,560 sq. ft. lot                        | 0.25                              | 0.28                               |
| “A-2”   | Residence District 12,001 to 17,500 sq. ft. lot                        | 0.33                              | 0.35                               |
| “B”   | Residence District 9,001 to 12,000 sq. ft. lot                         | 0.45                              | 0.46                               |
| “B-2”   | Residence District 6,001 to 9,000 sq. ft. lot                          | 0.58                              | 0.57                               |
| “C”   | Residence District 5,001 to 6,000 sq. ft. lot                          | 0.65                              | 0.64                               |
| “D”   | Residence District up to 5,000 sq. ft. lot                             | 0.75                              | 0.73                               |
| “DD”  | Planned Multiple Residence District                                    | 0.80                              | 0.77                               |
| “O”   | Office District  | 0.85                              | 0.82                               |
| “OO”  | Planned Office District  | 0.85                              | 0.82                               |
| “E”   | Retail Business District   | 0.85                              | 0.82                               |
| “EE”  | Planned Business District  | 0.85                              | 0.82                               |
| “EF”  | Excavation and Landfill District                                       | 0.10                              | 0.14                               |
| “F”   | Light Industrial District  | 0.88                              | 0.84                               |
| “FF”  | Planned Light Industrial District                                      | 0.92                              | 0.88                               |
| “FPM”   | Flood Plain Management District  | Established on Case-by-Case Basis |                                    |
| “G”   | Heavy Industrial District  | 0.95                              | 0.91                               |
| “GG”  | Planned Heavy Industrial District                                      | 0.95                              | 0.91                               |
| “H”   | Riverfront District  | Established on Case-by-Case Basis |                                    |
| “MHP”   | Mobile Home Park District  | 0.85                              | 0.82                               |
| -----   | Parking lots (paved), roofs, driveways                                 | 1.00                              | 0.95                               |
| Where land use will be mixed, the runoff coefficient should be calculated using a weighted average. For example, if 60% of the contributing drainage area to the storm water treatment structure is Residence District 10,500 sq. ft. lot, 30% is Planned Multiple Residence District, and 10% is unimproved land, the runoff coefficient is calculated as follows $(0.6)(0.46)+(0.3)(0.77)+(0.1)(0.10) = (0.52)$ |  |                                   |                                    |

| Extended Detention Controls                                       | Minimum Drain Times of WQv |
|---|----------------------------|
| Wet Extended Detention Basin <sup>a,b</sup>                       | 24 hours                   |
| Construction Extended Detention Wetland <sup>a,b</sup>            | 24 hours                   |
| Dry Extended Detention Basin <sup>a,c</sup>                       | 48 hours                   |
| Permeable Pavement – Extended Detention <sup>a</sup>              | 24 hours                   |
| Underground Storage – Extended Detention <sup>a,d</sup>           | 24 hours                   |
| Sand & Other Media Filtration – Extended Detention <sup>a,e</sup> | 24 hours                   |

**Table 6a Notes:**

- a. The outlet structure shall not discharge more than the first half of the WQv in less than one-third of the drain time.
- b. Provide a permanent pool with a minimum volume equal to the WQv and an extended detention volume above the permanent pool equal to 1.0 x WQv.
- c. Dry basins shall include a forebay and a micropool each sized at a minimum of 0.1 x WQv and a protected outlet or include acceptable pretreatment and a protected outlet.
- d. Underground storage shall have pretreatment for removal of suspended sediments included in the design and documented in the SWP3. This pretreatment shall concentrate sediment in a location where it can be readily removed. For non-infiltrating, underground extended detention systems, pretreatment shall be 50% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction Control Testing Protocol.
- e. The WQv ponding area shall completely empty between 24 and 72 hours

**Table 6b Infiltration Controls for Post-Construction Storm Water Control Systems**

| Infiltration Practices                            | Maximum Drain Times of WQv |
|---|----------------------------|
| Bioretention Area/Cell <sup>a,b</sup>             | 24 hours                   |
| Infiltration Basin                                | 24 hours                   |
| Infiltration Trench <sup>b</sup>                  | 48 hours                   |
| Permeable Pavement – Infiltration <sup>c</sup>    | 48 hours                   |
| Underground Storage – Infiltration <sup>c,d</sup> | 48 hours                   |

**Table 6b Notes:**

- a. Bioretention soil media shall have a permeability of approximately 1 – 4 in/hr. Meeting the soil media specifications in the RLDM is considered compliant with this requirement. Bioretention cells shall have underdrains unless in-situ conditions allow for the WQv (surface ponding) plus the bioretention soil (to a depth of 24 inches) to drain completely within 48 hours.
- b. Infiltration controls with the WQv stored above ground (bioretention, infiltration basin) shall fully drain the WQv within 24 hours to minimize nuisance effects of standing water and to promote vigorous communities of appropriate vegetation.
- c. Subsurface controls designed to fully infiltrate the WQv (infiltration trench, permeable pavement with infiltration, underground storage with infiltration) shall empty within 48 hours to recover storage for subsequent storm events.
- d. Underground storage controls with infiltration shall have adequate pretreatment of suspended sediments included in the design and documented in the SWP3 in order to minimize clogging of the infiltrating surface. Pretreatment shall concentrate sediment in a location where it can be readily removed. Examples include media filters situated upstream of the storage or other suitable alternative approved by Ohio EPA. For infiltrating underground controls, i shall be 80% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction Control Testing Protocol.

## (G) RUNOFF REDUCTION CONTROLS.

1. The WQv used to size Post-Construction Controls may be reduced by incorporating Runoff Reduction Controls (see **Table 7**) into the post-construction storm water control system. The approach to calculate and document runoff reduction is detailed in the RLDM. Control-specific runoff reduction volumes are set by specifications in the RLDM for the following controls:
  - (a) Impervious surface disconnection
  - (b) Rainwater harvesting
  - (c) Bioretention
  - (d) Infiltration basin or trench
  - (e) Permeable pavement with infiltration

- (f) Underground storage with infiltration
- (g) Grass swale
- (h) Sheet flow to filter strip or conservation area
- (i) Green roof

**Table 7 Runoff Reduction Controls and Associated Drain (Drawdown) Times**

| <b>Runoff Reduction Practice</b>  | <b>Drain Time of WQv</b> |                | <b>Runoff Reduction Credit (%) of WQv<sub>RR</sub>)</b> |
|---|--------------------------|----------------|---|
|   | <b>Minimum</b>           | <b>Maximum</b> |   |
| Impervious surface disconnection  | N/A                      | 48 hours       | TBD   |
| Rainwater harvesting and reuse  | N/A                      | 48 hours       | Min (V <sub>RR</sub> / WQv <sub>RR</sub> , 100%)        |
| Vegetated Swales: Detention Design  | 24-hours                 | 48 hours       | Min (V <sub>RR</sub> / WQv <sub>RR</sub> , 100%)        |
| Vegetated Swales: Flow Through <ul style="list-style-type: none"> <li>▪ HSG A/B or Amended</li> <li>▪ HSG C/D</li> </ul>  | 1                        | N/A            | 22%<br>11%  |
| Vegetated Strips: Turf Grass <ul style="list-style-type: none"> <li>▪ HSG A/B or Amended</li> <li>▪ HSG C/D</li> </ul>  | 24 hours                 | 48 hours       | 72%<br>36%  |
| Vegetated Strips: Conservation Areas <ul style="list-style-type: none"> <li>▪ HSG A/B or Amended</li> <li>▪ HSG C/D</li> </ul>  |                          |                | 100%<br>53%   |
| Vegetated Roof  | 24 hours                 | 48 hours       | Min (V <sub>RR</sub> / WQv <sub>RR</sub> , 100%)        |
| Partial Infiltration  | 24 hours                 | 48 hours       | Min (V <sub>RR</sub> / WQv <sub>RR</sub> , 100%)        |
| <b>Notes:</b>   |                          |                |   |
| 1. Size to convey a volume equal to the WQv, a duration of two (2) hours, and peak rainfall intensity of one (1) inch/hour at a depth of no more than three (3) inches. The use of this criterion is limited to sites where the total area disturbed is five (5) acres or less. |                          |                |   |

2. A Runoff Reduction Volume shall be calculated as a fraction of the water quality volume draining into and/or raining upon each Runoff Reduction Practice (WQv<sub>RR</sub>) based on the water retention properties of the control:

$$RRV = WQv_{RR} * RR_{Credit} \quad (\text{Equation 3})$$

Where:

$RRV$  = Runoff Reduction Volume, acre-feet  
 $WQv_{RR}$  = Water quality volume draining into and/or raining onto the Runoff Reduction Practice, acre-feet  
 $RR_{Credit}$  = Fraction of  $WQv_{RR}$  retained by the Runoff Reduction Practice (%)

The  $RR_{Credit}$  is determined for a Runoff Reduction Control using the equation or value listed on Table 7.  $V_{RR}$  in the equation is defined as:

$$V_{RR} = \text{Volume retained by the Runoff Reduction Control, acre-feet}$$

3. Additional guidance for determining the Runoff Reduction Volume may be found in the RLDM, or an alternative methodology proposed by the Owner and approved by the City.
4. The City may approve use of runoff reduction controls as a post-construction storm water control for areas of the site not draining into a common conveyance system of the site (e.g., sheet flow from perimeter areas such as the rear yards of residential lots, low density development scenarios, areas draining through a stream corridor protection area. The ESCSP

Plan shall demonstrate that the intent of pollutant removal and stream protection is being addressed by the selected Runoff Reduction controls.

**(H) ALTERNATIVE POST-CONSTRUCTION CONTROLS.**

Approval is required from both the Director of Public Works & Utilities and Ohio EPA to use alternative structural post-construction controls if the permittee can:

1. Demonstrate that none of the controls identified in Tables 6a and 6b of this regulation are feasible at this site.
2. Demonstrate that the alternative controls are equivalent in treating 100% of the WQv and perform better than those listed in Tables 6a and 6b,
3. Provide results of field or laboratory testing of the alternative control for treatment capabilities by a qualified, independent third party using the methodologies presented in the most recent version of the Ohio EPA General Permit for Storm Water Discharges Associated with Construction Activity (Construction General Permit); OR provide results from either the Washington State Technology Assessment Program (TAPE) or the New Jersey Department of Environmental Protection Manufactured Treatment Devices (MTD) program for equivalent controls.

**(I) EXISTING POST-CONSTRUCTION CONTROLS.**

Construction activities shall be exempt from this condition if it can be demonstrated that the treatment of the WQv is provided within an existing post-construction storm water control system that is part of a larger common plan of development or if structural post-construction storm water control systems are addressed in a regional or local storm water management plan. Use of existing or regional post-construction storm water controls systems is contingent on identification of the owner responsible for long-term maintenance and inspection of the facilities.

**(J) PREVIOUSLY DEVELOPED SITES.**

For previously developed (i.e., developments on previously developed property), one or a combination of the following two conditions shall be met:

1. A twenty (20) percent net reduction of the site's volumetric runoff coefficient through impervious area reduction with soil restoration or replacing impervious roof area with green roof, or
2. Treatment of at least twenty (20) percent of the WQv for the previously developed area using a practice meeting Table 6a/6b criteria.

Where there is a combination of redeveloped areas and new development, a weighted approached shall be used with the following equation:

$$WQv = P * A * [(Rv1 * 0.2) + (Rv2 - Rv1)] / 12 \quad (\text{Equation 4})$$

Where:

P = 0.90 inches  
 A = Area draining into the control in acres  
 Rv1 = Volumetric runoff coefficient for existing conditions (current site impervious area)

Rv2 = Volumetric runoff coefficient for proposed conditions (post-construction site impervious area)

Post-construction storm water control systems shall be located to treat impervious areas most likely to generate the highest pollutant load, such as parking lots or roadways, rather than areas predicted to be cleaner such as rooftops.

(K) FLOW-THROUGH DESIGN POST-CONSTRUCTION STORM WATER CONTROL SYSTEMS.

1. Certain post-construction storm water controls utilize treatment processes such as filtering or centrifugal separation rather than a detention and settling volume. These controls must be designed to treat 90 percent of the average annual runoff volume. For the design of these controls, the water quality flow rate (WQf) considered equivalent to the WQv shall be determined utilizing the Rational Method (**Equation 5**) with an intensity (i) appropriate for the water quality precipitation event and the time of concentration (tc) of runoff to the control, determined using the table given in Appendix C of the latest version of Ohio EPA's Construction General Permit:

$$WQf = C * i * A \quad (\text{Equation 5})$$

Where:

$WQf$  = Water Quality Flow Rate in cubic feet per second (cfs)  
 $C$  = Rational Method Coefficient of Runoff  
 $i$  = Intensity for the tc to the Alternative control (in/hr.)  
 $A$  = Area draining to the control practice (acres)

2. The Director of Public Works & Facilities may allow certain flow-through post-construction storm water controls to be used part of an alternative post-construction storm water control system. Such controls may include, but are not limited to: vegetation swales, vegetated filter strips, hydrodynamic separators, high-flow media filters, cartridge filters, membrane filters, subsurface flow wetlands, multi-chamber treatment trains, road shoulder media filter drains, and wetland channels.

(L) POST-CONSTRUCTION REQUIREMENTS FOR SMALL CONSTRUCTION ACTIVITIES

1. For all small soil disturbing activities which disturb at least one (1) acre, but less than two acres of land and are not a part of a larger common plan of development or sale which will disturb one or more acres of land, a post-construction storm water control system shall be used to treat storm water runoff for pollutants and to reduce adverse impacts on receiving waters. These post-construction storm water controls are subject to all criteria within this regulation that are applicable to larger projects. Practices to treat the site WQv should be selected from Tables 6a and 6b when feasible. The owner shall provide justification in the ESPSC Plan that explain site limiting factors which would prohibit the project from being constructed.
2. Post-construction storm water controls may include, but are not limited to, storm water detention storage structures (including wet basins), storm water retention storage structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff onsite, buffer strip and riparian zone preservation, minimization of disturbance and imperviousness, maximization of open space and sequential systems (which combine several practices).

3. Post-construction storm water controls should be placed on upland soils to the degree attainable.
4. The ESPSC Plan shall include an explanation of the technical basis used to select the pollution controls where flows exceed pre-development levels.
5. A permittee is required to prove that a detention/retention storage structure is either infeasible or ineffective before the Director of Public Works & Utilities will approve an alternative control.
6. Design methods for storm water detention storage and water quality requirements shall be consistent with those required for large construction activities.
7. Non-standard post-construction storm water controls will require approval by the Director of Public Works & Utilities. Proposed soil-disturbing activities that impact between one-tenth acre and one acre are subject to Chapter 4 Section (B) of these regulations. For these projects, the ESPSC Plan shall describe the post-construction storm water control systems that will be installed during construction.

#### (M) STORM WATER QUANTITY REQUIREMENTS - DETENTION STORAGE

1. All site designs shall establish post-construction storm water management practices to control peak flow rates of storm water discharges associated with specific design storms and reduce the generation of storm water.
2. Increased peak rates and volumes of runoffs shall be controlled such that:
  - (a) The peak discharge rate of runoff from the critical storm and all more frequent storms occurring under post-development conditions shall not exceed the peak discharge rate of runoff from a one (1) year, 24-hour frequency storm occurring on the same development drainage area under pre-development conditions.
  - (b) The critical storm for specific development drainage shall be determined as follows:
    - (i) Using the Natural Resources Conservation Service (NRCS) TR-55 "Urban Hydrology for Small Watersheds" or TR-20 "Computer Program for project formulation hydrology", or other appropriate and approved hydrologic simulation model along with rainfall data obtained from Huff & Angel "Rainfall Frequency Atlas of the Midwest", to determine the total volume (acre-feet) of runoff from a one (1) year, 24-hour storm occurring on the development drainage area before and after development.
    - (ii) Calculations shall clearly include the lot coverage assumptions used for the full build out of the proposed condition.
  - (c) Storms of less frequent occurrence (longer return periods) than the critical storms up to the 100-year storm peak runoff discharge rates no greater than the peak runoff rates from equivalent size storms under pre-development conditions. Consideration of the one (1), two (2), five (5), ten (10), twenty-five (25), fifty (50) and one-hundred (100) year storms shall be adequate in designing and developing the storm water management facilities to meet the standards.
3. Curve numbers for the pre-development condition shall reflect the average type of land use over the past ten (10) years and not only the current land use.

4. Curve numbers for the post-development conditions shall be determined using the hydrologic soil group one level more severe than the pre-development hydrologic soil group using Natural Resources Conservation Services TR-55.
5. To account for the unknown future cosmetic improvements to a construction site, an assumption of an impervious surface such as asphalt or concrete shall be utilized for all parking areas or driveways, even if stone/gravel is to be utilized in construction.
6. The percent increase in volume of runoff due to development shall be determined and the 24-hour critical storm shall be selected from **Table 8**.

**Table 8 Critical Storm Selection**

| If the percentage of increase in volume of runoff is: |            | The Critical Storm Will be: |
|---|------------|-----------------------------|
| Equal to or greater than:                             | Less than: |                             |
| ****  | 10         | 1 year                      |
| 10  | 20         | 2 year                      |
| 20  | 50         | 5 year                      |
| 50  | 100        | 10 year                     |
| 100   | 250        | 25 year                     |
| 250   | 500        | 50 year                     |
| 500   | ****       | 100 year                    |

7. It shall be strongly encouraged that off-site runoff from upstream areas be conveyed through the site in an underground sewer system.
  - (a) Other methods of conveying off-site flows around the site shall be approved by the city engineer.
  - (b) If off-site runoff shall be conveyed through a detention storage structure, measures shall be taken to ensure that the structure will discharge at the same rate in the future in the case that off-site flows are diverted away from the site.

#### (N) LONG-TERM OPERATION AND MAINTENANCE OF POST-CONSTRUCTION CONTROLS

1. The ESPSC Plan shall be designed to minimize maintenance requirements.
2. A description of operation and maintenance procedures needed to ensure the continued performance of control practices shall be provided as part of the ESPSC Plan, in compliance with the provisions of this manual.
3. To ensure that storm water management systems functions as designed and constructed, the post-construction Operation and Maintenance Plan shall be a stand-alone document which contains:
  - (a) A designated entity for storm water inspection and maintenance responsibilities.
  - (b) The routine and non-routine maintenance tasks to be undertaken.
  - (c) A schedule for inspection and maintenance.
  - (d) Any necessary legally binding maintenance easements and agreements.
  - (e) Construction drawings or excerpts showing the plan view, profile and details of the outlet(s).

- (f) A map showing all access and maintenance easements for Table 6a and 6b standard post-construction controls, runoff reduction practices, and alternative post-construction control practices and associated pre-treatment, inlets, outlets, and conveyance facilities.
- (g) Provide relevant elevations and associated volumes that dictate when removal of accumulated sediments shall occur.

4. Maintenance plans shall ensure that pollutants collected within structural post-construction practices be disposed of in accordance with local, state and federal regulations.
5. Permittees are responsible for assuring all post-construction practices meet plan specifications and intended post-construction conditions have been met (e.g., sediment removed from, and sediment storage restored to, permanent pools, sediment control outlets removed and replaced with permanent post-construction discharge structures, and all slopes and drainageways permanently stabilized), but are not responsible under this permit for operation and maintenance of post-construction practices once coverage under this permit is terminated.

#### (O) STORM WATER MANAGEMENT EASEMENTS

1. Access shall be ensured to all permanent storm water management facilities at a site for the purpose of free flow of storm water and future administration, inspection, maintenance, repair and replacement by securing all the storm water easements needed on a permanent basis.
2. Storm water management easements shall be provided by owner or operator to all waterways and storm water management structures and facilities, outside dedicated public road rights-of-way, as required for:
  - (a) Access for facility inspections and maintenance,
  - (b) Future repair and replacement, or
  - (c) Preservation of storm water management facilities, conveyance, infiltration and detention storage areas and facilities, including flood routes for the 100-year storm event.
3. Those lots crossed by an easement shall be restricted against the planting within said easements of trees, shrubbery or plantings with woody growth characteristics, and against the construction therein of buildings, accessories buildings, fences, walls or any other obstructions to the free flow of storm water and the movement of inspectors and maintenance and shall also be restricted against changing of final grade from that described by the grading plan.
4. Construction of such plantings, structures or changes of grade constitute a violation of this manual and are subject to the enforcement actions and penalties of this manual.
5. Removal of such plantings, structures, or grade changes by the City will be at the expense of the property owner.
6. The purpose and physical characteristics of an easement shall be specified by the owner or operator as part of the ESPSC Plan and approved by the Director of Public Works & Utilities. The easements shall be recorded with all plans in the name of the City and shall remain in effect even with transfer of title through an operation and maintenance agreement, according to this manual.

## **CHAPTER 9: FEES AND BONDS**

- (A) Funds shall be deposited with the City Building Inspection Division prior to review by the Director of Public Works & Utilities and/or its consultants to cover the professional services of the Director of Public Works & Utilities and/or other experts as the Director of Public Works & Utilities may require.
- (B) No soil disturbing activities shall be permitted until a cash bond has been deposited with the City Building Inspection Division to the satisfaction of the Director of Public Works & Utilities sufficient for the City to perform the obligations otherwise to be performed by the owner of the development area as stated in this regulation and to allow all work to be performed as needed in the event that the site owner fails to comply with the provisions of this regulation. The cash bond shall be returned after all work required by this regulation has been completed to the satisfaction of the Director of Public Works & Utilities.
- (C) No project subject to this regulation shall commence without an ESPSC Plan approved by the Director of Public Works & Utilities.

## **CHAPTER 10: VIOLATIONS**

- (A) No person shall violate or cause or knowingly permit to be violated any of the provisions of this regulation or fail to comply with any of such provisions or with any lawful requirements of any public authority made pursuant to this regulation, or knowingly use or cause or permit the use of any lands in violation of this regulation or in violation of any permit granted under this regulation.
- (B) The Director of Public Works & Utilities shall notify the owner when deficiencies are observed, describing the nature of the deficiency, the agreed upon corrective action, and the time period in which to have the deficiency corrected. If after a reasonable amount of time for voluntary compliance, the corrective actions are not undertaken to the satisfaction of the City, the City may issue a Notice of Violation pursuant to Middletown City Codes and proceed with other enforcement remedies as provided by this and other applicable provisions of the Middletown City Codes. Where the violations and/or deficiencies represent an immediate and substantial threat to the public health, safety or welfare, the City may immediately proceed with enforcement remedies as provided by Middletown City Codes and other applicable provisions of the Middletown City Codes.
- (C) Upon notice, the Director of Public Works & Utilities may suspend any active soil disturbing activity for a period not to exceed ninety (90) days and may require immediate erosion and sediment control measures whenever he or she determines that such activity is not meeting the intent of this regulation. Such notice shall be in writing, shall be given to the owner or site owner, and shall state the conditions under which work may be resumed. In instances, however, where the Director of Public Works & Utilities finds that immediate action is necessary for public safety or the public interest, he or she may require that work be stopped upon verbal order pending issuance of the written notice.