Place this page in your Rainwater and Land Development Manual when replacement pages are inserted.

Replacement Pages for Errata

Periodically, changes/corrections are made to Rainwater and Land Development manual text or to figures, and then are present in subsequent printings or files posted to the ODNR Rainwater and Land Development manual web page.

This page is intended for manuals printed between 10-1-07 and 11-28-07.

On **November 29, 2007**, the following pages were changed or corrected:

Chapter 2 pages 44, and 76.

On **June 23, 2009**, the following pages were changed or corrected:

Chapter 2 pages 44 (equation rewritten but effectively unchanged);
Chapter 5 page 29 (practice numbering corrected);
Chapter 6 page 21 (practice numbering);
Chapter 7 pages 3, 7, 10, 17 (practice numbering);
Appendix 6 pages 1-18 (new text-pg 1, removed extra tables & a typo).

This manual was printed on __________________ and had replacement

pages printed & inserted on the following dates: __________________

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Design Criteria

Diversion – Storm water runoff should be directed to the infiltration trench via dispersed sheet flow wherever possible. A grass filter strip of at least 25 feet must precede the infiltration trench in these situations. Where runoff is directed to the infiltration trench as concentrated flow (via a swale, storm sewer or other discrete conveyance), the infiltration trench must be designed "off-line" such that flows in excess of the Water Quality Volume (WQv) are diverted around the infiltration trench.

In addition, a diversion that allows the trench to be bypassed when the pretreatment system becomes clogged or otherwise fails should be included in the design. This can be accomplished by providing a drain valve.

Soil Hydraulic Conductivity – Soil infiltration rates within the trench must be between 0.52 and 2.4 inches per hour. The soil should have no greater than 20 percent clay content and less than 40 percent silt/clay content.

The list of soils in Ohio that meet the required infiltration rates and are potentially suitable for the installation of infiltration trenches can be found in Appendix E. However, do not use this or county soil surveys to determine final suitability. Site-specific soil tests should be performed to confirm that the hydraulic conductivity falls within the required range. A certified Soil Scientist or other trained professional shall perform one test hole per 5000 feet, with a minimum of two borings within the planned facility location. This evaluation shall include an evaluation of the normal and seasonal high groundwater levels.

Pretreatment – The potential for failure of infiltration practices due to clogging by sediments is high. Failure will result if sediment is not trapped before runoff enters the trench. Thus, it is imperative that the facility design includes a durable, maintainable pretreatment system for removing sediment from stormwater before the trench. This can be accomplished by installing a plunge pool. Where infiltration trenches are used to treat rooftop runoff with drainage areas of 1 acre or less, pretreatment can be accomplished by providing an underground trap with a permanent pool between the downspout and the infiltration trench (Fig 2.7.1). The trap must be accessible, but sealed tightly so that it does not become a breeding ground for mosquitoes.

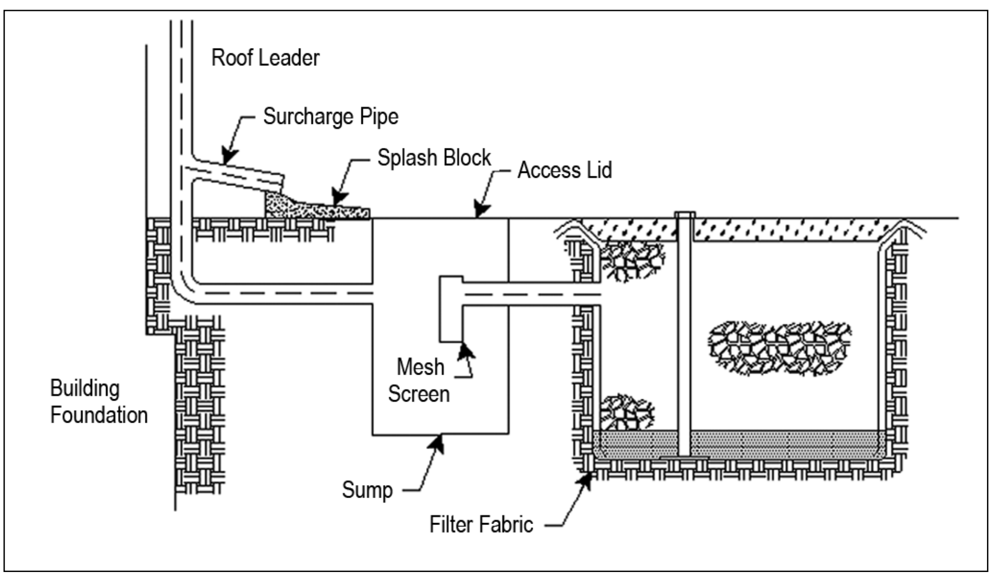


Figure 2.7.1 **Underground pretreatment facility and infiltration trench for treating rooftop runoff.**

Sizing the Pretreatment Facility – The size of the pretreatment facility is based on the infiltration rate of the soil in which the infiltration trench is built. For soils with infiltration rates of 2.0 inches per hour or less, the pretreatment facility shall be sized to contain 25% of the WQv. For infiltration rates greater than 2.0 inches per hour, the pretreatment facility shall be sized to contain 50% of the WQv.

Exit Velocity from Pretreatment Facility – The velocity of runoff as it exits from the pretreatment device must be non-erosive.

Drain Time Requirements – The practice is to be designed to infiltrate the Water Quality Volume (WQv, see page 30 of this chapt.) through the bottom floor of the structure in 24 to 48 hours. Drain times in excess of 72 hours should be avoided to prevent mosquito-breeding habitat from forming. Flows in excess of the WQv are to be diverted around the trench.

Dimensions – The dimensions of the storage reservoir (infiltration trench) are made by fitting the length, width and depth into a configuration, which satisfies drain time and storage volume requirements. The trench dimensions shall be sized by accepted engineering methods such as those outlined below:

1. Determine Initial Storage Depth – The bottom of the infiltration trench must be deeper than 2 feet to avoid freezing and shallow enough to leave at least 3 feet between the seasonal high-water table or bedrock and the trench bottom. Soil morphology also must be considered in determining the dimensions of the storage reservoir to utilize the optimum horizons or strata. The presence of a thin, slowly permeable soil horizon may require a trench depth which completely penetrates it to more permeable underlying material. Long trenches may need to be curved parallel to the topographic contour in order to keep the trench bottom elevation within the optimum depth in the soil profile.

2. Determine Area of Trench Bottom – The bottom of the trench is to be completely flat so as to allow runoff to infiltrate through the entire surface.

$$A_{\min} = \frac{WQ_v}{Porosity * (E * T)}$$

Where: A_{min} = Minimum area of the bottom of the trench (ft^2);

WQ_v = Water Quality Volume (ft^3); (Trench volume less stone volume).

E = Exfiltration Rate (ft/hr); (Soil infiltration rate at trench bottom)

T = Drain Time (hr) (Must be 24 to 48 hrs per Ohio EPA requirements)

The excavated volume of the trench is the WQ_v divided by porosity or the void space of the stone.

Determine Length and Width – A long, narrow trench is less affected by water table mounding. If depth to seasonal high-water table or bedrock is within 5 feet of the trench bottom, it is advisable to design the trench as long and narrow as possible. Otherwise, the configuration of the trench is not restricted and is only limited by site design constraints.

Stone – The infiltration trench is filled with clean, washed aggregate. Stone with a diameter of between 1 and 3 inches should be used.

Geotextile – The sides and top of the trench must be lined with a non-woven geotextile to restrict the amount of sediment entering the structure. The top layer of the geotextile should be covered by 6-to-12 inches of smaller sized gravel (0.75-inch diameter). This top layer

Underdrains shall be a perforated pipe capable of withstanding the expected load above it and exceeding the drainage capacity of the planting soil layer. The following requirements apply to underdrains:

- The underdrain system shall be placed at a minimum 0.5 % slope.
- Underdrain pipes shall be a minimum 4-in. diameter perforated pipe.
- Underdrains are placed within a layer of # 57 washed gravel, having a minimum of 3-in. of gravel above and 3-in. below the pipe.
- Underdrains shall be placed depending upon the purpose of the gravel layer:
  - o The underdrain is typically placed in the middle of the gravel layer in order to provide bedding material.
  - o To promote infiltration into in-situ soils or to create an anaerobic zone for denitrification, the underdrain is placed near the top of a gravel bed. Gravel depth is determined by water storage needed to infiltrate the entire water quality volume into the soil or the volume of water targeted for anaerobic treatment.
- Underdrain pipes shall end with a cap, or an elbow with a vertical pipe providing observation and/or cleanout at the elevated end of the pipe. Observation/cleanout pipes shall consist of a minimum 4 inch diameter vertical non-perforated PVC pipe extending to the surface of the practice and sealed with a removable watertight cap.
- Underdrains shall drain to an existing drainage system or other suitable stable outlet having positive drainage.

7. *Overflow and Routing -* Bioretention facilities shall have a non-erodible means of discharging flow exceeding the capacity of the practice. Commonly this will be an overflow pipe or drop inlet set at the maximum ponding elevation. Off-line facilities collect runoff and then are bypassed by major storm plows. Consideration for tailwater from the receiving system shall be made.

8. *Planting Materials –* Species planted in bioretention practices should be adapted to the region, pollution tolerant, and able to survive the variable moisture conditions. Most plants should be facultative (found equally in wetland or upland conditions) though some species found in either environment may be acceptable. Native and non-invasive plants shall be used.

   Select plants, which in a mature condition will be appropriate to the depth of soil and the underdrain system. For examples, trees may be selected if the planting soil can accommodate the root ball of the selected trees. Trees and large shrubs will require staking to prevent being dislodged by wind. A qualified landscape architect, botanist, or native plant dealer will be helpful to design a planting plan.

Design Checklist

1. Compute water quality volume (WQV). _____ WQV = C * P * A / 12, where:

WQv= water quality volume in acre-feet

C = runoff coefficient (Use formula below or coefficient from Ohio EPA NPDES permit)

P = 0.75 inch precipitation depth

A = area draining into the BMP in acres _____

Planned Site Imperviousness (i) _____ (Eg. For 80% imperviousness use 0.8)

$C = 0.858i^3 – 0.78i^2 + 0.774i + 0.04$

C = _____

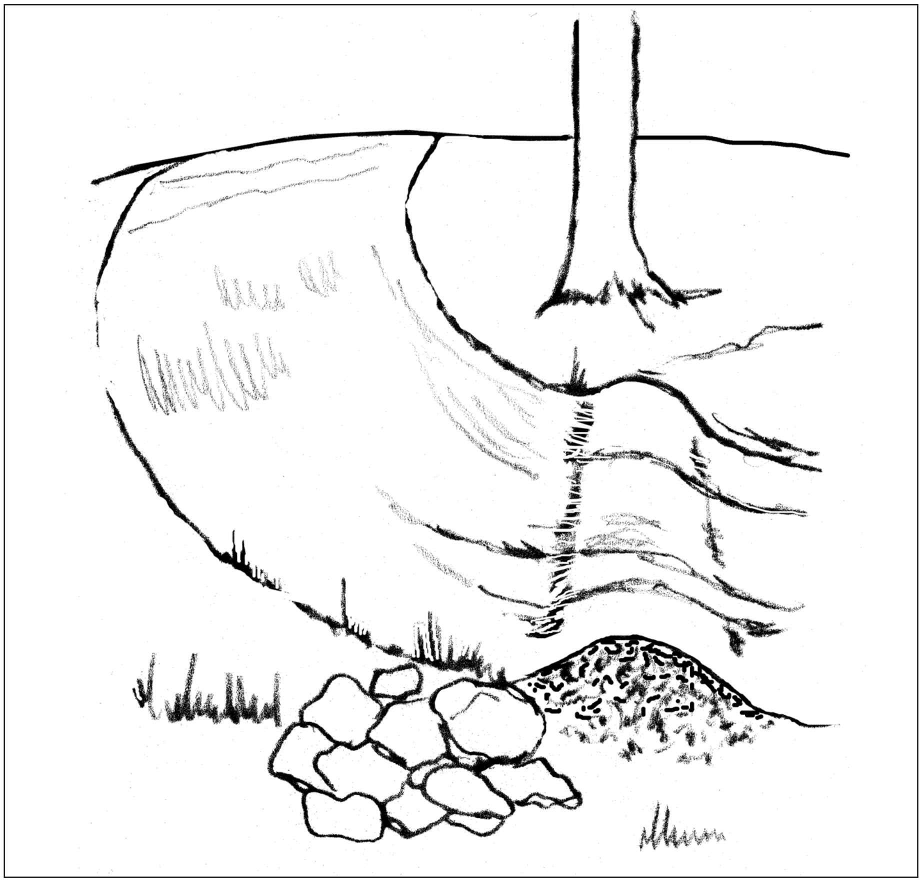
2. Compute critical storm detention requirements. Substitute local requirement if they differ from the critical storm method.

Design Storm	Peak Discharge Rate (cfs)	24-hour Runoff Volume (show units)		Percent Increase	Design Discharge (cfs)
		Pre-Development	Post- Development		
1-year					
2-year					
5-year					
10-year					
25-year					
50-year					
100-year					

3. Determine whether bioretention is an appropriate stormwater practice for the area.

- Limited drainage area (<2 acres perhaps even less than 1 acre)
- Outlet for an underdrain and or soils of sufficient hydraulic conductivity to fully drain the practice or a suitable outlet for an underdrain system in a period of 40 to 72 hours.
- Sites with sufficient fall between inflow point to outflow (generally 5 feet). Shallower facilities are expected to reduce the effectiveness of treatment.
- Additional stormwater detention needs do not make bioretention unfeasible
- No continuous groundwater flow or seasonal high groundwater table above the practice bottom. Or perimeter drains are sufficient to lower seasonal high groundwater table.
- Low potential for groundwater pollution (high pollution loads, high groundwater table or extremely permeable soils)
- Can meet setback requirements found in Table 2.10.1

5.6 Water Bar



Description

A water bar is a diversion constructed across the slope of an access road or utility right-of-way. Water bars are used to reduce concentrated runoff on unpaved road surfaces, thus reducing water accumulation and erosion gullies from occurring. Water bars divert runoff to road side swales, vegetated areas or settling ponds.

Conditions Where Practice Applies

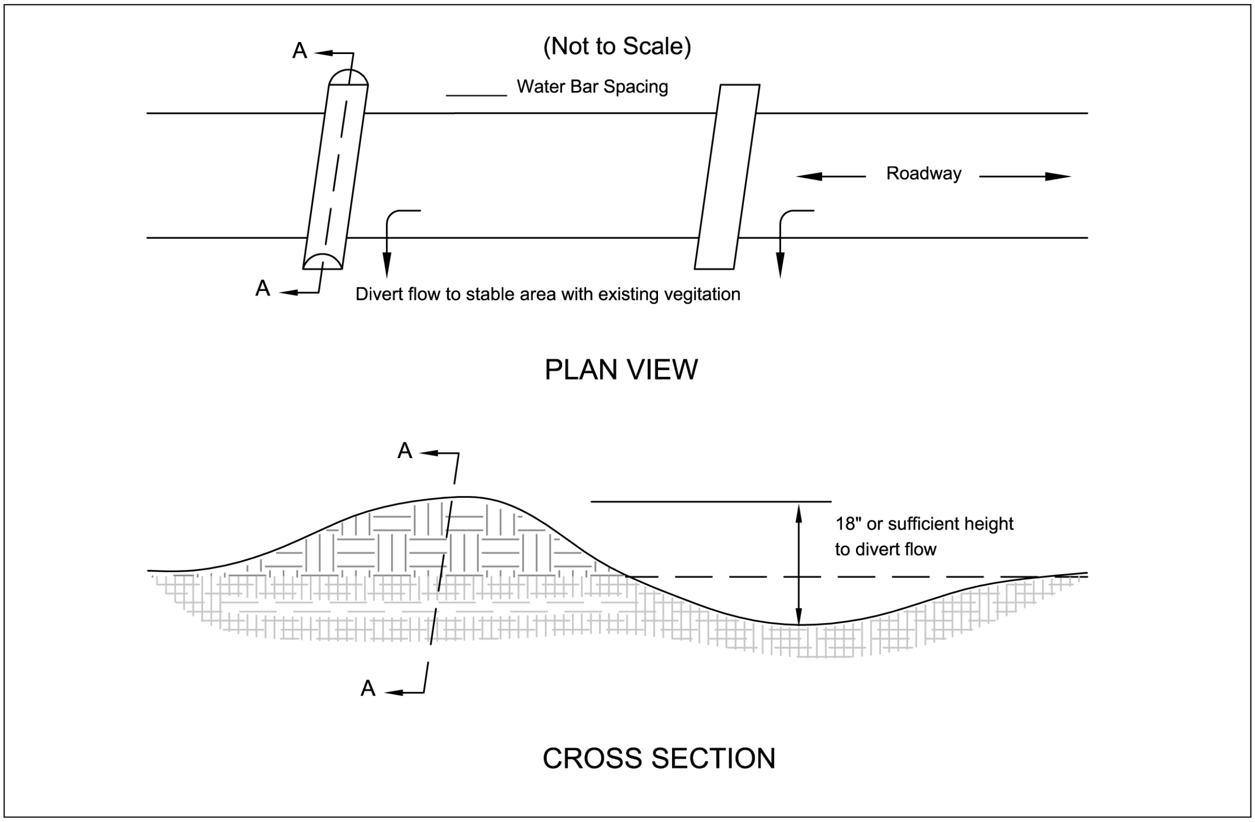
Water bars are used at construction site ingress/egress points, on long sloping access roads, on temporary construction roads, or at utility right-of-ways which do not have a stable surface or where runoff would otherwise collect and cause erosion.

Planning Considerations

If the contributing area is disturbed, this practice should be associated with sediment traps that will receive and treat the runoff.

The outlet of each water bar must be resistant to erosion. For small contributing areas, spreading the flow into a undisturbed vegetated area may be sufficient. For larger areas or higher velocities flow may need rock outlet protection to prevent gully erosion.

Specifications
for
Water Bar



1. The minimum water bar dimensions shall be:

   Top width of berm/dike – 2 feet minimum.

   Height/depth – 18 inches unless otherwise noted on plans.

   Side Slopes – Sufficiently flat to accommodate the expected traffic.

2. The spacing between water bars shall be as noted:

   Table 5.6.1 Water Bar Spacing

Road Grade (%)	Distance (Ft.)
1	400
2	250
5	135
10	80
15	60
20	45

3. The field location shall be adjusted as needed to provide a stabilized safe outlet.

4. The diverted runoff shall be directed onto an undisturbed vegetative area, to a settling trap or basin or trap if contributing area is stable.

5. Diversions/dikes shall be compacted by traversing with equipment during construction.

6. The water bars shall be angled slightly downslope across the centerline of the travel lane.

6.2 Sediment Trap

Description

A sediment trap is a temporary settling pond formed by construction of an embankment and/or excavated basin and having a simple outlet structure that is typically stabilized with geotextile and rip-rap. Sediment traps are constructed to detain sediment-laden runoff from small, disturbed areas for a sufficient period of time to allow the majority of the sediment to settle out. They are established early in the construction process using natural drainage patterns and favorable topography where possible to minimize grading.

Conditions Where Practice Applies

Sediment traps are used:

1. At the outlets of diversions, channels, slope drains, or other runoff conveyances that discharge sediment–laden water.
2. Below disturbed areas where the total contributing drainage area is **5 acres or less**. If the contributing drainage area is greater than 5 acres, the use of a Sediment Basin is recommended.
3. Where access can be maintained for removal and proper disposal of sediment.
4. In drainage swales or areas, where sediment control is needed upstream of a drainage pattern leading to a storm drain inlet.
5. Where the required life of the structure will be 18 months or less.

6. Where failure of the structure will not result in loss of life; or cause damage to buildings, roads, utilities, or other properties.

Note: Sediment traps, that have the entire capacity achieved through excavation, may have larger drainage areas without compromising the stability of the sediment trap.

Planning Considerations

Timing – Sediment traps shall be constructed as a first step in any land-disturbing activity, and shall be made functional before upslope land disturbance takes place. Sediment traps are temporary measures with a typical design life of 6 months to 18 months. One or more traps are often built early in the construction process to capture sediment, prior to construction of a larger structure (e.g., sediment basin or modified detention basin) is constructed. Sediment traps are to be functional during the entire construction process, both before and after new drainage systems are constructed.

Location – Sediment traps usually are placed near the edges of construction sites so to be out of the way of major construction activities.

Diverting Runoff – Temporary diversions at the perimeter of sites are used to direct runoff to sediment traps (see Temporary Diversion Specifications).

Storm-Sewer Diversions – Storm drains may be temporarily redirected through sediment traps during construction. After construction, the temporary pipes are removed and runoff is allowed to flow through the permanent storm drain as originally intended.

Utilities – Give special consideration to sediment trap location and possible interference with construction of proposed drainage ways, utilities and storm drains.

Trapping Efficiency – Improved sediment trapping efficiencies can be achieved by including both a "wet" storage volume and a drawdown or "dry" storage volume that enhances settling and prevents excessive sediment losses during large storm events. In order to maintain effectiveness, sediment must be periodically removed from the trap to maintain the required design volume. Frequent inspection and appropriate maintenance should be provided until the construction site is permanently protected against erosion.

Design Criteria

Capacity - The minimum total design volume for the sediment trap shall consist of two components, the dewatering zone and the sediment storage zone. These zones are shown schematically in Figure 6.2.1. The volume of the dewatering zone shall be calculated for the entire drainage area by the method shown below. The drainage area includes the entire area contributing runoff to the sediment basin, offsite as well as on. The sediment storage volume may be in the form of a permanent pool or wet storage to provide a stable-settling medium, while the dewatered volume shall be in the form of a draw down or dry storage of at least 67 cubic yards per acre which will provide extended settling time during less frequent, larger storm events.

a) Dewatering Zone Volume –

The volume of the dewatering zone shall be a minimum of 1800 cubic feet per acre of drainage (67 yd3/acre) or the minimum stated in the current NPDES construction general permit. The total volume of the dewatering zone shall be measured from the base of the stone outlet structure to the crest of the stone outlet structure.

7.1 Minimized Phased Disturbance

Description

Phased disturbance limits the total amount of grading at any one time and sequences operations so that at least half the site is either left as undisturbed vegetation or re-stabilized prior to additional grading operations. This approach actively monitors and manages exposed areas, so that erosion is minimized and sediment controls can be more effective in protecting aquatic resources and downstream landowners.

Condition Where Practice Applies

This practice can be applied anywhere development occurs and is well suited to protect critical areas on and off site, such as wetlands, streams, ponds and highly erodible areas subject to high erosion rates. The practice is applicable where natural vegetation can act as a soil stabilizer during development and perhaps as a water quality feature after construction.

Planning Considerations

Two planning principles should be applied for phased disturbance. First, developments should be fit around the natural site conditions (e.g. topography, drainage, vegetation and setting) and thus involve less grading and fewer offsite impacts than conventional development patterns. Practically this means retaining undisturbed green space around water resources and on critical areas like steep slopes.

The second planning principle is focused on managing active construction, so that at least 50% of the land area is maintained in vegetation. By anticipating the timing and extent each grading and construction operation, along with erosion and sediment controls, exposed ground does not sit idle. This management principle is applied by developing phases of a project that can be brought to completion quicker than the entire parcel; and by utilizing an effective construction sequence to assist project managers to anticipate the next step towards stabilization and completion.

Ideally with phasing and effective sequencing, a parcel is divided between vegetated inactive areas and active areas where work is continuous from clearing operations, through grading, drainage and construction until final re-stabilization with vegetation. A realistic construction sequence is an essential planning tool for this practice with the goal that only areas under active construction have exposed soils.

Construction Operation	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
PHASE 1: Roadway, Storm & Utilities	◄	—	—	—	—	—	►												
Install construction site entrance	•																		
Fence natural & tree protection area	•																		
Install SW/sed basin, diversion and silt F.		•																	
Seed SW/Sed basin areas		•																	
Clear ROW		•																	
Grading, install storm, San. and utilties		•	•																
Place inlet protection on storm sewers			•																
Grade road swales and stabilize			•	•															
Road construction				•	•														
Seed/mulch graded areas					•	•													
PHASE 1: Home Construction					◄	—	—	—	—	►									
Clear home sites					•	•	•												
Install silt fence & filter berms					•														
Basement excavation & rough grading					•	•	•	•											
Temporary seeding on lots						•	•	•	•										
Final yard grading								•	•	•									
Permanent seed and mulch								•	•	•									
PHASE 2: Roadway, Storm & Utilities								◄	—	—	►								
Install sediment trap, silt F. and filter B.								•											
Seed sediment trap								•											
Grading, install storm, San. and utilties									•	•									
Place inlet protection on storm inlets										•									
Erosion control matting on swales										•									
Road construction											•								
Winterization- Seed/mulch graded areas										•	•								
PHASE 2: Home Construction												◄	—	—	—	—	—	—	►
Clear home sites												•	•						
Install filter berms													•						
Basement excavation														•	•				
Temporary seeding on lots															•	•	•		
Final yard grading																	•	•	
Permanent seeding and mulching																		•	•
Remove temp riser, clean out SW pond																			•
Adapt SW pond outlet for permanent configuration																			•

Figure 7.1.1 Sample Sequence of Construction Operations

7.2 Clearing and Grubbing

Description

Clearing and grubbing is the removal of trees, brush and other unwanted material in order to develop land for other uses or provide access for site work. Clearing generally describes the cutting and removal of above ground material while grubbing is the removal of roots, stumps, and other unwanted material below existing grade.

Clearing and grubbing includes the proper disposal of materials and the implementation of best management practices in order to minimize exposure of soil to erosion and causing downstream sedimentation.

Condition Where Practice Applies

This practice may be applied anywhere existing trees and other material must be removed for development to occur. The potential for erosion and sedimentation increases as: the vegetation removed; area disturbed or watercourses encountered increases.

Planning Considerations

Site assessment, selection and marking

Sites should be assessed to determine areas to be left undisturbed as well as trees or vegetated areas to be saved (see tree preservation area). These areas need to be clearly marked on plans and in the field. Land clearing activities should not begin until the site assessment and the field marking is concluded.

Timing and Phasing

Large-scale sites should be cleared in phases, with initiation of each phase delayed until actual construction is scheduled for that area of the site.

Erosion, sediment and stream instability potential

Clearing in some areas should be avoided or delayed due to the potential for destabilization. Cleared sites on heavy soils and steep slopes are subject to excessive erosion and may require additional practices to keep the soil in place. Land clearing during dry or frozen times will decrease compaction and potential water quality problems from runoff.

Stream corridors should be left in tact unless and until plans have been made to immediately restore stable conditions. These areas are subject to rapid erosion once vegetation is removed and soon become a source of sediment downstream. Alternatively naturally vegetated stream corridors help protect water resources from pollution generated during grubbing and grading operations.

Design Criteria

Timber Salvage – Develop plans specifying the kind and location of timber to be salvaged, the location of haul roads and skid trails, location and width of natural buffer zones around water bodies, and the location and methods of stream crossings. The method of disposing of all material that will not be salvaged should also be specified. Plans should also include the best management practices that will be used to protect the cleared area from erosion.

Identify and protect healthy trees following specifications in the **Tree and Natural Area Preservation** practice. Where possible, preserve a natural buffer/filter strip adjacent to all water bodies. Avoid clearing to the water bodies' edge.

1. Where it is necessary to clear to the water's edge, appropriate sediment control should be used and seeding and other stabilization should be initiated within 2 days of work becoming idle.
2. Phase work so that only part of the site is being cleared at any given time. This will reduce the amount of time soil is exposed to erosive forces. Follow examples in the **Phased Disturbance** practice.
3. Install earth diversions to intercept and divert runoff to stable outlets and appropriate sediment ponds.
4. All debris should be kept out of surface water resources. If possible, leave mulch or vegetation on the ground to decrease runoff and potential runoff. See the "Disposal Options" section, below.
5. Exposed areas not planning for immediate earthwork should be temporarily seeded to prevent further erosion at the site. See the **Temporary Seeding** practice. Additional stabilization or sediment control practices may be necessary to keep soil on the site.

Grubbing – Grubbing removes roots and stumps by digging or pushing over with earth moving equipment. Grubbing should be carefully monitored near lakes and streams to protect the water's edge. Removing root systems near the banks of streams and lakes make cause the area to become unstable and erode. If possible, avoid grubbing at all near the water's edge.

Tree Removal –

1. Where trees and stumps are removed in separate operations, trees may be used for commercial purposes such as lumber, firewood, or mulch.

2. Trees and stumps may be removed in one operation. This method leaves materials that can be useful in stream restoration and stabilization (e.g rootwads, vanes). may be used as a rootwads for streambank restoration work. Be certain that sufficient trunk is left for effective anchoring in the bank. Tops of trees should be removed and chipped for mulch.
3. Operating heavy equipment too close to trees will result in damage or loss due to soil disruption, compaction and trunk damage. It is recommended that all heavy equipment operations be limited to outside the drip line of all trees to be preserved. The drip line is the area from the trunk of the tree outward to a point at which there is no longer any overhanging vegetation.
4. In forested wetlands, shallow–rooted species are protected by each other from potential wind damage. Whenever trees are removed from a forested wetland, the possibility of blow downs or windthrow increases. Shallow rooted species are also protected by edge trees, which shield the prevailing wind side of the woodlot. It is helpful to leave as many edge trees as possible on the prevailing wind side of the cleared area.

Disposal Options –

Where possible, all stumps, roots, logs, brush, limbs, tops and other debris resulting from the clearing or thinning operation should be disposed of by processing through a chipping machine. The chips can then be utilized as mulch (see Mulching practice), as part of a site stabilization or final landscaping plan. Organic material may also be disposed of at an approved composting facility.

Note that treetops, stumps and field stone which are cleared and piled/windrowed in suitable areas can improve habitat for wildlife such as rabbits, raccoons, snakes, salamanders, toads and frogs.

Maintenance

Land clearing itself requires no maintenance except maintenance of the equipment used in the land clearing operation. Tree protection that utilizes fencing and signage should be maintained throughout the clearing stages. It is also important to maintain all other temporary and permanent practices that are used in conjunction with the land clearing to prevent soil erosion and sedimentation.

Common Problems / Concerns

Clearing of areas planned for preservation may occur and desirable species may be damaged, therefore preservation areas should be well marked.

During construction, naturally vegetated banks of stream and lakes may become destabilized. Clearly mark areas where natural vegetation must be maintained, and immediately implement stabilization plans of denuded areas.

As large areas are disturbed, site erosion potential drastically increases until cover is re-established. Establish temporary seedings as soon as clearing/grubbing and grading activities stop or become idle.

7.3 Tree and Natural Area Reservation

Description

Tree and natural area preservation insures that important vegetated areas existing on-site prior to development will survive the construction process. Tree protection areas prevent the losses and damages to trees that are common as a result of construction. This practice is useful to protect individual trees, and areas of forest or natural vegetation in stream corridors, or open space.

Conditions Where Practice Applies

This practice is applicable to any tree, forested or naturally vegetated area planned for long-term survival and subject to construction impacts. Existing trees provide valuable benefits during and after construction including: reduced erosion, reduced runoff rates and volume, reduced cooling costs, sound and visual barriers and higher property values.

Planning Considerations

Preservation of important natural areas must begin before the location of buildings, roads and utilities is determined. Early site planning should include delineating forested areas and significant trees and creating an inventory of the existing trees on-site. These should influence the placement of roads, buildings, and parking areas in the same manner as topography, streams and wetlands.

Tree Stand Delineation – Useful information for the delineation may include:
- Stands of trees to be preserved
- Individual trees of significance due to age, size, history, or aesthetic value

7.4 Construction Entrance

Description

A construction entrance is a stabilized pad of stone underlain with a geotextile and is used to reduce the amount of mud tracked off-site with construction traffic. Located at points of ingress/egress, the practice is used to reduce the amount of mud tracked off-site with construction traffic.

Conditions Where Practice Applies

A construction entrance is applicable where:

- Construction traffic leaves active construction areas and enters public roadways or areas unchecked by effective sediment controls;
- Areas where frequent vehicle and equipment access is expected and likely to contribute sediment to runoff, such as at the entrance to individual building lots.

Planning Considerations

Construction entrances address areas that contribute significant amounts of mud to runoff by providing a stable area for traffic. Although they allow some mud to be removed from construction vehicle tires before they enter a public roads, they should not be the only practice relied upon to manage off-site tracking. Since most mud is flung from tires as they reach higher speeds, restricting traffic to stabilized construction roads, entrances and away from muddy areas is necessary.

If a construction entrance is not sufficient to remove the majority of mud from wheels or there is an especially sensitive traffic situation on adjacent roads, wheel wash areas may be necessary. This requires an extended width pad to avoid conflicts with traffic, a supply of wash water and sufficient drainage to assure runoff is captured in a sediment pond or trap.

Proper installation of a construction entrance requires a geotextile and proper drainage to insure construction site runoff does not leave the site. The use of geotextile under the stone helps to prevent potholes from developing and will save the amount of stone needed during the life of the practice. Proper drainage may include culverts to direct water under the roadway or water bars to direct muddy water off the roadway toward sediment traps or ponds.

Design Criteria

The area of the entrance must be cleared of all vegetation, roots, and other objectionable material. Geotextile will then be placed the full width and length of the entrance.

Stone shall be placed to a depth of at least 6 inches. Roads subject to heavy duty loads should be increased to a minimum of 10 inches. Surface water shall be conveyed under the entrance, through culverts, or diverted via a water bars or mountable berms (minimum 5:1 slopes) so as to convey sediment laden runoff to sediment control practices or to allow clean water to pass by the entrance.

The stabilized construction entrance shall meet the specifications that follow.

Maintenance

The entrance shall be maintained in a condition that will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with additional stone or the washing and reworking of existing stone as conditions demand and repair and/or cleanout of any structures used to trap sediment. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into storm drains must be removed immediately. The use of water trucks to remove materials dropped, washed, or tracked onto roadways will not be permitted under any circumstances.

Common Problems / Concerns

Mud is allowed to accumulate and is tracked on to public right-of-ways. The entrance and associated construction roads may need dressing with additional stone.

Soft depression areas develop in entrance area. Stone may not have been underlain with geotextile or insufficient stone base has been provided.

Appendix 6: Soils with Greatest Potential Use for Infiltration

The following is a list of Ohio soil map units that have the optimum soil characteristics for infiltration. These soils have a natural drainage class that is well drained, depths to bedrock over 100 inches and an appropriate saturated hydraulic conductivity between the depths of 20-60 inches.

Saturated hydraulic conductivity is the amount of water that would move vertically through a unit of saturated soil per unit time under hydraulic gradient, described in the National Soil Survey Handbook (http://soils.usda.gov/technical/hand¬book/contents/part618p3.html#50).

Of course, site designers must realize that soil map units are not enough information for design. For example, soil map units may have inclusions of other soils types. Some soil map units not listed here, such as the urban soil complex, are too disturbed to characterize consistently in this format. Also note that some of the following soils may have other limitations such as steep slopes and although they may receive water well, these may limit the potential of siting an infiltration practice at the particular area. Therefore on-site measures of soil and site characteristics are always recommended.

The following tables are listed by county, showing the soil map units that meet the 3 criteria for 'greatest potential use' for infiltration. If a county is not listed, that county does not have soil map units that meet all of the criteria. Assistance to identify the potential for infiltration of soils not included in this table can be obtained by contacting soil scientists with the ODNR-Division of Soil & Water Conservation or USDA-Natural Resources Conservation Service.

Adams County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EkB	Elkinsville silt loam, 1 to 6 percent slopes	4,642	1.2
Ge	Gessie loam, frequently flooded	2,762	0.7
	Total	7,404	2.0

Allen County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
KnA	Knoxdale silt loam, 0 to 2 percent slopes, occasionally flooded	2,750	1.1
	Total	2,750	1.1

Ashland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
WuB	Wooster-Riddles silt loams, 2 to 6 percent slopes	---	*
WuC	Wooster-Riddles silt loams, 6 to 12 percent slopes	---	*
WuD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	---	*
	Total	0	0.0

* Less than 0.1 percent.

Ashtabula County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam	2,319	0.5
Sm	Steep land, loamy	6,428	1.4
	Total	8,747	1.9

Athens County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cd	Chagrin loam, rarely flooded	2,090	0.6
Cg	Chagrin silt loam, frequently flooded	14,250	4.4
CmC	Clymer loam, 8 to 15 percent slopes	1,000	0.3
HcA	Hackers silt loam, 0 to 3 percent slopes	820	0.3
Mp	Moshannon silt loam, frequently flooded	470	0.1
PaB	Parke silt loam, 2 to 6 percent slopes	450	0.1
RcC	Richland loam, 8 to 15 percent slopes	310	*
RcD	Richland loam, 15 to 25 percent slopes	3,640	1.1
	Total	23,030	7.1

* Less than 0.1 percent.

Auglaize County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	2,890	1.1
	Total	2,890	1.1

Belmont County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
As	Ashton silt loam, occasionally flooded	319	*
Cf	Chagrin loam, occasionally flooded	2	*
Cg	Chagrin silt loam, occasionally flooded	2,240	0.6
DuB	Duncannon-Urban land complex, 0 to 15 percent slopes	514	0.1
No	Nolin variant silt loam, occasionally flooded	1,813	0.5
Nu	Nolin variant-Urban land complex	291	*
RcC	Richland loam, 8 to 15 percent slopes	684	0.2
RcD	Richland loam, 15 to 25 percent slopes	2,658	0.8
RcE	Richland moderately stony loam, 25 to 40 percent slopes	788	0.2
RkC	Richland channery loam, 8 to 15 percent slopes	39	*
RkD	Richland channery loam, 15 to 25 percent slopes	292	*
	Total	9,640	2.8

* Less than 0.1 percent.

WhC	Westmoreland silt loam, 6 to 15 percent slopes	3,142	0.9
WhD	Westmoreland silt loam, 15 to 25 percent slopes	13,234	3.6
WhE	Westmoreland silt loam, 25 to 35 percent slopes	13,957	3.8
	Total	37,298	10.3

* Less than 0.1 percent.

Crawford County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AdB	Alexandria silt loam, 2 to 6 percent slopes	1,038	0.4
AdC2	Alexandria silt loam, 6 to 12 percent slopes, moderately eroded	2,066	0.8
AdD2	Alexandria silt loam, 12 to 18 percent slopes, moderately eroded	573	0.2
HpE	Hennepin-Alexandria silt loams, 18 to 50 percent slopes	775	0.3
	Total	4,452	1.7

* Less than 0.1 percent.

Cuyahoga County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam, occasionally flooded	4,252	1.4
GeF	Geeburg-Mentor silt loams, 25 to 70 percent slopes	5,194	1.8
	Total	9,446	3.2

Defiance County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee loam, occasionally flooded	3,299	1.2
	Total	3,299	1.2

Delaware County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MaB	Martinsville loam, 2 to 6 percent slopes	24	*
MbB	Martinsville loam, till substratum, 2 to 6 percent slopes	959	0.3
McD2	Mentor silt loam, 12 to 18 percent slopes, eroded	63	*
RoA	Rossburg silt loam, 0 to 2 percent slopes, occasionally flooded	1,464	0.5
	Total	2,510	0.9

* Less than 0.1 percent.

Erie County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
NoA	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	576	0.3
	Total	576	0.3

Fairfield County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 6 percent slopes	2,163	0.7
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	1,860	0.6

Cg	Chagrin silt loam, frequently flooded	625	0.2
Gf	Gessie silt loam, occasionally flooded	1,748	0.5
Gg	Gessie silt loam, frequently flooded	1,841	0.6
HhC2	Hickory silt loam, 6 to 12 percent slopes, eroded	810	0.2
HkE	Hickory-Germano complex, 20 to 35 percent slopes	583	0.2
HmD2	Hickory-Gilpin complex, 12 to 20 percent slopes, eroded	2,889	0.9
PkB	Pike silt loam, 2 to 6 percent slopes	432	0.1
PkC2	Pike silt loam, 6 to 12 percent slopes, eroded	559	0.2
	Total	13,510	4.2

Fayette County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	826	0.3
Rs	Ross silt loam	1,393	0.5
	Total	2,219	0.9

Franklin County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	2,424	0.7
Uw	Urban land-Genesee complex, occasionally flooded	1,370	0.4
	Total	3,794	1.1

Gallia County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AkB	Allegheny loam, 3 to 8 percent slopes	550	0.2
AkC	Allegheny loam, 8 to 15 percent slopes	652	0.2
AkD	Allegheny loam, 15 to 25 percent slopes	587	0.2
Cg	Chagrin silt loam, frequently flooded	6,780	2.2
Cu	Cuba silt loam, occasionally flooded	1,226	0.4
EkB	Elkinsville silt loam, 1 to 6 percent slopes	2,129	0.7
	Total	11,924	4.0

Greene County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee loam	1,831	0.7
Rs	Ross loam	3,601	1.4
RtA	Rush silt loam, 0 to 2 percent slopes	2,036	0.8
RtB	Rush silt loam, 2 to 6 percent slopes	1,932	0.7
	Total	9,400	3.5

Guernsey County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AgC	Allegheny loam, 8 to 15 percent slopes	407	0.1
MeB	Mentor silt loam, 2 to 8 percent slopes	2,595	0.8

MeC	Mentor silt loam, 8 to 15 percent slopes	1,863	0.6
MeD	Mentor silt loam, 15 to 25 percent slopes	1,567	0.5
MfB	Mentor-Urban land complex, 2 to 8 percent slopes	152	*
MgB	Mentor silt loam, 2 to 6 percent slopes	8	*
RcC	Richland channery loam, 8 to 15 percent slopes	19	*
RcD	Richland channery loam, 15 to 25 percent slopes	471	0.1
	Total	7,082	2.1

* Less than 0.1 percent.

Hamilton County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee loam, occasionally flooded	3,912	1.5
Go	Genesee-Urban land complex, occasionally flooded	1,888	0.7
Hu	Huntington silt loam, occasionally flooded	875	0.3
Ju	Jules silt loam, occasionally flooded	5,635	2.1
McA	Martinsville silt loam, 0 to 2 percent slopes	2,073	0.8
McB	Martinsville silt loam, 2 to 6 percent slopes	616	0.2
PbB2	Parke silt loam, 3 to 8 percent slopes, eroded	575	0.2
PbC2	Parke silt loam, 8 to 15 percent slopes, eroded	914	0.3
PbD	Parke silt loam, 15 to 25 percent slopes	381	0.1
PbE	Parke silt loam, 25 to 35 percent slopes	381	0.1
PcB	Parke-Urban land complex, 3 to 8 percent slopes	519	0.2
PcC	Parke-Urban land complex, 8 to 15 percent slopes	320	0.1
RwB2	Russell silt loam, 3 to 8 percent slopes, eroded	1,621	0.6
RxB	Russell-Urban land complex, 3 to 8 percent slopes	8,304	3.1
UgB	Urban land-Elkinsville complex, 3 to 8 percent slopes	1,117	0.4
UgC	Urban land-Elkinsville complex, 8 to 15 percent slopes	722	0.3
Uh	Urban land-Huntington complex, frequently flooded	4,627	1.8
UmB	Urban land-Martinsville complex, 3 to 8 percent slopes	5,253	2.0
UmC	Urban land-Martinsville complex, 8 to 15 percent slopes	431	0.2
	Total	40,164	15.2

Hardin County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	14	*
MaB	Martinsville loam, 1 to 4 percent slopes	397	0.1
No	Nolin silt loam, occasionally flooded	810	0.3
	Total	1,221	0.4

* Less than 0.1 percent.

Henry County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gm	Genesee loam	372	0.1
Rs	Ross loam	547	0.2
	Total	919	0.3

Highland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EkB	Elkinsville silt loam, 1 to 6 percent slopes	14	*
Gd	Gessie loam, frequently flooded	77	*
Ge	Gessie silt loam, occasionally flooded	8	*
Gn	Genesee silt loam	5,829	1.6
HkC2	Hickory silt loam, 6 to 12 percent slopes, moderately eroded	1,741	0.5
HkD2	Hickory silt loam, 12 to 18 percent slopes, moderately eroded	4,538	1.3
HkE2	Hickory silt loam, 18 to 25 percent slopes, moderately eroded	2,235	0.6
HkF2	Hickory silt loam, 25 to 35 percent slopes, moderately eroded	758	0.2
HyC3	Hickory clay loam, 6 to 12 percent slopes, severely eroded	352	*
HyD3	Hickory clay loam, 12 to 18 percent slopes, severely eroded	2,016	0.6
HyE3	Hickory clay loam, 18 to 25 percent slopes, severely eroded	201	*
OcA	Ockley silt loam, 0 to 2 percent slopes	141	*
OcB	Ockley silt loam, 2 to 6 percent slopes	566	0.2
OcC2	Ockley silt loam, 6 to 12 percent slopes, moderately eroded	444	0.1
OdB	Ockley-Urban land complex, gently sloping	40	*
Rn	Ross silt loam	2,944	0.8
RuB	Russell silt loam, 2 to 6 percent slopes	210	*
WvA	Williamsburg silt loam, 0 to 2 percent slopes	91	*
WvB	Williamsburg silt loam, 2 to 6 percent slopes	350	*
WvC	Williamsburg silt loam, 6 to 12 percent slopes	256	*
	Total	22,811	6.4

* Less than 0.1 percent.

Hocking County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 6 percent slopes	269	*
AfC	Alford silt loam, 6 to 12 percent slopes	638	0.2
AgB	Allegheny loam, 2 to 6 percent slopes	235	*
AgC	Allegheny loam, 6 to 12 percent slopes	242	*
Cg	Chagrin silt loam, frequently flooded	13,498	5.0
HcD2	Hickory-Gilpin complex, 12 to 20 percent slopes, eroded	62	*
HkD2	Hickory silt loam, 12 to 20 percent slopes, eroded	2	*
HkE2	Hickory silt loam, 20 to 35 percent slopes, eroded	46	*
HmC2	Hickory silt loam, 6 to 12 percent slopes, eroded	1	*
HmD2	Hickory silt loam, 12 to 18 percent slopes, eroded	1,380	0.5
HmE	Hickory silt loam, 20 to 35 percent slopes, eroded	746	0.3
HmF	Hickory silt loam, 25 to 40 percent slopes	464	0.2
HrE	Hickory-Germano complex, 20 to 35 percent slopes	13	*
PkC2	Pike silt loam, 6 to 12 percent slopes, eroded	2	*
Po	Pope loam, occasionally flooded	2,169	0.8
RcD	Richland loam, 15 to 25 percent slopes	5	*
	Total	19,772	7.3

* Less than 0.1 percent.

Jackson County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AkB	Allegheny loam, 3 to 8 percent slopes	319	0.1
AkC	Allegheny loam, 8 to 15 percent slopes	766	0.3
AkD	Allegheny loam, 15 to 25 percent slopes	2,166	0.8
Cu	Cuba silt loam, occasionally flooded	752	0.3
Ha	Haymond silt loam, occasionally flooded	10	*
	Total	4,013	1.5

* Less than 0.1 percent.

Jefferson County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RaB	Richland silt loam, 2 to 6 percent slopes	68	*
RcB	Richland silt loam, 1 to 7 percent slopes	3,975	1.5
RcC	Richland silt loam, 7 to 15 percent slopes	200	*
	Total	4,243	1.6

* Less than 0.1 percent.

Lawrence County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin loam, frequently flooded	3,863	1.3
Ch	Chagrin silt loam, frequently flooded	63	*
Cu	Cuba silt loam, occasionally flooded	3,570	1.2
EkB	Elkinsville silt loam, 1 to 6 percent slopes	3,050	1.0
EkE	Elkinsville silt loam, 15 to 40 percent slopes	366	0.1
EmB	Elkinsville-Urban land complex, 1 to 8 percent slopes	3,657	1.3
	Total	14,569	5.0

* Less than 0.1 percent.

Licking County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AcB	Alford silt loam, 2 to 8 percent slopes	35	*
AcC2	Alford silt loam, 8 to 15 percent slopes, eroded	5	*
AfA	Alford silt loam, 0 to 2 percent slopes	610	0.1
AfB	Alford silt loam, 2 to 6 percent slopes	3,105	0.7
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	705	0.2
AhB	Alford-Urban land complex, 2 to 6 percent slopes	500	0.1
HkC2	Hickory silt loam, 6 to 12 percent slopes, eroded	490	0.1
HkD2	Hickory silt loam, 12 to 18 percent slopes, eroded	265	*
MnA	Mentor silt loam, 0 to 2 percent slopes	520	0.1
MnB	Mentor silt loam, 2 to 6 percent slopes	3,405	0.8
MnC2	Mentor silt loam, 6 to 12 percent slopes, eroded	4,080	0.9
MnD2	Mentor silt loam, 12 to 18 percent slopes, eroded	370	*
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded	2,250	0.5
RsA	Rush silt loam, 0 to 2 percent slopes	975	0.2
	Total	17,315	3.9

* Less than 0.1 percent.

Logan County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,371	0.5
	Total	1,371	0.5

Lorain County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MnB	Mentor silt loam, 2 to 6 percent slopes	434	0.1
MnC	Mentor silt loam, 6 to 12 percent slopes	127	*
MnE	Mentor silt loam, 12 to 25 percent slopes	104	*
	Total	665	0.2

* Less than 0.1 percent.

Lucas County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
SmB	Sisson loam, 2 to 6 percent slopes	451	0.2
SmC	Sisson loam, 6 to 12 percent slopes	614	0.3
SmD	Sisson loam, 12 to 18 percent slopes	826	0.4
SnB	Sisson-Urban land complex, 2 to 12 percent slopes	1,546	0.7
	Total	3,437	1.5

Madison County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam, occasionally flooded	987	0.3
	Total	987	0.3

Mahoning County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
WrF2	Wooster loam, 25 to 50 percent slopes, moderately eroded	247	*
WsB	Wooster silt loam, 2 to 6 percent slopes	2,068	0.8
WsC2	Wooster silt loam, 6 to 12 percent slopes, moderately eroded	3,837	1.4
WsD2	Wooster silt loam, 12 to 18 percent slopes, moderately eroded	571	0.2
WsE2	Wooster silt loam, 18 to 25 percent slopes, moderately eroded	88	*
	Total	6,811	2.5

* Less than 0.1 percent.

Marion County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MaA	Martinsville loam, 0 to 2 percent slopes	880	0.3
MaB	Martinsville loam, 2 to 6 percent slopes	477	0.2
No	Nolin silt loam, occasionally flooded	3,773	1.5
Ro	Rossburg silt loam, 0 to 2 percent slopes, occasionally flooded	4	*
	Total	5,134	2.0

* Less than 0.1 percent.

Medina County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cr	Chagrin silt loam, occasionally flooded	59	*
MoB	Mentor silt loam, 2 to 6 percent slopes	4	*
WvB	Wooster-Riddles silt loams, 2 to 6 percent slopes	49	*
WvC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	188	*
WvD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	11	*
	Total	311	0.1

* Less than 0.1 percent.

Meigs County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin silt loam, frequently flooded	10,689	3.9
DuC	Duncannon silt loam, 6 to 12 percent slopes	227	*
EkA	Elkinsville silt loam, 0 to 2 percent slopes	261	*
GaC	Gallia loam, 6 to 12 percent slopes	802	0.3
GaD	Gallia loam, 12 to 18 percent slopes	255	*
Mo	Moshannon silt loam, frequently flooded	1,264	0.5
RcB	Richland silt loam, 2 to 6 percent slopes	1,071	0.4
RdD	Richland loam, 15 to 25 percent slopes	3	*
RdE	Richland loam, 25 to 40 percent slopes	1	*
	Total	14,573	5.3

* Less than 0.1 percent.

Mercer County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,816	0.6
	Total	1,816	0.6

Miami County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam	2,876	1.1
	Total	2,876	1.1

Monroe County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AlD	Allegheny silt loam, 12 to 18 percent slopes	1	*
AsA	Ashton silt loam, 0 to 3 percent slopes	192	*
Cg	Chagrin silt loam	5,942	2.0
Hu	Huntington silt loam	737	0.3
	Total	6,872	2.3

* Less than 0.1 percent.

Montgomery County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Rs	Ross silt loam	10,731	3.6
Rt	Ross-Urban land complex	3,786	1.3
	Total	14,517	4.9

Morgan County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ca	Chagrin silt loam, frequently flooded	327	0.1
RvE	Richland-Vandalia complex, 20 to 35 percent slopes	53	*
	Total	380	0.1

* Less than 0.1 percent.

Morrow County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
ObA	Ockley loam, 0 to 2 percent slopes	3	*
ObB	Ockley loam, 2 to 6 percent slopes	69	*
	Total	72	0.0

* Less than 0.1 percent.

Muskingum County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 2 to 8 percent slopes	5,395	1.3
AfC2	Alford silt loam, 8 to 15 percent slopes, eroded	5,545	1.3
Cb	Chagrin loam, rarely flooded	2,277	0.5
LcD	Lakin-Alford complex, 15 to 25 percent slopes	541	0.1
No	Nolin silt loam, occasionally flooded	4,638	1.1
UtA	Urban land-Nolin complex, rarely flooded	593	0.1
	Total	18,989	4.4

Noble County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AlD	Allegheny silt loam, 12 to 18 percent slopes	9	*
Ch	Chagrin silt loam, occasionally flooded	1,990	0.8
RcD	Richland channery loam, 15 to 25 percent slopes	16	*
	Total	2,015	0.8

* Less than 0.1 percent.

Ottawa County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, frequently flooded	1,041	0.6
	Total	1,041	0.6

Perry County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfB	Alford silt loam, 1 to 8 percent slopes	6,773	2.6
AfC	Alford silt loam, 8 to 15 percent slopes	1,862	0.7
AfC2	Alford silt loam, 8 to 15 percent slopes, eroded	107	*
AfD	Alford silt loam, 15 to 25 percent slopes	282	0.1
AgB	Alford silt loam, 2 to 8 percent slopes	3	*
MeB	Mentor silt loam, gravelly substratum, 1 to 8 percent slopes	836	0.3
MeC	Mentor silt loam, gravelly substratum, 8 to 15 percent slopes	1,137	0.4
No	Nolin silt loam, occasionally flooded	3,510	1.3
SfD	Shelocta-Cruze complex, 15 to 25 percent slopes	1	*
SfE	Shelocta-Cruze complex, 25 to 40 percent slopes	26	*
	Total	14,537	5.5

* Less than 0.1 percent.

Pickaway County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam, occasionally flooded	9,332	2.9
Gs	Gessie silt loam, occasionally flooded	47	*
Rt	Ross silt loam, overwash, frequently flooded	801	0.2
WeA	Wea silt loam, 0 to 2 percent slopes	1,965	0.6
WeB	Wea silt loam, 2 to 6 percent slopes	476	0.1
	Total	12,621	3.9

* Less than 0.1 percent.

Pike County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
En	Elkinsville silt loam, rarely flooded	2,182	0.8
Ge	Genesee silt loam, occasionally flooded	6,699	2.4
Gf	Gessie silt loam, occasionally flooded	72	*
Ha	Haymond silt loam, occasionally flooded	2,705	1.0
Hu	Huntington silt loam, occasionally flooded	3,637	1.3
Mh	Martinsville loam, rarely flooded	727	0.3
Mt	Mentor silt loam, rarely flooded	117	*
PaA	Parke silt loam, 0 to 3 percent slopes	639	0.2
PaB	Parke silt loam, 3 to 8 percent slopes	212	*
SuB	Spargus channery silt loam, 2 to 6 percent slopes	7	*
	Total	16,997	6.0

* Less than 0.1 percent.

Portage County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Tg	Tioga loam	1,055	0.3
	Total	1,055	0.3

Preble County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RuB	Russell silt loam, 2 to 6 percent slopes	2,857	1.0
	Total	2,857	1.0

Putnam County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	1,807	0.6
Kw	Knoxdale silt loam, occasionally flooded	10	*
Rw	Rossburg silt loam, occasionally flooded	33	*
	Total	1,850	0.6

* Less than 0.1 percent.

Richland County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeB	Mentor silt loam, 2 to 6 percent slopes	267	*
MeC	Mentor silt loam, 6 to 12 percent slopes	198	*
WeD	Westmoreland silt loam, 12 to 18 percent slopes	102	*
WmD	Wheeling and Mentor silt loams, 12 to 18 percent slopes	301	*
	Total	868	0.3

* Less than 0.1 percent

Ross County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Gessie silt loam, occasionally flooded	17,914	4.0
Gf	Gessie silt loam, frequently flooded	5,601	1.3
Hd	Haymond silt loam, occasionally flooded	2,911	0.7
HkD2	Hickory silt loam, 12 to 20 percent slopes, eroded	131	*
HkE2	Hickory silt loam, 20 to 35 percent slopes, eroded	329	*
Ht	Huntington silt loam, occasionally flooded	245	*
McA	Martinsville loam, rarely flooded	166	*
MeC2	Mentor silt loam, 6 to 12 percent slopes, eroded	702	0.2
MeD2	Mentor silt loam, 12 to 20 percent slopes, eroded	512	0.1
MfA	Mentor silt loam, rarely flooded	561	0.1
MgA	Mentor silt loam, gravelly substratum, 0 to 2 percent slopes	2,914	0.7
MgB	Mentor silt loam, gravelly substratum, 2 to 6 percent slopes	657	0.1
PkA	Pike silt loam, 0 to 2 percent slopes	1,873	0.4
PkB	Pike silt loam, 2 to 6 percent slopes	1,355	0.3
SuB	Spargus channery silt loam, 2 to 6 percent slopes	1,259	0.3
	Total	37,130	8.4

* Less than 0.1 percent.

Sandusky County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeB	Mentor silt loam, 1 to 4 percent slopes	1,277	0.5
MeF	Mentor silt loam, 25 to 50 percent slopes	756	0.3

	Total	2,033	0.8

Scioto County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AfD	Alford silt loam, 10 to 25 percent slopes	660	0.2
Cu	Cuba silt loam, occasionally flooded	1,280	0.3
EhB	Elkinsville silt loam, 1 to 6 percent slopes	12	*
EkB	Elkinsville silt loam, 1 to 8 percent slopes	2,768	0.7
EkE	Elkinsville silt loam, 25 to 40 percent slopes	1,679	0.4
EmB	Elkinsville-Urban land complex, 1 to 8 percent slopes	1,541	0.4
Ge	Genesee silt loam, occasionally flooded	2,365	0.6
Ha	Haymond silt loam, occasionally flooded	3,054	0.8
Hu	Huntington silt loam, occasionally flooded	522	0.1
No	Nolin silt loam, occasionally flooded	12,086	3.1
SbB	Shelocta silt loam, 3 to 8 percent slopes	10,880	2.8
SbC	Shelocta silt loam, 8 to 15 percent slopes	2,119	0.5
SbD	Shelocta silt loam, 15 to 25 percent slopes	3,584	0.9
WmB	Wheeling silt loam, 1 to 8 percent slopes	1,450	0.4
	Total	44,000	11.2

* Less than 0.1 percent.

Seneca County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ch	Chagrin silt loam, occasionally flooded	5,427	1.5
Ge	Genesee silt loam, occasionally flooded	157	*
Ru	Ross silt loam, occasionally flooded	1,170	0.3
	Total	6,754	1.9

* Less than 0.1 percent.

Shelby County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee silt loam, occasionally flooded	1,108	0.4
	Total	1,108	0.4

Stark County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
MeA	Mentor silt loam, 0 to 2 percent slopes	270	*
MeB	Mentor silt loam, 2 to 6 percent slopes	447	0.1
MeC	Mentor silt loam, 6 to 12 percent slopes	237	*
MeD	Mentor silt loam, 12 to 18 percent slopes	176	*
RuA	Rush silt loam, 0 to 3 percent slopes	---	*
WuB	Wooster silt loam, 2 to 6 percent slopes	6,487	1.7
WuC	Wooster silt loam, 6 to 12 percent slopes	3,816	1.0

WuC2	Wooster silt loam, 6 to 12 percent slopes, moderately eroded	10,791	2.9
WuD2	Wooster silt loam, 12 to 18 percent slopes, moderately eroded	6,137	1.7
WuE2	Wooster silt loam, 18 to 25 percent slopes, moderately eroded	1,538	0.4
WuF2	Wooster silt loam, 25 to 50 percent slopes, moderately eroded	143	*
WvD	Wooster-Urban land complex, steep	305	*
WxB	Wooster-Riddles silt loams, 2 to 6 percent slopes	---	*
WxC	Wooster-Riddles silt loams, 6 to 12 percent slopes	---	*
WxC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	---	*
WxD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	---	*
	Total	30,347	8.2

* Less than 0.1 percent.

Summit County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
CwC2	Chili-Wooster complex 6 to 12 percent slopes, moderately eroded	449	0.2
CwD2	Chili-Wooster complex, 12 to 18 percent slopes, moderately eroded	275	0.1
CwE2	Chili-Wooster complex, 18 to 25 percent slopes, moderately eroded	232	*
WwD	Wooster-Urban land complex, hilly	300	0.1
WyC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	4	*
	Total	1,260	0.5

* Less than 0.1 percent.

Tuscarawas County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
EkA	Elkinsville silt loam, 0 to 3 percent slopes	600	0.2
MeB	Mentor silt loam, 2 to 6 percent slopes	2	*
RuA	Rush silt loam, 0 to 3 percent slopes	3,322	0.9
	Total	3,924	1.1

* Less than 0.1 percent.

Union County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gn	Genesee silt loam	3,006	1.1
No	Nolin silt loam, 0 to 2 percent slopes, occasionally flooded	35	*
RpA	Rossburg silt loam, 0 to 2 percent slopes, occasionally flooded	2	*
	Total	3,043	1.1

* Less than 0.1 percent.

Vinton County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Cg	Chagrin silt loam, 0 to 2 percent slopes, frequently flooded	4,434	1.7
RcD	Richland loam, 15 to 25 percent slopes	29	*
RcE	Richland loam, 25 to 40 percent slopes	48	*
	Total	4,511	1.7

* Less than 0.1 percent.

Warren County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
CqC2	Crouse-Miamian silt loams, 6 to 12 percent slopes, eroded	94	*
CrB	Crider silt loam, 2 to 6 percent slopes	333	0.1
Gd	Genesee fine sandy loam	4,515	1.7
Gn	Genesee loam	4,612	1.8
HiD2	Hickory silt loam, 12 to 18 percent slopes, eroded	220	*
HiE2	Hickory silt loam, 18 to 25 percent slopes, eroded	7	*
HiF2	Hickory silt loam, 25 to 35 percent slopes, eroded	279	0.1
HmE	Hennepin-Miamian silt loams, 18 to 25 percent slopes	240	*
HmE2	Hennepin-Miamian silt loams, 18 to 25 percent slopes, moderately eroded	1,654	0.6
HnD3	Hennepin-Miamian complex, 12 to 18 percent slopes, severely eroded	399	0.2
HuE2	Hickory-Morrisville silt loams, 18 to 25 percent slopes, eroded	27	*
PaB	Parke silt loam, 2 to 6 percent slopes	224	*
PaD2	Parke silt loam, 6 to 18 percent slopes, moderately eroded	183	*
Rn	Ross loam	3,598	1.4
WlA	Williamsburg silt loam, 0 to 2 percent slopes	156	*
WlB	Williamsburg silt loam, 2 to 6 percent slopes	529	0.2
WlC2	Williamsburg silt loam, 6 to 12 percent slopes, moderately eroded	166	*
	Total	17,236	6.6

* Less than 0.1 percent.

Washington County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AlB	Allegheny silt loam, 2 to 6 percent slopes	536	0.1
AlC	Allegheny silt loam, 6 to 12 percent slopes	1,801	0.4
AlD	Allegheny silt loam, 12 to 18 percent slopes	1,479	0.4
AlG	Allegheny silt loam, 18 to 50 percent slopes	497	0.1
AsA	Ashton silt loam, 0 to 2 percent slopes	631	0.2
AsB	Ashton silt loam, 2 to 6 percent slopes	101	*
Cg	Chagrin silt loam	7,284	1.8
DtB	Duncannon silt loam, 2 to 6 percent slopes	156	*
DtC	Duncannon silt loam, 6 to 12 percent slopes	147	*
DuD	Duncannon-Lakin complex, 12 to 18 percent slopes	205	*
DuE	Duncannon-Lakin complex, 18 to 25 percent slopes	373	*
GaB	Gallia silt loam, 2 to 6 percent slopes	441	0.1
GaC	Gallia silt loam, 6 to 12 percent slopes	1,433	0.4
GaD	Gallia silt loam, 12 to 18 percent slopes	341	*
HcA	Hackers silt loam, 0 to 2 percent slopes	948	0.2
HcB	Hackers silt loam, 2 to 6 percent slopes	1,758	0.4
HcC	Hackers silt loam, 6 to 12 percent slopes	198	*
Hu	Huntington silt loam	852	0.2
MeA	Mentor silt loam, 0 to 2 percent slopes	2,182	0.5
MeB	Mentor silt loam, 2 to 6 percent slopes	1,991	0.5
MeC	Mentor silt loam, 6 to 12 percent slopes	611	0.1
Mp	Moshannon silt loam	6,621	1.6
No	Nolin silt loam	2,891	0.7
	Total	33,477	8.2

* Less than 0.1 percent.

Wayne County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
RhB	Riddles silt loam, 2 to 6 percent slopes	2,444	0.7
RhC	Riddles silt loam, 6 to 12 percent slopes	2,359	0.7
RhD2	Riddles silt loam, 12 to 18 percent, eroded	1,069	0.3
RhE	Riddles silt loam, 18 to 25 percent slopes	2,500	0.7
WuB	Wooster-Riddles silt loams, 2 to 6 percent slopes	23,623	6.6
WuC	Wooster-Riddles silt loams, 6 to 12 percent slopes	6,927	1.9
WuC2	Wooster-Riddles silt loams, 6 to 12 percent slopes, eroded	15,191	4.3
WuD2	Wooster-Riddles silt loams, 12 to 18 percent slopes, eroded	6,816	1.9
	Total	60,929	17.1

Williams County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Ge	Genesee loam	1,396	0.5
	Total	1,396	0.5

Wood County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
Gm	Genesee loam	385	*
Gn	Genesee silt loam	777	0.2
	Total	1,162	0.3

* Less than 0.1 percent.

Wyandot County, Ohio

Map Symbol	Soil Name	Acres	Percent of County
AdC2	Alexandria silt loam, 6 to 12 percent slopes, moderately eroded	1	*
Cm	Chagrin silt loam, rarely flooded	871	0.3
Ge	Genesee silt loam, occasionally flooded	4,143	1.6
HpE	Hennepin-Alexandria silt loams, 18 to 50 percent slopes	1	*
MaB	Martinsville fine sandy loam, 2 to 6 percent slopes	591	0.2
SfC2	Shinrock-Martinsville complex, 6 to 12 percent slopes, eroded	1,638	0.6
SfD2	Shinrock-Martinsville complex, 12 to 18 percent slopes, eroded	246	*
	Total	7,501	2.9

* Less than 0.1 percent.