Article 8 Soil Erosion

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I. General

A. Purpose

1. In accordance with the Michigan Soil Erosion and Sedimentation Control Act (Public Act 451, Part 91, 1994, as amended), the City has adopted City Code, Chapter 55 (Unified Development Code), Section 5.22 (Storm Water Management and Soil Erosion). As such, all construction activities shall be performed in accordance with the Ordinance.

B. Necessity of Grading/Soil Erosion & Sedimentation Control Permit

1. The necessity for a Grading/Soil Erosion permit shall be as established per City Code, Chapter 55 (Unified Development Code), Section 5.29.3A (Grading Permit: Applicability) subject to exemptions in Section 5.29.3B (Grading Permit: Exemptions).

C. Grading/Soil Erosion & Sedimentation Control Permit Application and Required Data

1. A Grading/Soil Erosion permit application shall be submitted pursuant to City Code, Chapter 55 (Unified Development Code), Section 5.29.3C (Grading Permit: Grading Permit Application).

2. The permit application and plans shall contain all information as set forth in City Code, Chapter 55 (Unified Development Code), Section 5.29.D (Grading Permit: Application Data Required). Select "Grading/Soil Erosion Permit Application" on the City's Permit Applications website for a copy of the current form and a checklist of required information.
3. All construction plans (other than single or two-family family residential) requiring soil erosion control measures shall contain the City's standard Soil Erosion and Sedimentation Control Notes per Article 12 (Standard Details), SD-SESC-6 of these Standards and an approved Sequence of Soil Erosion Measures developed in compliance with SD-SESC-7.

D. General Soil Erosion Control Design Standards

1. The following general guidelines should be followed for any type of development (public or private):

   a) The development plan should be fitted to the soils and topography to create the least erosion potential.

   b) Wherever feasible during construction, natural vegetation should be retained and protected. Where inadequate vegetation exists, temporary or permanent vegetation should be established, per the approved Landscape Plan.

   c) Where land must be stripped of vegetation during construction, exposed area should be limited to the smallest practical size at any one time and the duration of exposure should be limited to the shortest practical amount of time.

   d) Critical areas exposed during construction should be protected with temporary vegetation and/or mulching per Section II.A of this Article.

   e) Permanent vegetation and improvements such as streets, storm sewers or other features of the development capable of carrying storm runoff in a safe manner shall be installed as early as possible.

   f) Provisions should be made to control the increased runoff caused by changed soil and surface conditions both during and after development.

   g) Temporary sediment basins to remove suspended soil particles from runoff waters from land undergoing development should be constructed and maintained wherever erosive conditions indicate they are needed to prevent off-site damages.

   h) Diversions, grassed waterways, grade stabilization structures, and similar mechanical structural control measures required by the site shall be installed as early in the development of the area as possible.

II. Soil Erosion Control Protective Measures and Materials

A. Vegetative Protection and Mulching

1. Dates, kinds and rates of temporary seed required shall be dependent on the time of year as provided for in Table A of this Article. Other temporary seed mixes shall be used only with approval of the PSAA.

Table A Planting Dates for Temporary Vegetation Cover Types			
Plant Type	Planting Dates	Seeding Rate	
		Pounds Per 1,000 Square Feet	Pounds Per Acre
Oats	4/1 to 9/15	2	96
MDOT TSM 6/24	4/15 to 10/10	2	100
Buckwheat	6/1 to 7/15	2	75
Sudangrass	6/1 to 7/15	1	40
Cereal Rye	8/1 to 10/15	3	120
Wheat	9/20 to 10/15	3	120
Source: USDA NRCS, 2018 and MDOT 2020 Standard Spec.			

2. Mulching shall be used with all seeding on disturbed soil areas to provide erosion protection and promote the growth of vegetation.

3. During months unfavorable to seeding, an anchored mulch blanket shall be installed for temporary use without seeding per Article 12 (Standard Details), SD-SESC-4 (Mulch Blanket) of these Standards, unless otherwise approved by the PSAA. All blanket and staking materials shall be biodegradable.

B. Silt Fence

1. Silt fence shall be required as a perimeter control device to protect downslope surface waters and adjacent properties by removing suspended solids from runoff prior to leaving a site.

2. Silt fence should be installed at the downstream edge of disturbed areas along a line of equal elevation i.e. parallel to contour lines and at all locations as shown on the Plans.

3. Whenever possible, silt fence shall be placed in flat areas at least 10 feet from the toe of the slopes.

4. Maximum contributing drainage area is one-half acre per 100 lineal feet of silt fence.

5. Materials and properties for silt fence construction shall comply with Table B of this Article.

Table B Silt Fence Materials					
Woven Geotextile Fabric Width (in.)	Min. Hardwood Post Length (in.)*	Min. Grab Tensile (lbs.) per ASTM D4632	Min. Trapezoidal Tear Strength (lbs.) per ASTM D4533	Min Permittivity (sec^{-1}) per ASTM D4491	Max. Apparent Opening Size (mm.) per ASTM D4751
24	36	100	45	0.1	0.6
36	48	100	45	0.1	0.6
*Hardwood posts shall be a minimum of 1.5 inches x 1.5 inches					

6. Minimum post spacing shall be 6 feet and maximum post spacing shall be 10 feet.

7. Silt fence shall be installed in accordance with Article 12 (Standard Details), SD-SESC-3 (Silt Fence) of these Standards and as set forth below.

8. A trench 6 inches deep shall be constructed by machine or, if equipment cannot be operated on the site, by hand.

9. Post installation shall start at the center of the low point (if applicable) with the remaining posts spaced 6 feet apart.

10. Posts shall be installed with at least 1 foot of bury in the ground. Where 1 foot cannot be achieved, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.

11. Filter fabric shall be attached to posts by staples unless otherwise approved by the PSAA.

12. Filter fabric shall be installed such that 6 inches of fabric is left at the bottom to be buried and fabric shall be wrapped around posts per Article 12 (Standard Details), SD-SESC-3 (Silt Fence) of these Standards.

13. Fabric shall be installed in the trench such that 4 inches lie against the side of the trench and 2 inches across the trench bottom in the upstream direction.

14. The trench shall then be backfilled and compacted to prevent any flow from passing under the fence.

15. During installation, the fabric will be rejected if it is found to have defects, rips, holes, flaws, deterioration, or damage.

16. Filter fabric shall be removed and replaced whenever it has deteriorated to such an extent that it reduces the effectiveness of the silt fence.

17. Contractor shall remove and properly dispose of accumulated sediment when it reaches 1/3 to 1/2 the height of the silt fence above ground elevation.

18. Silt fence shall be maintained by the contractor until the project is accepted or until the fence is removed at the direction of the PSAA.

19. Whenever possible, silt fence shall be placed in flat areas at least 10 feet from the toe of the slopes.

20. Maximum contributing drainage area is one-half acre per 100 lineal feet of silt fence.

21. Silt fence shall be installed in accordance with Article 12 (Standard Details), SD-SESC-3 (Silt Fence) of these Standards.

C. Mud Mats

1. Mud mats shall be installed at every point where construction traffic leaves a site with disturbed soils.

2. Mud mat materials shall conform to the following:

   a) 2-inch to 3-inch diameter open-graded aggregate (stone or crushed concrete) shall be utilized.

   b) Non-woven geotextile fabric (8-12 oz./yd^2) shall be placed as an underlay.

3. The following specifications shall be utilized unless other approved by the PSAA:

   a) Minimum mud mat length shall be 50 feet.

   b) Width shall be at least 2 feet wider than the width of the largest vehicle or piece of equipment expected to utilize the egress point with additional width as needed for turning radius. In no case shall the width be less than 10 feet.

   c) Minimum thickness shall be 6 inches. Greater thickness shall be utilized where necessary to maintain mat integrity.

d) Side slopes should be no steeper than 2 horizontal to 1 vertical.

e) Mud mats shall be constructed in accordance with Article 12 (Standard Details), SD-SESC-5 (Mud Mat) of these Standards.

D. Inlet Protection

1. Storm inlet protection measures shall be provided to temporarily pond runoff before it enters the storm sewer, allowing sediment to settle, or to remove sediment by filtering.

2. Storm inlet protection measures shall conform to Article 12 (Standard Details), SD-SESC-1 (Inlet Protection) of these Standards, for inlets with flat castings or SD-SESC-2 (Stone Filter), for inlets with beehive castings.

E. Other Soil Erosion Measures

1. In addition to the materials and measures set forth above in Section II. A-D of this Article, measures such as sedimentation basins, bank erosion protection measures, and diversion channels, may be required to adequately control soil erosion and sedimentation during construction activities.

2. In such cases, appropriate individuals BMPS as set forth in the Michigan Nonpoint Source Best Management Practices Manual shall provide direction for design of such measures. Such design shall be subject to the approval of the PSAA.