



150 E. GAY STREET, 24<sup>TH</sup> FLOOR  
COLUMBUS, OH 43215-3192  
TELEPHONE: (614) 744-2570  
FACSIMILE: (844) 670-6009  
<http://www.dickinsonwright.com>

CHRISTINE M.T. PIRIK  
CPirik@dickinsonwright.com  
(614) 591-5461

June 17, 2019

Ms. Tanowa Troupe, Secretary  
Ohio Power Siting Board  
Docketing Division  
180 East Broad Street, 11<sup>th</sup> Floor  
Columbus, OH 43215

**Re: Case Nos. 09-479-EL-BGN, 11-3446-EL-BGA, 16-469-EL-BGA,  
and 16-2404-EL-BGA**

In the Matter of the Application of Hardin Wind Energy LLC for a Certificate of  
Environmental Compatibility and Public Need for the Hardin Wind Farm.

**Phase 3 – Compliance with Condition 54, Case No. 09-479-EL-BGN –  
Storm Water Pollution Prevention Plan**

Dear Ms. Troupe:

Hardin Wind Energy LLC (“Applicant”) is certified to construct a wind-powered electric generation facility in Hardin County, Ohio, in accordance with the orders issued by the Ohio Power Siting Board (“OPSB”) in the above-referenced cases.

The Applicant is currently preparing to begin Phase 3 of the project, which will entail construction of the access roads and turbine foundations that were not included in Phases 1 and 2.

At this time, for purposes of complying with the certificate conditions for Phase 3, the Applicant is filing the attached Storm Water Pollution Prevention Plan. This document is being provided in compliance with Condition 54 of OPSB’s March 22, 2010 Order in Case No. 09-479-EL-BGN.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

/s/ Christine M.T. Pirik

Christine M.T. Pirik (0029759)

William V. Vorys (0093479)

Dickinson Wright PLLC

150 East Gay Street, Suite 2400

Columbus, Ohio 43215

***Attorneys for Hardin Wind Energy LLC***

cc: Ed Steele  
Derek Collins

COLUMBUS 39579-20 117492v1

# Construction Storm Water Pollution Prevention Plan (SWP3)

*Hardin Wind Energy LLC*



Prepared for  
Hardin Wind Energy LLC

May 13, 2018

# Construction Storm Water Pollution Prevention Plan (SWP3)

*Hardin Wind Energy LLC*



Prepared for  
Hardin Wind Energy LLC

May 13, 2018



## General Project Information

**Project name:** Hardin Wind Energy LLC

**Project location:** Hardin County, south of the town of McGuffey

Latitude/Longitude of approximate centroid of project:

Latitude: 40.632603° Longitude: -83.792202°

Method used to collect: Google Earth

**Project size:** Total number of acres to be disturbed: 227

**Total new impervious surface:** 37.51

**Percent Imperviousness created:** 0.16

Pre-construction acres of impervious surface: 0.56

Post-construction acres of impervious surface: 38.07

**Construction timeline:**

Start date: 6-17-2019 Estimated completion date: 12/31/2020

**Contact information:**

**Operator / Owner:**

Name of firm or organization: Hardin Wind Energy LLC

Mailing address: One South Wacker Drive; Suite 1800

City: Chicago State: IL Zip code: 60606

Contact name: Stachowiak, Dariusz Title: Project Manager

Contact phone: 312-638-8493 E-mail: DStachowiak@invenergyllc.com

Fax Number:





**Operator / General Contractor:**

Name of firm or organization: TBD

Mailing address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip code: \_\_\_\_\_

Contact name: \_\_\_\_\_ Title: \_\_\_\_\_

Contact phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Note: SWP3 to be amended once contractor's information is available.

---

# Hardin Wind Energy LLC

May 13, 2018

## Contents

1.0	Introduction .....	1
2.0	Site Description .....	2
2.1	Construction Activity .....	2
2.2	Site Area .....	4
2.3	Runoff Coefficients.....	5
2.4	Storm Water Discharges .....	5
2.5	Prior Land Use.....	6
2.6	On-site Streams.....	6
2.7	Implementation Schedule .....	7
2.8	Receiving Waters and Wetlands .....	7
2.9	Standard Erosion and Sediment Control Practices.....	7
2.10	Asphalt and Concrete Plant Storm Water Discharges .....	8
2.11	Grading and Stabilization Activities.....	8
2.12	Site Maps .....	9
3.0	Controls .....	11
3.1	Preservation Methods.....	11
3.2	Erosion Control Practices.....	12
3.3	Runoff Control Practices .....	13
3.4	Sediment Control Practices.....	14
3.5	Post-Construction Storm Water Management Requirements.....	16
3.6	Surface Water Protection.....	18
3.7	Other Controls .....	18
3.8	Maintenance .....	22
3.9	Inspections .....	22
4.0	Approved State or Local Plans .....	25
5.0	Contractors training.....	26
6.0	Signature and Review .....	27
7.0	Plan Amendments .....	28
8.0	Notice of Termination Requirements .....	29

---

## List of Figures

Figure 1	Site Location and Index Map
Figure 2	Generalized Soil Overview
Figure 3	Inundation Extents for 100-Year Event
Figure 4	Typical Turbine Site Layout
Figure 5-1 through 5-31	SWPPP Site Maps

## List of Appendices

Appendix A	Ohio Construction Storm Water General Permit OHC000005
Appendix B	Grading and Stabilization Activities Log
Appendix C	Record of SWP3 Amendments
Appendix D	SWP3 Training Log
Appendix E	BMP Specifications
Appendix F	Release Reporting of a Hazardous Substance
Appendix G	Construction Site Inspection Checklist

---

Owner Certification (Operator)

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## 1.0 Introduction

*(OHC000005 III.A) A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. The SWP3 shall be a comprehensive, stand-alone document, which is not complete unless it contains the information required by Part III.G of this permit. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants in storm water discharges during construction and pollutants associated with post-construction activities to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.*

Hardin Wind Energy LLC is planning to construct the Hardin County Wind Project (Project). The proposed Project is located on rural farmland in Hardin County, Ohio, outside of the town of McGuffey (Figure 1).

## 2.0 Site Description

### 2.1 Construction Activity

(OHC000005 III.G.1.a) A description of the nature and type of the construction activity (e.g., low density residential, shopping mall, highway, etc.);

The proposed Project will include:

- installation of 60 wind turbines,
- installation of permanent access roads with culverts as needed,
- maintenance to the Township roads as needed (this area is not included in the SWP3 at the moment, the SWP3 will be amended once more information is available following deliver of turbines),
- installation of underground collection of cables connecting turbines and substation (this area is not included in the SWP3 at the moment, the SWP3 will be amended once more information is available, sometime in 2020), and
- temporary laydown areas (this area is not included in the SWP3 at the moment, the SWP3 will be amended once more information is available).

Construction will consist of the following:

- **Maintenance to the Township roads** (to be added to the Figures once details are available) will involve: paving and upgrades to shoulders and roadside ditches as needed. General maintenance will occur during construction phase whit final upgrade done following delivery of turbines.

Typical construction phasing will consist of the following:

1. installation of sediment control BMPs
  2. paving
  3. upgrade of road side ditches
  4. upgrade of road shoulders
  5. site restoration
- **Installation of temporary turning radius** (Refer to Figures 5-1 through 5-31) will involve:
    1. installation of sediment control BMPs
    2. clearing, grubbing or stripping, as needed
    3. installation of culverts, as needed
    4. temporary stabilization of ditches and road banks, as needed
    5. fill with material to grade
    6. apply gravel base
    7. following turbine erection, the turning radius will be removed by removing the fill material
    8. removal of any extra culvert lengths
    9. restore all exposed soil
  - **Installation of permanent access roads** (Refer to Figures 5-1 through 5-31) will involve:

1. installation of sediment control BMPs, as needed
  2. clearing, grubbing or stripping, as needed
  3. compact subgrade
  4. install geogrid or cement stabilize the subgrade
  5. apply gravel base
  6. following turbine erection the soil will be decompacted along shoulders
  7. all non-aggregate areas will be restored by applying the topsoil and returning it to the pre-construction condition
  8. gravel cap will be applied to the permanent access roads
- **Installation of 60 wind turbines** (Refer to Figures 5-1 through 5-31) will involve: installation of stone piers where needed and excavation to prepare for the installation of turbine foundations. The materials removed from the excavation will be stockpiled in a horseshoe formation surrounding the excavation for use as backfill. The soil base is protected against damage by installing a flowable concrete mud mat after the final excavation. Following the installation of the mud mats, the foundations will be filled and compacted using the stockpiled native material. Following backfilling, the wind tower will be installed. Typical construction phasing at each location will consist of the following:
    1. installation of sediment control BMPs, as needed
    2. clearing, grubbing or stripping, as needed
    3. installation of stone piers where needed
    4. excavation and stockpiling of excavated material
    5. dewatering, as needed
    6. installation of mud mat within the excavation
    7. backfilling the excavation
    8. installation of wind tower
    9. installation of gravel surrounding wind tower
    10. site restoration
  - **Installation or plowing of underground collection of cables connecting turbines and substation** (to be added to the Figures once details are available) will involve:
    1. installation of sediment control BMPs, as needed
    2. open trenching in segments of 300 feet or horizontal directional drilling (HDD) at stream and road crossings depending on terrain
    3. stockpiling along the trenches
    4. installation of cables
    5. backfilling
    6. restoration
  - **Temporary laydown area and concrete batch plant** (to be added to the Figures once details are available) will involve:
    1. installation of sediment control BMPs, as needed
    2. provide any necessary secondary containment and secure storage
    3. restoration

## 2.2 Site Area

*(OHC000005 III.G.1.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);*

*(OHC000005 III.G.1.c) A measure of the impervious area and percent imperviousness created by the construction activity (existing, new and total impervious area after construction);*

This SWPPP includes the installation of 60 turbines, installation of permanent access roads, and installation of temporary turn radius. The SWPPP will be amended to add maintenance of the Township roads, installation of underground collection of cables connecting turbines and substation, temporary laydown areas and concrete batch plant during the construction as construction plans are developed.

The disturb area due to the installation of 60 turbines, installation of permanent access roads, and installation of temporary turn radius will be approximately 227 acres. However, not the entire area will be disturbed at one time. Work will be phased to minimize disturbance area to the extent possible.

The project site is predominantly farmland, and clearing and grubbing will generally be restricted to the removal of planted agricultural crops or remains of crops, grass, and topsoil. At each turbine location, the excavation will be approximately 100 feet wide, 100 feet long, and 11 feet deep. Following backfilling, wind towers (18 feet in diameter) will be installed with 10 feet wide gravel area surrounding it (approximately 0.03 acre permanent impact per turbine). Refer to Figure 4 for a typical site layout. The rest of the work area will be returned to its pre-construction agricultural use. The work area at each turbine location which has the potential for soil disturbance is a 170 foot setback in all directions from the center of the turbine. Areas surrounding the excavation may be used for parking, stockpiling, material storage, etc. The permanent access road will be installed for each turbine as shown on Figures 5-1 through 5-31. These permanent access roads will be approximately 16 feet wide. An additional 8 feet of temporary workspace on each side of the road will be needed. To allow for turbine component delivery, a temporary turning radius will be installed at the each construction entrance.

Equipment used will include a backhoe or similar excavator, and trucks to transport personnel, equipment and soil. During the project it will be necessary to excavate and temporarily stockpile soil. Subsoil and topsoil will be segregated into separate piles. Subsoil may be used for backfilling the excavation, while topsoil removed during stripping will be graded into existing site topography or used as fill in non-structural areas following project completion.

**Table 2-1: A measure of the impervious area and percent imperviousness created by the construction activity**

Existing Impervious Area (acre)	New Impervious Area due to Proposed Access Roads (acre)	New Impervious Area due to Turbines (acre)	Percent Imperviousness Created by the Construction Activity
0.56	37.16	0.35	0.16%



## 2.3 Runoff Coefficients

*(OHC000005 III.G.1.d) 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);*

Existing soil conditions for the site are agricultural fields ranging from hydrologic soil group B/C and C/D (see Table 2.2). From the National Engineering Handbook (1972) the runoff curve numbers for cultivated lands can range from a low of 71 for soil group B with conservation treatments to 91 for soil group D and no conservation treatments.

Post-construction runoff coefficients would remain the same for the cultivated lands. A runoff curve number of 96 would be used for all new gravel surfacing.

## 2.4 Storm Water Discharges

*(OHC000005 III.G.1.e) Existing data describing the soil and, if available, the quality of any discharge from the site;*

The proposed turbines sites are located in rural farmland. The majority of the site lies in the Scioto Marsh area which is a very flat area of former marsh land that formed in the glacial lake basin and resulted in approximately 2 to 10 feet of peat overlying the underlying lacustrine clay. Natural and man-made drainage waterways are located in low-lying areas of the site.

The predominant soil types in the vicinity of the project and as mapped in the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey are summarized in Table 2-2 and shown on Figure 2. Table 2-2: NRCS Soil Data

Map Unit	Map Unit Symbol	Kf factor*	Hydrologic group**	% Organic	% Sand	% Silt	% Clay
McGuffey muck	Mc	unavailable	C/D	40.0	0	unavailable	unavailable
Roundhead muck	Ro	unavailable	C/D	37.5	0	unavailable	unavailable
Linwood muck	Ln	unavailable	B/D	55.0	0	unavailable	unavailable
Milford silty clay loam, 0 to 2 percent slopes	Mf	0.24	C/D	5.0	10.0	54.0	36.0
<p>* Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.</p> <p>** Group B—Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. Group C—Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments. Group D—Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential. All soils with a depth to a water impermeable layer less than 50 centimeters [20 inches] and all soils with a water table within 60 centimeters [24 inches] of the surface are in this group, although some may have a dual classification, as described in the next section, if they can be adequately drained.</p>							

Additionally, a geotechnical evaluation was performed by Barr Engineering. It was found that the topsoil consists primarily of organic silt to silty clay and is actively farmed. The thickness varies, depending upon the plowed zone and location. The boring logs indicate a range of topsoil thickness of approximately 12 to 18 inches. These soils appear to be reworked site soils with a moderate amount of organic materials. Deeper layers of highly organic soils and peat were encountered across the site, but these layers appeared to be confined to depths shallower than the proposed foundation embedment depth.

Current water discharges are typical of agricultural fields. Following the completion of the project, the runoff coefficient, quality of discharge from the site and stormwater flow path will be similar to the existing conditions. Upon completion of the project, the project site will be stabilized and returned to pre-construction conditions, except permanent access roads, wind turbine footprint, and approximately 10 feet of gravel area surrounding each turbine.

## 2.5 Prior Land Use

(OHC000005 III.G.1.f) A description of prior land uses at the site;

The area is used for agricultural purposes.

## 2.6 On-site Streams

(OHC000005 III.G.1.g) A description of the condition of any on-site streams (e.g. prior channelization, bed instability or headcuts, channels on public maintenance, or natural channels);

Additional wetland and streams delineation is being done. Once all wetlands and waterways are delineated, all applicable permits will be obtained and the SWPPP will be amended to include any additional conditions.

## 2.7 Implementation Schedule

*(OHC000005 III.G.1.h) An implementation schedule which describes the sequence of major construction operations (i.e., designation of vegetative preservation areas, grubbing, excavating, grading, utilities, infrastructure installation and others) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;*

Refer to Section 2.1: Construction Activity and 2.2: Site Area.

## 2.8 Receiving Waters and Wetlands

*(OHC000005 III.G.1.ih) The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal 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. For discharges to an MS4, the point of discharge to the MS4 and the location where the MS4 ultimately discharges to a stream or surface water of the state shall be indicated;*

The majority of the Project is located within the upper portion of the Scioto River watershed that was studied during 2009. The upper Scioto River watershed is divided into five subwatersheds:

- 05060001 01      Headwaters Scioto River
- 05060001 02      Rush Creek
- 05060001 03      Little Scioto River
- 05060001 04      Panther Creek-Scioto River
- 05060001 05      Fulton Creek-Scioto River

The Project is located within the 05060001 01, 05060001 02 and 05060001 04 subwatersheds. Stormwater from the Project area will be discharged into multiple unnamed tributaries to the Scioto River and the Cottonwood Ditch and into the Scioto River and the Cottonwood Ditch. The TMDL for the Scioto River (upper) Watershed is not approved at the time of the SWP3 preparation.

Additionally, a small portion of the Project is located within the Cessna Creek Watershed Assessment Unit, subwatershed 04100008 01 01. There will be no direct discharge to surface waters within this project area.

## 2.9 Standard Erosion and Sediment Control Practices

*(OHC000005 III.G.1.j) For subdivided developments, a detail drawing of individual parcels with their erosion, sediment or storm water control practices and/a typical individual lot showing standard individual lot erosion and sediment control practices.*

*A typical individual lot drawing does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones;*

*(OHC000005 II.A) You shall design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls shall be designed, installed and maintained to:*

- 1. Control storm water volume and velocity within the site to minimize soil erosion and stream;*
- 2. Control storm water discharges, including both peak flowrates and total storm water volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;*
- 3. Minimize the amount of soil exposed during construction activity;*
- 4. Minimize the disturbance of steep slopes;*
- 5. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls shall address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;*
- 6. If feasible, provide and maintain a 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, you shall comply with the stabilization requirements found in Part II.B for areas within 50 feet of a surface water; and*
- 7. Minimize soil compaction and, unless infeasible, preserve topsoil.*

Refer to Figures 5-1 through 5-31 and Section 3.0 below.

## **2.10 Asphalt and Concrete Plant Storm Water Discharges**

*(OHC000005 III.G.1.k) Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;*

A concrete washout will occur at the laydown areas and turbine locations. Washing out of concrete trucks and rinsing of the concrete trucks shutes will be monitored to avoid contamination of any surface or groundwater. A washout pit will be constructed for concrete truck washing. All excess washout and concrete will be collected and disposed of at an approved disposal location. For a concrete washout pit detail refer to Appendix E.

## **2.11 Grading and Stabilization Activities**

*(OHC000005 III.G.1.m) A log documenting grading and stabilization activities as well as amendments to the SWP3, which occur after construction activities commence; and*

Major grading activities are not anticipated. Pre-construction grades are expected to stay the same. At each turbine location, the excavation will be backfilled and the area will be returned to its pre-construction grade.

All grading and stabilization activities will be documented in the Appendix B. All SWP3 amendments will be documented in the Appendix C.

## **2.12 Site Maps**

The site maps attached to this SWP3 meet the requirements of OHC000005.

**Table 2-3: Site Map Features**

Requirement	Figure
Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3	Figures 5-1 through 5-31
Soils types for all areas of the site, including locations of unstable or highly erodible and/or contaminated soils	Figure 2
Existing and proposed contours	Figures 5-1 through 5-31
A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres	NA
The location of any delineated boundary for required riparian setbacks	NA
Conservation easements or areas designated as open space, preserved vegetation or otherwise protected from earth disturbing activities. Any description of any associated temporary or permanent fencing or signage	NA
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 permittee intends to fill or relocate for which the permittee is seeking approval from the Army Corps of Engineers and/or Ohio EPA	Figures 5-1 through 5-31
Existing and planned locations of buildings, roads, parking facilities and utilities	Figures 5-1 through 5-31
The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during site development	Figures 5-1 through 5-31
Sediment traps and basins noting their sediment storage and dewatering (detention) volume and contributing drainage area	NA
The location of permanent storm water management practices (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	NA
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	SWPPP will be amended to include this when location is known
The location of designated construction entrances where the vehicles will access the construction site	Figures 5-1 through 5-31
The location of any areas of floodplain fill, floodplain excavation, stream restoration or stream crossings	Figures 5-1 through 5-31

## 3.0 Controls

### 3.1 Preservation Methods

*(OHC000005 III.G.2.a) The SWP3 shall make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving existing vegetation, vegetative buffer strips, and existing soil profile and topsoil; phasing of construction operations to minimize the amount of disturbed land at any one time and designation of tree preservation areas or other protective clearing or grubbing practices. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water.*

*(OHC000005 II.A.6) If feasible, provide and maintain a 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, you shall comply with the stabilization requirements found in Part II.B for areas within 50 feet of a surface water.*

All ground disturbance will be limited to the construction area. Soil disturbance will be minimized wherever possible to prevent erosion to the extent possible. The project site is predominantly farmland, and clearing and grubbing will generally be restricted to the removal of planted agricultural crops or remains of crops, grass, and topsoil. Tree removal will be minimized, but it might be required in small areas within the project.

Topsoil, compared to subsoil, generally has physical and chemical properties more suitable for plant growth. During excavation, topsoil will be excavated first and kept separate from subsoil. A minimum of one foot of separation will be maintained between topsoil and subsoil piles to prevent mixing. Where one foot of separation cannot be maintained, a physical barrier, such as silt fence, will be installed to prevent topsoil and subsoil from mixing. Backfilling will be completed with the excavated material from the same stratification in which the soil was removed (i.e. topsoil on top of the subsoil).

HDD for installation of cables will be used at stream, wetland and road crossings if possible to avoid impact to sensitive areas.

Construction will be phased to the extent possible to minimize the amount of disturbed land at any one time as described in Section 2.2: Site Area.

A 50-foot undisturbed natural buffer around surface waters will be preserved and maintained where possible. Where the 50-foot buffer will not be preserved, areas within the buffer will be stabilized within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.

## 3.2 Erosion Control Practices

(OHC000005 III.G.2.b) The SWP3 shall make use of erosion controls that provide cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to re-establish vegetation or suitable cover on disturbed areas after grading or construction shall be included in the SWP3. The SWP3 shall provide specifications for 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. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, and use of construction entrances and the use of alternative ground cover.

### 3.2.1 Stabilization

(OHC000005 III.G.2.b.i) Disturbed areas shall be stabilized in accordance with Table 1 (Permanent Stabilization) and Table 2 (Temporary Stabilization) in Part II.B of this permit.

#### 3.2.1.1 Stabilization in areas not to be returned to its pre-construction agricultural use that will not to be stabilized with permanent aggregate

Table 1 (Permanent Stabilization)

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the state and at final grade	Within two days of reaching final grade
Other areas at final grade	Within seven days of reaching final grade within that area

Table 2 (Temporary Stabilization)

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 14 days
Any disturbed areas that will be dormant for more than 14 days but less than one year, and not within 50 feet of a surface water of the state	Within seven days of the most recent disturbance within the area. For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Stabilization practices may include temporary seeding, permanent seeding, mulching, erosion control matting sod stabilization, and other appropriate measures. Seeding (temporary or permanent), mulching or erosion control matting will be conducted in accordance with the practice standards located in Appendix E.



Following completion of the project, areas that are not stable (e.g., with gravel) and will not be returned to its original use (farming) will be stabilized with permanent seeding and mulch or erosion control matting. See Appendix F for more details regarding seeding and mulching. Refer to Figures 5-1 through 5-31 for location of areas where stabilization is expected to be required. A seed mixture that will be used will be acceptable to the appropriate county cooperative extension service. If needed, reseeding will be done within 7 days of emergence of seedlings as necessary until sufficient vegetation in all areas has been established.

Final stabilization in areas that will not be returned to its original agricultural use and are not stabilized with gravel or other impervious surfaces, will be achieved by establishing a uniform perennial vegetative cover with density of at least 70%.

### **3.2.1.2 Stabilization in areas that will be returned to its pre-construction agricultural use that will not be stabilized with gravel**

Final stabilization of these areas will be achieved by returning the areas to their pre-construction agricultural use.

## **3.2.2 Permanent Stabilization of Conveyance Channels**

*(OHC000005 III.G.2.b.ii) Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the most current edition of the Rainwater and Land Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.*

Following removal of the turning radius all disturbed areas within the channels/road side ditches will be stabilized with seeding and installation of erosion control matting.

## **3.3 Runoff Control Practices**

*(OHC000005 III.G.2.c) The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices 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 physical and biological characteristics and functions are maintained and protected.*

Culverts will be installed within swales along the township roads at the beginning of the proposed access roads and turn radius. If the soil is disturbed during installation, erosion control matting will be installed at the outlet to prevent erosion. Following turbine erection, the turning radius will be removed by removing the fill material and the extra culvert lengths will be removed. The swale/roadside ditch will be restored with seeding and installation of erosion control matting. If erosion control matting is not preventing erosion at their culver outland, additional dissipation device will be installed (example: riprap).

### 3.4 Sediment Control Practices

*(OHC000005 III.G.2.d) The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, sediment barriers, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control*

*(OHC000005 III.G.2.d.i) Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven 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.*

Where vehicle traffic leaves any part of the site and enters public roadways or areas unchecked by effective sediment controls, construction entrance will be installed to minimize tracking of sediment from the construction areas. Construction entrance BMPs that may be used include:

- rock / aggregate pads
- mud mats pads
- slash mulch pads
- wood chip pads
- concrete or steel wash racks
- other equivalent systems

If vehicle tracking BMPs are not adequately preventing sediment from being tracked onto the paved road, then street sweeping will also be employed. Refer to Figures 5-1 through 5-31 for location of construction entrance for and Appendix E for construction entrance specifications.

If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, sediment barriers will be established on all downgradient perimeters prior grading activity and within 7 days of grubbing activities. Runoff from the site will accrue as sheet flow. Sediment controls that may be used include:

- silt fence
- a 12-inch diameter filter sock
- other equivalent measures

See Appendix E for the above sediment control product specifications and Figures 5-1 through 5-31 for location of these practices. If during inspections it is determined that additional practices are needed, SWP3 will be revised and practices will be added.

### 3.4.1 Sediment Settling Ponds

*(OHC000005 III.G.2.d.ii) A sediment settling pond is required for any one of the following conditions:*

- *Concentrated or collected storm water runoff (e.g., storm sewer or ditch);*
- *Runoff from drainage areas, which exceed the design capacity of silt fence or other sediment barriers;*
- *Runoff from drainage areas that exceed the design capacity of inlet protection.*

It is not expected that sediment settling ponds will be needed for the Project.

### 3.4.2 Sediment Barrier and Diversions

*(OHC000005 III.G.2.d.iii) Sheet flow runoff from denuded areas shall be intercepted by sediment barrier or diversions to protect adjacent properties and water resources from sediment transported via sheet flow.*

Sediment barrier (silt fence or 12-inch diameter sediment barrier) will be placed on the level contour of the land, so that flows are dissipated into uniform sheet flow that has less energy for transporting sediment. Silt fence will not be installed where concentrate runoff is present.

Sediment barrier will be installed in accordance with the most current edition of the Rainwater and Land Development manual (see Appendix E). Refer to Figures 5-1 through 5-31 for sediment barrier location.

Storm water diversion practices are not expected to be needed due to terrain.

### 3.4.3 Inlet Protection

*(OHC000005 III.G.2.d.iv) Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.*

There are no inlets receiving runoff from the project. This section is not applicable.

### 3.4.4 Surface Waters of the State Protection

*(OHC000005 III.G.2.d.v) If construction activities disturb areas adjacent to surface waters of the state, structural practices shall be designed and implemented on site to protect all adjacent surface waters of the state from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond) shall be used in a surface water of the state. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water. Where impacts within this buffer area are unavoidable, due to the nature of the construction (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the buffer area are minimized.*

A 50-foot undisturbed natural buffer around surface waters will be preserved and maintained where possible. Where the 50-foot buffer will not be preserved, areas within the buffer will be stabilized within

two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.

Sediment barrier (silt fence or 12-inch diameter sediment barrier) will be placed between the buffer/surface water and the ground disturbance to prevent sediment from reaching the buffer/surface water.

### **3.4.5 Modifying Controls**

*(OHC000005 III.G.2.d.vi) If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee shall replace or modify the control for site conditions.*

If the inspection reveals that a control practice is in need of repair or maintenance, it will be repaired or maintained within 3 days of the inspection.

If the inspection reveals that a control practice fails to perform its intended function and that another, more appropriate control practice is required, the SWP3 will be amended and the new control practice will be installed within 10 days of the inspection.

If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained the SWP3, the control practice will 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 will contain a statement of explanation as to why the control practice is not needed.

## **3.5 Post-Construction Storm Water Management Requirements**

*OHC000005 III.G.2.e) So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 shall contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale shall address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality.*

Construction of the 16-foot wide gravel roadways and the turbine pads will have minimal impact on the hydrology of the sites. The area of Turbines 15-19 is one of the highest density of post-construction roadways and pads with 5,600 feet of 16-foot wide roadway and 5 turbine pads. This results in 2.08 acres of new post-construction gravel surfacing. The field where these turbines will be constructed is approximately 320 acres.

The hydrologic soil groups for the sites range from B/C to C/D. Using a conservative runoff curve number of 71 for fields with conservation treatment (National Engineering Handbook, 1972) and a curve number of 96 for the gravel surfacing, the weighted curve number for the site would increase from 71.0 to 71.2. If the fields do not have conservation treatments or have soils closer to hydrologic soil group D, the increase would be as low as 0.05.

This minimal increase in the runoff curve number along with site slopes of less than 1% will result in increase to runoff flow rates and total runoff volumes of 2 percent or less.

Other turbine locations for the project require road and pad construction on a lower density which would result in lower increases to the runoff curve numbers, flow rates, and volumes.

Post-construction storm water management control options are limited for the turbine sites and access roads due to the linear nature of the project, the limited amount of right-of-way (ROW) that could be obtained for the sites, existing land use, and existing soil types.

Explored options include vegetated swales along the access roads. However, the ROW is 16 feet wide and the access roads will be 16 feet wide. The limited ROW makes it unfeasible to construct stormwater vegetated swales along the access roads.

Roads need to maintain a minimum width of 16' to allow for the delivery of oversized wind turbine components and it is a strict requirement from the manufacturer.

The land of the project is farming land, that will return to its use after construction is completed. The project is committed to minimize the disturbance of the farming activities in the project area by maintaining the roads at level and within the minimum ROW in the extent possible.

Besides the issue with the limited amount of ROW, maintenance of the vegetated swales would be difficult. The access roads will be within the same level as the surrounding cultivated fields and farmers will be driving over the roads, including the swales, to move from the field on one side of the road to another during the farming practices. This will make maintenance of the swales practically impossible.

We reached to Lynette Hablitzel (Storm Water Coordinator, Division of Surface Water, Ohio EPA) on April 9, 2019 to consult regarding additional possible options to comply with the post-construction storm water management requirements. A meeting between Hardin Wind Energy LLC and the Ohio EPA (Justin Reinhart) was held on April 18, 2019 when Hardin Wind Energy LLC presented challenges with complying with this condition. Following the meeting, Justin notified us (refer to Appendix H) that the Ohio EPA recognizes the unique challenges that the projects has with post-construction water quality controls and recommended that the permit language allowing for off-site mitigation for the road & turbine pads is utilized which can involve:

- retrofitting water quality controls into existing, older stormwater basins or
- mitigate through installation of a local agricultural conservation practice (example: a ditch modification or buffer strip type practice).

Additionally, Justin provided the contact information for Hardin Soil & Water Conservation District (SWCD) (Appendix H). SWCD confirmed that they have no current or planned projects and that planning such project (example: installation of a buffer strip) can take 1.5+years to plan.

## 3.6 Surface Water Protection

*(OHC000005 III.G.2.f) If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state isolated wetland permit requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state isolated wetland permit requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee shall contact the appropriate U.S. Army Corps of Engineers District Office.*

All water courses, including wetlands, will be delineated by fencing, flagging, or other prominent means.

All construction equipment will avoid watercourses, including wetlands, except at specific locations where construction has been approved.

Storage, stockpiling, and/or disposal of equipment and materials in these sensitive areas is prohibited.

Structures will be located outside of identified watercourses, including wetlands, except at specific locations where construction has been approved.

Additional wetland delineations will be completed in spring/summer 2019. If any wetlands will be impacted, the work will be covered under the appropriate wetland permits (USACE Nationwide Permit (NWP) or the ODNR isolated wetlands permit).

## 3.7 Other Controls

### 3.7.1 Non-Sediment Pollutant Controls

*(OHC000005 III.G.2.g.i) In accordance with Part II.E, no solid (other than sediment) or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the state or an MS4. Under no circumstance shall wastewater from the washout of concrete trucks, stucco, paint, form release oils, curing compounds, and other construction materials be discharged directly into a drainage channel, storm sewer or surface waters of the state. Also, no pollutants from vehicle fuel, oils, or other vehicle fluids can be discharged to surface waters of the state. No exposure of storm water to waste materials is recommended. The SWP3 must include methods to minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, and sanitary waste to precipitation, storm water runoff, and snow melt. In accordance with Part II.D.3, the SWP3 shall include measures to prevent and respond to chemical spills and leaks. You may also reference the existence of other plans (i.e., Spill Prevention Control and Countermeasure (SPCC) plans, spill*

*control programs, Safety Response Plans, etc.) provided that such plan addresses conditions of this permit condition and a copy of such plan is maintained on site.*

*The following discharges are prohibited:*

- 1. Wastewater from washout of concrete, unless managed by an appropriate control;*
- 2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;*
- 3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and*
- 4. Soaps or solvents used in vehicle and equipment washing or all other waste water streams which could be subject to an individual NPDES permit (Part III.G.2.g).*

Equipment and vehicle washing is not expected to occur at this Project. No wheel wash water or other wash waters are expected at the site. This section of the SWP3 will be updated if vehicle washing occurs.

Building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site will be stored under cover (e.g., plastic sheeting, temporary roofs, or in weather-proof containers) to prevent discharge of pollutants through minimization of contact with stormwater. All containers (e.g., dumpsters, drums) used disposal of debris, trash, hazardous or petroleum wastes will be covered and leak-proof. Additionally, all of the above will be stored away from drainage ditches, field drains, or other storm water drainage areas.

The SPCC plan will be developed for the project and will be available at the site.

When needed, the contractor will fuel equipment in designated areas only, which will be identified on Figures once these areas are selected. Contractors will have spill kits sized for the amount of refueling taking place, with spill kits located at designated fueling areas (if any).

If present, stationary fuel tanks shall meet industry standards (designed to hold fuel type, properly maintained, not illegally modified, not missing leak indicator floats for double walled tanks, etc....) or be removed from the work area.

In order to reduce the likelihood of a spill event, the following practices will be implemented for portable fueling operations:

- The equipment operator must be present, in addition to the fuel truck operator
- A spill kit will be staged at all fueling operations
- Fueling truck dispensing nozzle is equipped with an automatic shutoff
- Oil sheens that accumulate in portable containment or drip trays will be cleaned with oil absorbing pads or rags prior to draining water. Rags/pads must be disposed of according to state and federal rules.

If a spill of 25 or more gallons occurs, the contractor is responsible for contacting: Ohio EPA (at 1-800-282-9378), the local fire department, and the local emergency planning committee (LEPC) within 30 minutes. For details regarding release reporting requirements see Appendix F.

If any process wastewaters (e.g., equipment washing, leachate associated with on-site waste disposal, and concrete wash-outs) are produced, they will be collected and disposed of properly (e.g., to a publicly-owned treatment works).

No solid materials, including building materials, will be discharged to Waters of the State. If present, solid waste, litter and debris will be collected, stored, and disposed of properly daily. All applicable State and/or local waste disposal, sanitary sewer or septic system regulations will be followed, if applicable.

All construction debris and all contaminated soil will be promptly removed and properly disposed of in accordance with EPA regulations

Concrete may be received on site. Cement and wastewater from washout of concrete is prohibited to be discharged from the site. If needed, wastewater from concrete washout will be handled according to the standards in Appendix E. Cement and/or slurry will be removed and properly disposed of off-site. The washout area will be cleaned or a new area will be constructed when the facility becomes two-thirds full. A sign will be posted on-site denoting the location for the concrete washout area(s).

Gravel or any other construction material during or following construction of the facility will not be spread such on agricultural land.

Damage to field tile drainage systems resulting from construction, maintenance, and operation of the facility will be minimized, avoided or rerouted. Damaged field tile systems will be promptly repaired to at least original requirements at Applicant's expense.

### **3.7.2 Off-site Traffic**

*(OHC000005 III.G.2.g.ii) Off-site vehicle tracking of sediments and dust generation shall be minimized. In accordance with Part II.D.1, the SWP3 shall include methods to minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. No detergents may be used to wash vehicles. Wash waters shall be treated in a sediment basin or alternative control that provides equivalent treatment prior to discharge.*

Dust control will be used when conditions require it, such as on windy and dry days when soils are exposed. Water trucks or other types of dust controls can be used depending on the site needs (refer to the Attachment E).

Where vehicle traffic leaves any part of the site and enters public roadways or areas unchecked by effective sediment controls construction entrance will be installed to minimize tracking of sediment from the construction areas. Construction entrance BMPs that may be used include:

- rock / aggregate pads
- mud mats pads
- slash mulch pads
- wood chip pads
- concrete or steel wash racks



- other equivalent systems

If vehicle tracking BMPs are not adequately preventing sediment from being tracked onto the paved road, then street sweeping will also be employed. Refer to Figures 5-1 through 5-31 for location of construction entrance for and Appendix E for construction entrance specifications.

Equipment and vehicle washing is not expected to occur at this site. This section of the SWP3 will be updated if vehicle washing occurs. Detergents and other cleaners are not allowed to be discharge and therefore will not be used.

### 3.7.3 Compliance with Other Requirements

*(OHC000005 III.G.2.g.iii) The SWP3 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 to the extent these are located within the permitted area.*

All work will be consistent with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.

### 3.7.4 Trench and Ground Water Control

*(OHC000005 III.G.2.g.iv) In accordance with Part II.C, there shall be no turbid discharges to surface waters of the state resulting from dewatering activities. 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 construction 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 must be taken when discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.*

If needed, onsite dewatering will be conducted. Water will be discharged via filter bag in an upland area. If discharge from the filter bag is still turbid, the filter bag will be placed within a straw bale dewatering structure with two layers of geotextile fabric. The straw bale structure will be adequately-sized and constructed. Discharge points will be adequately protected from erosion and scour (refer to Appendix E).

### 3.7.5 Contaminated Sediment

*(OHC000005 III.G.2.g.v) Where construction activities are to occur on sites with contamination from previous activities, operators shall be aware that concentrations of materials that meet other criteria (is not considered a Hazardous Waste, meeting VAP standards, etc.) may still result in storm water discharges in excess of Ohio Water Quality Standards. Such discharges are not authorized by this permit. Appropriate BMPs include, but are not limited to:*

- *The use of berms, trenches, and pits to collect contaminated runoff and prevent discharges;*
- *Pumping runoff into a sanitary sewer (with prior approval of the sanitary sewer operator) or into a container for transport to an appropriate treatment/disposal facility; and*

- *Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the material.*

*Operators should consult with Ohio EPA Division of Surface Water prior to seeking permit coverage.*

Contamination is not expected to be encountered. However, if any contaminated soil is encountered it will be treated and/or disposed in Ohio EPA approved solid waste management facilities or hazardous waste treatment, storage or disposal facilities (TSDFs).

## 3.8 Maintenance

*(OHC000005 III.G.2.h) All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up-slope areas they control are permanently stabilized. The SWP3 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.*

### 3.8.1 Temporary Control Practices

Maintenance of the following areas and BMPs will be performed based on the following requirements:

- If a control practice is in need of repair or maintenance it will be repaired or maintained within 3 days of the inspection. For example:
  - Sediment barrier: sediment removal after sediment reaches 1/2 of the height of the device
  - Construction entrance: periodic top dressing with additional stone or the washing and reworking of existing stone
- If a control practice fails to perform its intended function and it needs to be replaced with a new control practice, a new control practice will be installed within 10 days of the inspection.
- Tracked sediment from all roadways and storm drains will be removed immediately.

### 3.8.2 Permanent Control Practices

Refer to section 3.5: Post-Construction Storm Water Management Requirements.

## 3.9 Inspections

A “qualified inspection personnel” will conduct inspections to ensure that the control practices are functional. They will also evaluate whether the SWP3 is adequate and properly implemented or whether additional control measures are required.

Disturbed areas and areas used for storage of materials that are exposed to precipitation will be inspected for evidence of or the potential for pollutants entering the drainage systems. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site will be inspected for evidence of off-site vehicle tracking.

The site will be inspected:

- after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day, excluding weekends and holidays unless work is scheduled; and
- once every seven calendar days.

The inspection frequency may be reduced to at least once every month for dormant sites if:

- the entire site is temporarily stabilized or
- runoff is unlikely due to weather conditions for extended periods of time (e.g., site is covered with snow, ice, or the ground is frozen).

The beginning and ending dates of any reduced inspection frequency will be documented in the SWP3.

Once a definable area has been finally stabilized, the area may be marked on the SWP3 and no further inspection requirements shall apply to that portion of the site.

*"Qualified inspection personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.*

*"Temporary stabilization" means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.*

### **3.9.1 Inspection Records**

Following each inspection, a checklist will be completed and signed by the qualified inspection personnel representative. At a minimum, the inspection report shall include:

- 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 construction 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 BMPs that need to be maintained;
- vii. location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- viii. location(s) where additional BMPs 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.

Refer to Appendix G for the: Construction Site Inspection Checklist.

### **3.9.2 Record Retention**

The permittee will maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection:

- names(s) and qualifications of personnel making the inspection
- the date(s) of the inspection
- major observations relating to the implementation of the SWP3 and
- a certification as to whether the facility is in compliance with the SWP3 and the permit
- and identify any incidents of non-compliance

The record and certification will be signed in accordance with Part V.G. of this permit.

## 4.0 Approved State or Local Plans

*(OHC000005 III.G.3) All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee shall certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.*

No additional municipal storm water requirements apply.

## 5.0 Contractors training

*(OHC000005 III.E) The permittee shall inform all contractors and subcontractors not otherwise defined as "operators" in Part VII of this general permit who will be involved in the implementation of the SWP3 of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created and signatures shall be obtained prior to commencement of work on the construction site.*

*(OHC000005 III.G.2) In accordance with Part II.A, the SWP3 shall contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) shall implement such controls. The SWP3 shall clearly describe for each major construction activity identified in Part III.G.1.g: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). The SWP3 shall identify the subcontractors engaged in activities that could impact storm water runoff. The SWP3 shall contain signatures from all of the identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the SWP3.*

Construction Activity	Contractor Responsible For Implementation
Upgrades to the Township roads	TBD (SWP3 to be updated once this information is available)
Installation of 60 wind turbines	TBD (SWP3 to be updated once this information is available)
Installation of permanent access roads and swales	TBD (SWP3 to be updated once this information is available)
Installation of underground collection of cables connecting turbines and substation	TBD (SWP3 to be updated once this information is available)

Once contractors and subcontractors are identified, the SWP3 will be amended to include appropriate information. All contractors and subcontractors will be informed about their roles and responsibilities in complying with the SWP3. A written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3 will be included in the Appendix D, SWP3 training log.

## 6.0 Signature and Review

(OHC000005 III.C)

1. Plan Signature and Retention On-Site. The SWP3 shall include the certification in Part V.H, be signed in accordance with Part V.G., and be retained on site during working hours.

The certification is included on pages iii of this document.

2. Plan Availability
  - a. On-site: The plan will be made available immediately upon request of the director or his authorized representative and MS4 operators or their authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit will also be made available at the site.
  - b. By written request: The permittee must provide the most recent copy of the SWP3 within 7 days upon written request by any of the following:
    - i. The director or the director's authorized representative;
    - ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or
    - iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.
  - c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.
3. Plan Revision. The director or authorized representative may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director or authorized representative (or as otherwise provided in the notification), the permittee shall make the required changes to the SWP3 and shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

## 7.0 Plan Amendments

*(OHC000005 III.D) The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the state or if the SWP3 proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.*

Refer to Appendix C: Record of SWP3 Amendments.



## 8.0 Notice of Termination Requirements

### A. Failure to notify.

*The terms and conditions of this permit will remain in effect until a signed Notice of Termination (NOT) form is submitted.*

### B. When to submit an NOT.

1. *Permittees wishing to terminate coverage under this permit shall submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is submitted. Prior to submitting the NOT form, the permittee shall conduct a site inspection in accordance with Part III.G.2.i of this permit and have a maintenance agreement in place to ensure all post construction BMPs will be maintained in perpetuity.*
2. *All permittees shall submit an NOT form within 45 days of completing all permit requirements. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:*
  - a. *Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);*
  - b. *Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;*
  - c. *A maintenance agreement is in place to ensure all post construction BMPs are adequately maintained in perpetuity;*
  - d. *For non-residential developments, all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been stabilized and temporary erosion and sediment control measures have been removed at the appropriate time, or all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated;*
  - e. *An exception has been granted under Part III.G.4.*

"Final stabilization" means that either:

- All soil disturbing activities at the site are complete.
- All areas are stabilized with:
  - Permanent structures or equivalent stabilization measures (such as the use of pavement, gravel, rip-rap, gabion, etc.)
  - A uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the otherwise not stable areas
- All temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or
- For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-

construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the state and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria described above.

Majority of the project area is used for agricultural purposes. Upon completion of the Project, the access roads will be stabilized with gravel and, all areas that are not stable (example: permanent vegetation, gravel, etc.) that will not be returned to its original agricultural use will be stabilized with permanent seeding and mulch.

The NOT will be submitted when:

- seeded area achieve at least 70 percent vegetative cover,
- all areas that will not be seeded or covered by gravel or other permanent material are returned to their pre-construction agricultural use, and
- all temporary synthetic and structural erosion prevention and sediment control BMPs have been removed

*C. How to submit an NOT.*

*To terminate permit coverage, the permittee shall submit a complete and accurate Notice of Termination (NOT) form using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: <https://ebiz.epa.ohio.gov/>. Submission through the Ohio EPA eBusiness Center will require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOT. Existing eBusiness Center account holders can access the NOT form through their existing account and submit using their existing PIN. Please see the following link for guidance: <http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance>. Alternatively, if you are unable to access the NOT form through the agency eBusiness Center due to a demonstrated hardship, the NOT may be submitted on paper NOT forms provided by Ohio EPA. NOT information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOT form.*

## Appendices

## **Appendix A**

**Ohio Construction Storm Water General Permit OHC000004**

Issuance Date: April 23, 2018  
Effective Date: April 23, 2018  
Expiration Date: April 22, 2023

Ohio EPA APR 23/18  
Entered Directors Journal

**OHIO ENVIRONMENTAL PROTECTION AGENCY**

**GENERAL PERMIT AUTHORIZATION FOR STORM WATER DISCHARGES ASSOCIATED  
WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT  
DISCHARGE ELIMINATION SYSTEM**

In compliance with the provisions of the federal Water Pollution Control Act, as amended (33 U.S.C. Section 1251 et. seq. hereafter referred to as "the Act") and the Ohio Water Pollution Control Act [Ohio Revised Code ("ORC") Chapter 6111], dischargers of storm water from sites where construction activity is being conducted, as defined in Part I.B of this permit, are authorized by the Ohio Environmental Protection Agency, hereafter referred to as "Ohio EPA," to discharge from the outfalls at the sites and to the receiving surface waters of the state identified in their Notice of Intent ("NOI") application form on file with Ohio EPA in accordance with the conditions specified in Parts I through VII of this permit.

It has been determined that a lowering of water quality of various waters of the state associated with granting coverage under this permit is necessary to accommodate important social and economic development in the state of Ohio. In accordance with OAC 3745-1-05, this decision was reached only after examining a series of technical alternatives, reviewing social and economic issues related to the degradation, and considering all public and intergovernmental comments received concerning the proposal.

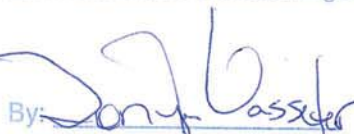
This permit is conditioned upon payment of applicable fees, submittal of a complete NOI application form, development (and submittal, if applicable) of a complete Storm Water Pollution Prevention Plan (SWP3) and written approval of coverage from the director of Ohio EPA in accordance with Ohio Administrative Code ("OAC") Rule 3745-38-02.



**Craig W. Butler**  
**Director**

**Total Pages: 60**

I certify this to be a true and accurate copy of the  
official documents as filed in the records of the Ohio  
Environmental Protection Agency.

By:  Date: 4-23-18

## TABLE OF CONTENTS

### PART I. COVERAGE UNDER THIS PERMIT

- A. Permit Area
- B. Eligibility
- C. Requiring an individual NPDES permit or an alternative general NPDES permit
- D. Permit requirements when portions of a site are sold
- E. Authorization
- F. Notice of Intent Requirements

### PART II. NON-NUMERIC EFFLUENT LIMITATIONS

- A. Erosion and Sediment Controls
- B. Soil Stabilization
- C. Dewatering
- D. Pollution Prevention Measures
- E. Prohibited Discharges
- F. Surface Outlets
- G. Post-Construction Storm Water Management Controls

### PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)

- A. Storm Water Pollution Prevention Plans
- B. Timing
- C. SWP3 Signature and Review
- D. Amendments
- E. Duty to inform contractors and subcontractors
- F. Total Maximum Daily Load (TMDL) allocations
- G. SWP3 Requirements

### PART IV. NOTICE OF TERMINATION REQUIREMENTS

- A. Failure to notify
- B. When to submit an NOT
- C. How to submit an NOT

### PART V. STANDARD PERMIT CONDITIONS

- A. Duty to comply
- B. Continuation of an expired general permit
- C. Need to halt or reduce activity not a defense
- D. Duty to mitigate
- E. Duty to provide information
- F. Other information
- G. Signatory requirements
- H. Certification
- I. Oil and hazardous substance liability
- J. Property rights
- K. Severability
- L. Transfers
- M. Environmental laws
- N. Proper operation and maintenance
- O. Inspection and entry
- P. Duty to Reapply
- Q. Permit Actions
- R. Bypass
- S. Upset
- U. Reporting Requirements

### PART VI. REOPENER CLAUSE

### PART VII. DEFINITIONS

### APPENDICES

- A. Big Darby Creek Watershed
- B. Portions of the Olentangy Watershed
- C. Intensity for Calculation of Water Quality Flow (WQF)

## **PART I. COVERAGE UNDER THIS PERMIT**

### **A. Permit Area.**

This permit covers the entire State of Ohio. Appendices A and B of this permit contain additional watershed specific requirements for construction activities located partially or fully within the Big Darby Creek Watershed and portions of the Olentangy River Watershed. Projects within portions of the Olentangy River watershed shall seek coverage under this permit following the expiration of OHCO00002 (May 31, 2019).

### **B. Eligibility.**

1. Construction activities covered. Except for storm water discharges identified under Part I.B.2, this permit may cover all new and existing discharges composed entirely of storm water discharges associated with construction activity that enter surface waters of the state or a storm drain leading to surface waters of the state.

For the purposes of this permit, construction activities include any clearing, grading, excavating, grubbing and/or filling activities that disturb one or more acres. Discharges from trench dewatering are also covered by this permit as long as the dewatering activity is carried out in accordance with the practices outlined in Part III.G.2.g.iv of this permit.

Construction activities disturbing one or more acres of total land or will disturb less than one acre of land but are part of a larger common plan of development or sale that will ultimately disturb one or more acres of land are eligible for coverage under this permit. The threshold acreage includes the entire area disturbed in the larger common plan of development or sale.

This permit also authorizes storm water discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

- a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;
  - b. The support activity is not a commercial operation serving multiple unrelated construction projects and does not operate beyond the completion of the construction activity at the site it supports;
  - c. Appropriate controls and measures are identified in a storm water pollution prevention plan (SWP3) covering the discharges from the support activity; and
  - d. The support activity is on or contiguous with the property defined in the NOI (offsite borrow pits and soil disposal areas, which serve only one project, do not have to be contiguous with the construction site).
2. Limitations on coverage. The following storm water discharges associated with construction activity are not covered by this permit:

- a. Storm water discharges that originate from the site after construction activities have ceased, including any temporary support activity, and the site has achieved final stabilization. Industrial post-construction storm water discharges may need to be covered by an NPDES permit;
  - b. Storm water discharges associated with construction activity that the director has shown to be or may reasonably expect to be contributing to a violation of a water quality standard; and
  - c. Storm water discharges authorized by an individual NPDES permit or another NPDES general permit.
3. Waivers. After March 10, 2003, sites whose larger common plan of development or sale have at least one, but less than five acres of land disturbance, which would otherwise require permit coverage for storm water discharges associated with construction activities, may request that the director waive their permit requirement. Entities wishing to request such a waiver must certify in writing that the construction activity meets one of the two waiver conditions:
- a. Rainfall Erosivity Waiver. For a construction site to qualify for the rainfall erosivity waiver, the cumulative rainfall erosivity over the project duration must be five or less and the site must be stabilized with a least a 70 percent vegetative cover or other permanent, non-erosive cover. The rainfall erosivity must be calculated according to the method in U.S. EPA Fact Sheet 3.1 Construction Rainfall Erosivity Waiver dated January 2001 and be found at: [http://epa.ohio.gov/portals/35/permits/USEPAfact3-1\\_s.pdf](http://epa.ohio.gov/portals/35/permits/USEPAfact3-1_s.pdf). If it is determined that a construction activity will take place during a time period where the rainfall erosivity factor is less than five, a written waiver certification must be submitted to Ohio EPA at least 21 days before construction activity is scheduled to begin. If the construction activity will extend beyond the dates specified in the waiver certification, the operator must either: (a) recalculate the waiver using the original start date with the new ending date (if the R factor is still less than five, a new waiver certification must be submitted) or (b) submit an NOI application form and fee for coverage under this general permit at least seven days prior to the end of the waiver period; or
  - b. TMDL (Total Maximum Daily Load) Waiver. Storm water controls are not needed based on a TMDL approved or established by U.S. EPA that addresses the pollutant(s) of concern or, for non-impaired waters that do not require TMDLs, and equivalent analysis that determines allocations for small construction sites for the pollutant(s) of concern or that determines that such allocations are not needed to protect water quality based on consideration of existing in-stream concentrations, expected growth in pollutant contributions from all sources, and a margin of safety. The pollutant(s) of concern include sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. The operator must certify to the director of Ohio EPA that the construction activity will take place, and storm water discharges will occur, within the drainage area addressed by the TMDL or equivalent analysis. A written waiver certification must be submitted to Ohio EPA at least 21 days before the construction activity is scheduled to begin.



4. Prohibition on non-storm water discharges. All discharges covered by this permit must be composed entirely of storm water with the exception of the following: discharges from firefighting activities; fire hydrant flushings; potable water sources including waterline flushings; irrigation drainage; lawn watering; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated ground water from trench or well point dewatering and foundation or footing drains where flows are not contaminated with process materials such as solvents. Dewatering activities must be done in compliance with Part II.C and Part III.G.2.g.iv of this permit. Discharges of material other than storm water or the authorized non-storm water discharges listed above must comply with an individual NPDES permit or an alternative NPDES general permit issued for the discharge.

Except for flows from firefighting activities, sources of non-storm water listed above that are combined with storm water discharges associated with construction activity must be identified in the SWP3. The SWP3 must identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

5. Spills and unintended releases (Releases in excess of Reportable Quantities). This permit does not relieve the permittee of the reporting requirements of Title 40 of the Code of Federal Regulations ("CFR") Part 117 and 40 CFR Part 302. In the event of a spill or other unintended release, the discharge of hazardous substances in the storm water discharge(s) from a construction site must be minimized in accordance with the applicable storm water pollution prevention plan for the construction activity and in no case, during any 24-hour period, may the discharge(s) contain a hazardous substance equal to or in excess of reportable quantities.

40 CFR Part 117 sets forth a determination of the reportable quantity for each substance designated as hazardous in 40 CFR Part 116. The regulation applies to quantities of designated substances equal to or greater than the reportable quantities, when discharged to surface waters of the state. 40 CFR Part 302 designates under section 102(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, those substances in the statutes referred to in section 101(14), identifies reportable quantities for these substances and sets forth the notification requirements for releases of these substances. This regulation also sets forth reportable quantities for hazardous substances designated under section 311(b)(2)(A) of the Clean Water Act (CWA).

**C. Requiring an individual NPDES permit or an alternative NPDES general permit.**

1. The director may require an alternative permit. The director may require any operator eligible for this permit to apply for and obtain either an individual NPDES permit or coverage under an alternative NPDES general permit in accordance with OAC Rule 3745-38-02. Any interested person may petition the director to take action under this paragraph.

The director will send written notification that an alternative NPDES permit is required. This notice shall include a brief statement of the reasons for this decision, an application form and a statement setting a deadline for the operator to file the application. If an operator fails to submit an application in a timely manner as required by the director under this paragraph, then coverage, if in effect, under this permit is automatically terminated at the end of the day specified for application submittal.

2. Operators may request an individual NPDES permit. Any owner or operator eligible for this permit may request to be excluded from the coverage of this permit by applying for an individual permit. The owner or operator shall submit an individual application with reasons supporting the request to the director in accordance with the requirements of 40 CFR 122.26. If the reasons adequately support the request, the director shall grant it by issuing an individual NPDES permit.
3. When an individual NPDES permit is issued to an owner or operator otherwise subject to this permit or the owner or operator is approved for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of approval for coverage under the alternative general permit, whichever the case may be.

**D. Permit requirements when portions of a site are sold**

If an operator obtains a permit for a development, and then the operator (permittee) sells off lots or parcels within that development, permit coverage must be continued on those lots until a Notice of Termination (NOT) in accordance with Part IV.B is submitted. For developments which require the use of centralized sediment and erosion controls (i.e., controls that address storm water runoff from one or more lots) for which the current permittee intends to terminate responsibilities under this permit for a lot after sale of the lot to a new owner and such termination will either prevent or impair the implementation of the controls and therefore jeopardize compliance with the terms and conditions of this permit, the permittee will be required to maintain responsibility for the implementation of those controls. For developments where this is not the case, it is the permittee's responsibility to temporarily stabilize all lots sold to individual lot owners unless an exception is approved in accordance with Part III.G.4. In cases where permit responsibilities for individual lot(s) will be terminated after sale of the lot, the permittee shall inform the individual lot owner of the obligations under this permit and ensure that the Individual Lot NOI application is submitted to Ohio EPA.

**E. Authorization**

1. Obtaining authorization to discharge. Operators that discharge storm water associated with construction activity must submit an NOI application form and Storm Water Pollution Prevention Plan (SWP3) if located within the Big Darby Creek watershed or portions of the Olentangy watershed in accordance with the requirements of Part I.F of this permit to obtain authorization to discharge under this general permit. As required under OAC Rule 3745-38-06(E), the director, in response to the NOI submission, will notify the applicant in writing that he/she has or has not been granted general permit coverage to discharge storm water associated with construction activity under the terms and conditions of this permit or that the applicant must apply for an individual NPDES permit or coverage under an alternate general NPDES permit as described in Part I.C.1.

2. No release from other requirements. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations. Other permit requirements commonly associated with construction activities include, but are not limited to, section 401 water quality certifications, isolated wetland permits, permits to install sanitary sewers or other devices that discharge or convey polluted water, permits to install drinking water lines, single lot sanitary system permits and disturbance of land which was used to operate a solid or hazardous waste facility (i.e., coverage under this NPDES general permit does not satisfy the requirements of OAC Rule 3745-27-13 or ORC Section 3734.02(H)). The issuance of this permit is subject to resolution of an antidegradation review. This permit does not relieve the permittee of other responsibilities associated with construction activities such as contacting the Ohio Department of Natural Resources, Division of Water, to ensure proper well installation and abandonment of wells.

**F. Notice of Intent Requirements**

1. Deadlines for notification.
  - a. Initial coverage: Operators who intend to obtain initial coverage for a storm water discharge associated with construction activity under this general permit must submit a complete and accurate NOI application form, a completed Storm Water Pollution Prevention Plan (SWP3) for projects within the Big Darby Creek and portions of the Olentangy river watersheds and appropriate fee at least 21 days (or 45 days in the Big Darby Creek watershed and portions of the Olentangy watershed) prior to the commencement of construction activity. If more than one operator, as defined in Part VII of this general permit, will be engaged at a site, each operator shall seek coverage under this general permit prior to engaging in construction activities. Coverage under this permit is not effective until an approval letter granting coverage from the director of Ohio EPA is received by the applicant. Where one operator has already submitted an NOI prior to other operator(s) being identified, the additional operator shall request modification of coverage to become a co-permittee. In such instances, the co-permittees shall be covered under the same facility permit number. No additional permit fee is required.
  - b. Individual lot transfer of coverage: Operators must each submit an individual lot notice of intent (Individual Lot NOI) application form (no fee required) to Ohio EPA at least seven days prior to the date that they intend to accept responsibility for permit requirements for their portion of the original permitted development from the previous permittee. Transfer of permit coverage is not granted until an approval letter from the director of Ohio EPA is received by the applicant.
2. Failure to notify. Operators who fail to notify the director of their intent to be covered and who discharge pollutants to surface waters of the state without an NPDES permit are in violation of ORC Chapter 6111. In such instances, Ohio EPA may bring an enforcement action for any discharges of storm water associated with construction activity.
3. How to submit an NOI. Operators seeking coverage under this permit must submit a complete and accurate Notice of Intent (NOI) application using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: <https://ebiz.epa.ohio.gov/>. Submission through the Ohio EPA eBusiness Center will

require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOI. Existing eBusiness Center account holders can access the NOI form through their existing account and submit using their existing PIN. Please see the following link for guidance:

<http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance>. Alternatively, if you are unable to access the NOI form through the agency eBusiness Center due to a demonstrated hardship, the NOI may be submitted on a paper NOI form provided by Ohio EPA. NOI information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOI form.

4. Additional notification. NOIs and SWP3s are considered public documents and shall be made available to the public in accordance with Part III.C.2. The permittee shall make NOIs and SWP3s available upon request of the director of Ohio EPA, local agencies approving sediment and erosion control plans, grading plans or storm water management plans, local governmental officials, or operators of municipal separate storm sewer systems (MS4s) receiving drainage from the permitted site. Each operator that discharges to an NPDES permitted MS4 shall provide a copy of its Ohio EPA NOI submission to the MS4 in accordance with the MS4's requirements, if applicable.
5. Re-notification. Existing permittees having coverage under the previous generations of this general permit shall have continuing coverage under OHC000005 with the submittal of a timely renewal application. Within 180 days from the effective date of this permit, existing permittees shall submit the completed renewal application expressing their intent for continued coverage. In accordance with Ohio Administrative Code (OAC) 3745-38-02(E)(2)(a)(i), a renewal application fee will only apply to existing permittees having general permit coverage for 5 or more years as of the effective date of this general permit. Permit coverage will be terminated if Ohio EPA does not receive the renewal application within this 180-day period.

## Part II. NON-NUMERIC EFFLUENT LIMITATIONS

You shall comply with the following non-numeric effluent limitations for discharges from your site and/or from construction support activities. Part III of this permit contains the specific design criteria to meet the objectives of the following non-numeric effluent limitations. You shall develop and implement the SWP3 in accordance with Part III of this permit to satisfy these non-numeric effluent limitations.

- A. **Erosion and Sediment Controls.** You shall design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls shall be designed, installed and maintained to:
  1. Control storm water volume and velocity within the site to minimize soil and stream erosion;
  2. Control storm water discharges, including both peak flowrates and total storm water volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
  3. Minimize the amount of soil exposed during construction activity;

4. Minimize the disturbance of steep slopes;
  5. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls shall address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
  6. If feasible, provide and maintain a 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, you shall comply with the stabilization requirements found in Part II.B for areas within 50 feet of a surface water; and
  7. Minimize soil compaction and, unless infeasible, preserve topsoil.
- B. Soil Stabilization.** Stabilization of disturbed areas shall, at a minimum, be initiated in accordance with the time frames specified in the following tables.

**Table 1: Permanent Stabilization**

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the state and at final grade	Within two days of reaching final grade
Other areas at final grade	Within seven days of reaching final grade within that area

**Table 2: Temporary Stabilization**

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 14 days
Any disturbed areas that will be dormant for more than 14 days but less than one year, and not within 50 feet of a surface water of the state	Within seven days of the most recent disturbance within the area  For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed. Permanent and temporary stabilization are defined in Part VII.

- C. Dewatering.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.
- D. Pollution Prevention Measures.** Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:
1. Minimize the discharge of pollutants from equipment and vehicle washing, wheel washwater, and other washwaters. Washwaters shall be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
  2. Minimize the exposure of construction materials, products, and wastes; landscape materials, fertilizers, pesticides, and herbicides; detergents, sanitary waste and other materials present on the site to precipitation and to storm water; and
  3. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.
- E. Prohibited Discharges.** The following discharges are prohibited:
1. Wastewater from washout of concrete, unless managed by an appropriate control;
  2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
  3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
  4. Soaps or solvents used in vehicle and equipment washing or all other waste water streams which could be subject to an individual NPDES permit (Part III.G.2.g).
- F. Surface Outlets.** When discharging from sediment basins utilize outlet structures that withdraw water from the surface, unless infeasible. (Note: Ohio EPA believes that the circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include time periods with extended cold weather during winter months. If you have determined that it is infeasible to meet this requirement, you shall provide documentation in your SWP3 to support your determination.)
- G. Post-Construction Storm Water Management Controls.** So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity.

### **PART III. STORM WATER POLLUTION PREVENTION PLAN (SWP3)**

#### **A. Storm Water Pollution Prevention Plans.**

A SWP3 shall be developed for each site covered by this permit. For a multi-phase construction project, a separate NOI shall be submitted when a separate SWP3 will be prepared for

subsequent phases. SWP3s shall be prepared in accordance with sound engineering and/or conservation practices by a professional experienced in the design and implementation of standard erosion and sediment controls and storm water management practices addressing all phases of construction. The SWP3 shall clearly identify all activities which are required to be authorized under Section 401 and subject to an antidegradation review. The SWP3 shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges associated with construction activities. The SWP3 shall be a comprehensive, stand-alone document, which is not complete unless it contains the information required by Part III.G of this permit. In addition, the SWP3 shall describe and ensure the implementation of best management practices (BMPs) that reduce the pollutants and impact of storm water discharges during construction and pollutants associated with the post-construction land use to ensure compliance with ORC Section 6111.04, OAC Chapter 3745-1 and the terms and conditions of this permit.

## **B. Timing.**

An acceptable SWP3 shall be completed and submitted to the applicable regulated MS4 entity (for projects constructed entirely within a regulated MS4 area) prior to the timely submittal of an NOI. Projects within the Big Darby Creek and portions of the Olentangy watersheds must submit a SWP3 with the NOI. The SWP3 shall be updated in accordance with Part III.D. Submission of a SWP3 does not constitute review and approval on the part of Ohio EPA. Upon request and good cause shown, the director may waive the requirement to have a SWP3 completed at the time of NOI submission. If a waiver has been granted, the SWP3 must be completed prior to the initiation of construction activities. The SWP3 must be implemented upon initiation of construction activities.

In order to continue coverage from the previous generations of this permit, the permittee shall review and update the SWP3 to ensure that this permit's requirements are addressed within 180 days after the effective date of this permit. If it is infeasible for you to comply with a specific requirement in this permit because (1) the provision was not part of the permit you were previously covered under, and (2) because you are prevented from compliance due to the nature or location of earth disturbances that commenced prior to the effective date of this permit, you shall include documentation within your SWP3 of the reasons why it is infeasible for you to meet the specific requirement.

Examples of OHC000005 permit conditions that would be infeasible for permittees renewing coverage to comply with include:

- OHC000005 post-construction requirements, for projects that obtained NPDES construction storm water coverage and started construction activities prior to the effective date of this permit;
- OHC000005 post-construction requirements, for multi-phase development projects with an existing regional post-construction BMP issued under previous NPDES post-construction requirements. This only applies to construction sites authorized under Ohio EPA's Construction Storm Water Permits issued after April 20, 2003;
- OHC000005 post-construction requirements, for renewing or initial coverage and you have a SWP3 approved locally and you will start construction within 180 days of the effective date of this permit;

- Sediment settling pond design requirements, if the general permit coverage was obtained prior to April 21, 2013 and the sediment settling pond has been installed; or
- Case-by-case situations approved by the Director.

**C. SWP3 Signature and Review.**

1. Plan Signature and Retention On-Site. The SWP3 shall include the certification in Part V.H, be signed in accordance with Part V.G., and be retained on site during working hours.
2. Plan Availability
  - a. On-site: The plan shall be made available immediately upon request of the director or his authorized representative and MS4 operators or their authorized representative during working hours. A copy of the NOI and letter granting permit coverage under this general permit also shall be made available at the site.
  - b. By written request: The permittee must provide the most recent copy of the SWP3 within 7 days upon written request by any of the following:
    - i. The director or the director's authorized representative;
    - ii. A local agency approving sediment and erosion plans, grading plans or storm water management plans; or
    - iii. In the case of a storm water discharge associated with construction activity which discharges through a municipal separate storm sewer system with an NPDES permit, to the operator of the system.
  - c. To the public: All NOIs, general permit approval for coverage letters, and SWP3s are considered reports that shall be available to the public in accordance with the Ohio Public Records law. The permittee shall make documents available to the public upon request or provide a copy at public expense, at cost, in a timely manner. However, the permittee may claim to Ohio EPA any portion of an SWP3 as confidential in accordance with Ohio law.
3. Plan Revision. The director or authorized representative may notify the permittee at any time that the SWP3 does not meet one or more of the minimum requirements of this part. Within 10 days after such notification from the director or authorized representative (or as otherwise provided in the notification), the permittee shall make the required changes to the SWP3 and shall submit to Ohio EPA the revised SWP3 or a written certification that the requested changes have been made.

**D. Amendments.**

The permittee shall amend the SWP3 whenever there is a change in design, construction, operation or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the state or if the SWP3 proves to be ineffective in achieving the



general objectives of controlling pollutants in storm water discharges associated with construction activity. Amendments to the SWP3 may be reviewed by Ohio EPA in the same manner as Part III.C.

**E. Duty to inform contractors and subcontractors.**

The permittee shall inform all contractors and subcontractors not otherwise defined as “operators” in Part VII of this general permit who will be involved in the implementation of the SWP3 of the terms and conditions of this general permit. The permittee shall maintain a written document containing the signatures of all contractors and subcontractors involved in the implementation of the SWP3 as proof acknowledging that they reviewed and understand the conditions and responsibilities of the SWP3. The written document shall be created, and signatures shall be obtained prior to commencement of earth disturbing activity on the construction site.

**F. Total Maximum Daily Load (TMDL) allocations.**

If a TMDL is approved for any waterbody into which the permittee’s site discharges and requires specific BMPs for construction sites, the director may require the permittee to revise his/her SWP3. Specific conditions have been provided in Appendix A (for the Big Darby Creek Watershed) and Appendix B (for portions of the Olentangy river watershed).

**G. SWP3 Requirements.**

Operations that discharge storm water from construction activities are subject to the following requirements and the SWP3 shall include the following items:

1. Site description. Each SWP3 shall provide:
  - a. A description of the nature and type of the construction activity (e.g., low density 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 construction activity (existing, new and total impervious area after construction);
  - d. 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);
  - e. Existing data describing the soil and, if available, the quality of any discharge from the site;

- f. A description of prior land uses at the site;
- g. A description of the condition of any on-site streams (e.g. prior channelization, bed instability or headcuts, channels on public maintenance, or natural channels);
- h. An implementation schedule which describes the sequence of major construction operations (i.e., designation of vegetative preservation areas, grubbing, excavating, grading, utilities, infrastructure installation and others) and the implementation of erosion, sediment and storm water management practices or facilities to be employed during each operation of the sequence;
- i. The name and/or location of the immediate receiving stream or surface water(s) and the first subsequent named receiving water(s) and the areal 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. For discharges to an MS4, the point of discharge to the MS4 and the location where the MS4 ultimately discharges to a stream or surface water of the state shall be indicated;
- j. For subdivided developments, a detail drawing of individual parcels with their erosion, sediment or storm water control practices and/or a typical individual lot showing standard individual lot erosion and sediment control practices.

A typical individual lot drawing does not remove the responsibility to designate specific erosion and sediment control practices in the SWP3 for critical areas such as steep slopes, stream banks, drainage ways and riparian zones;

- k. Location and description of any storm water discharges associated with dedicated asphalt and dedicated concrete plants covered by this permit and the best management practices to address pollutants in these storm water discharges;
- l. A cover page or title identifying the name and location of the site, the name and contact information of all construction site operators, the name and contact information for the person responsible for authorizing and amending the SWP3, preparation date, and the estimated dates that construction will start and be complete;
- m. A log documenting grading and stabilization activities as well as amendments to the SWP3, which occur after construction activities commence; and
- n. Site map showing:
  - i. Limits of earth-disturbing activity of the site including associated off-site borrow or spoil areas that are not addressed by a separate NOI and associated SWP3;
  - ii. Soils types for all areas of the site, including locations of unstable or highly erodible and/or known contaminated soils;

- iii. Existing and proposed contours. A delineation of drainage watersheds expected during and after major grading activities as well as the size of each drainage watershed, in acres;
- iv. The location of any delineated boundary for required riparian setbacks;
- v. Conservation easements or areas designated as open space, preserved vegetation or otherwise protected from earth disturbing activities. 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 permittee intends to fill or relocate for which the permittee 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;
- viii. The location of all erosion and sediment control practices, including the location of areas likely to require temporary stabilization during site development;
- ix. Sediment traps and basins noting 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, sediment storage volume, practice surface area, dewatering time, outlet type and dimensions;
- x. The location of permanent storm water management practices (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;
- xi. 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;
- xii. The location of designated construction entrances where the vehicles will access the construction site; and
- xiii. The location of any areas of proposed floodplain fill, floodplain excavation, stream restoration or known temporary or permanent stream crossings.

2. Controls. In accordance with Part II.A, the SWP3 shall contain a description of the controls appropriate for each construction operation covered by this permit and the operator(s) shall implement such controls. The SWP3 shall clearly describe for each major construction activity identified in Part III.G.1.h: (a) appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which contractor is responsible for implementation (e.g., contractor A will clear land and install perimeter controls and contractor B will maintain perimeter controls until final stabilization). The SWP3 shall identify the subcontractors engaged in activities that could impact storm water runoff. The SWP3 shall contain signatures from all of the identified subcontractors indicating that they have been informed and understand their roles and responsibilities in complying with the SWP3. Ohio EPA recommends that the primary site operator review the SWP3 with the primary contractor prior to commencement of construction activities and keep a SWP3 training log to demonstrate that this review has occurred.

Ohio EPA recommends that the erosion, sediment, and storm water management practices used to satisfy the conditions of this permit should meet the standards and specifications in the most current edition of Ohio's Rainwater and Land Development (see definitions) manual or other standards acceptable to Ohio EPA. The controls shall include the following minimum components:

- a. Preservation Methods. The SWP3 shall make use of practices which preserve the existing natural condition as much as feasible. Such practices may include: preserving existing vegetation, vegetative buffer strips, and existing soil profile and topsoil; phasing of construction operations to minimize the amount of disturbed land at any one time; and designation of tree preservation areas or other protective clearing or grubbing practices. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water.
- b. Erosion Control Practices. The SWP3 shall make use of erosion controls that provide cover over disturbed soils unless an exception is approved in accordance with Part III.G.4. A description of control practices designed to re-establish vegetation or suitable cover on disturbed areas after grading shall be included in the SWP3. The SWP3 shall provide specifications for 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. Such practices may include: temporary seeding, permanent seeding, mulching, matting, sod stabilization, vegetative buffer strips, phasing of construction operations, use of construction entrances and the use of alternative ground cover.
- i. **Stabilization.** Disturbed areas shall be stabilized in accordance with Table 1 (Permanent Stabilization) and Table 2 (Temporary Stabilization) in Part II.B of this permit.
- ii. **Permanent stabilization of conveyance channels.** Operators shall undertake special measures to stabilize channels and outfalls and prevent erosive flows. Measures may include seeding, dormant seeding (as defined in the most current edition of the Rainwater and Land

Development manual), mulching, erosion control matting, sodding, riprap, natural channel design with bioengineering techniques or rock check dams.

- c. Runoff Control Practices. The SWP3 shall incorporate measures which control the flow of runoff from disturbed areas so as to prevent erosion from occurring. Such practices may include rock check dams, pipe slope drains, diversions to direct flow away from exposed soils and protective grading practices. These practices 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 physical and biological characteristics and functions are maintained and protected.
- d. Sediment Control Practices. The plan shall include a description of structural practices that shall store runoff allowing sediments to settle and/or divert flows away from exposed soils or otherwise limit runoff from exposed areas. Structural practices shall be used to control erosion and trap sediment from a site remaining disturbed for more than 14 days. Such practices may include, among others: sediment settling ponds, sediment barriers, earth diversion dikes or channels which direct runoff to a sediment settling pond and storm drain inlet protection. All sediment control practices must be capable of ponding runoff in order to be considered functional. Earth diversion dikes or channels alone are not considered a sediment control practice unless those are used in conjunction with a sediment settling pond.

The SWP3 shall contain detail drawings for all structural practices.

- i. **Timing.** Sediment control structures shall be functional throughout the course of earth disturbing activity. Sediment basins and perimeter sediment barriers shall be implemented prior to grading and within seven days from the start of grubbing. They shall continue to function until the upslope 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.
- ii. **Sediment settling ponds.** A sediment settling pond is required for any one of the following conditions:
- Concentrated or collected storm water runoff (e.g., storm sewer or ditch);
  - Runoff from drainage areas, which exceed the design capacity of silt fence or other sediment barriers; or
  - Runoff from drainage areas that exceed the design capacity of inlet protection.

The permittee may request approval from Ohio EPA to use alternative controls if the permittee can demonstrate the alternative controls are equivalent in effectiveness to a sediment settling pond.

In accordance with Part II.F, if feasible, sediment settling ponds shall be dewatered at the pond surface using a skimmer or equivalent device. The sediment settling pond volume consists of both a dewatering zone and a sediment storage zone. The volume of the dewatering zone shall be a minimum of 1800 cubic feet (ft<sup>3</sup>) per acre of drainage (67 yd<sup>3</sup>/acre) with a minimum 48-hour drain time. The volume of the sediment storage zone shall be calculated by one of the following methods:

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

Method 2: The volume of the sediment storage zone shall be the volume necessary to store the sediment as calculated with RUSLE or a similar generally accepted erosion prediction model.

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. When determining the total contributing drainage area, off-site areas and areas which remain undisturbed by construction 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 dewatering zone shall be less than or equal to five feet. The configuration between inlets and the outlet of the basin shall provide at least two units of length for each one unit of width ( $\geq 2:1$  length:width ratio); however, a length to width ratio of 4:1 is recommended. When designing sediment settling ponds, the permittee 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. Combining multiple sediment and erosion control measures in order to maximize pollutant removal is encouraged.

- iii. **Sediment Barriers and Diversions.** Sheet flow runoff from denuded areas shall be intercepted by sediment barriers or diversions to protect adjacent properties and water resources from sediment transported via sheet flow. Where intended to provide sediment control, silt fence shall be placed on a level contour downslope of the disturbed area. For most applications, standard silt fence may be substituted with a 12-inch diameter sediment barrier. The relationship between the maximum drainage area to sediment barrier for a particular slope range is shown in the following table:

**Table 3 Sediment Barrier Maximum Drainage Area Based on Slope**

Maximum drainage area (in acres) to 100 linear feet of sediment barrier	Range of slope for a particular drainage area (in percent)
0.5	< 2%
0.25	$\geq 2\%$ but < 20%
0.125	$\geq 20\%$ but < 50%

Placing sediment barriers in a 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 where practicable. Diversion practices, which include swales, dikes or berms, may receive storm water runoff from areas up to 10 acres.

- iv. **Inlet Protection.** Other erosion and sediment control practices shall minimize sediment laden water entering active storm drain systems. All inlets receiving runoff from drainage areas of one or more acres will require a sediment settling pond.
- v. **Surface Waters of the State Protection.** If construction activities disturb areas adjacent to surface waters of the state, structural practices shall be designed and implemented on site to protect all adjacent surface waters of the state from the impacts of sediment runoff. No structural sediment controls (e.g., the installation of silt fence or a sediment settling pond) shall be used in a surface water of the state. For all construction activities immediately adjacent to surface waters of the state, the permittee shall comply with the buffer non-numeric effluent limitation in Part II.A.6, as measured from the ordinary high water mark of the surface water. Where impacts within this buffer area are unavoidable, due to the nature of the construction (e.g., stream crossings for roads or utilities), the project shall be designed such that the number of stream crossings and the width of the disturbance within the buffer area are minimized.
- vi. **Modifying Controls.** If periodic inspections or other information indicates a control has been used inappropriately or incorrectly, the permittee shall replace or modify the control for site conditions.
- e. Post-Construction Storm Water Management Requirements. So that receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained, post-construction storm water practices shall provide long-term management of runoff quality and quantity. To meet the post-construction requirements of this permit, the SWP3 shall contain a description of the post-construction BMPs that will be installed during construction for the site and the rationale for their selection. The rationale shall address the anticipated impacts on the channel and floodplain morphology, hydrology, and water quality. Post-construction BMPs cannot be installed within a surface water of the state (e.g., wetland or stream) unless it is authorized by a CWA 401 water quality certification, CWA 404 permit, or Ohio EPA non-jurisdictional wetland/stream program approval. Note: local jurisdictions may have more stringent post-construction requirements.

Detail drawings and maintenance plans shall be provided for all post-construction BMPs in the SWP3. Maintenance plans shall be provided by the permittee to the post-construction operator of the site (including homeowner associations) upon completion of construction activities (prior to termination of permit coverage). Maintenance plans shall ensure that pollutants collected within structural post-construction practices are disposed of in accordance with local, state, and federal regulations. To ensure that storm water management systems function as

designed and constructed, the post-construction operation and maintenance plan shall be a stand-alone document which contains: (1) a designated entity for storm water inspection and maintenance responsibilities; (2) the routine and non-routine maintenance tasks to be undertaken; (3) a schedule for inspection and maintenance; (4) any necessary legally binding maintenance easements and agreements; (5) construction drawings or excerpts showing the plan view, profile and details of the outlet(s); (6) a map showing all access and maintenance easements; and (7) for table 4a/4b practices, provide relevant elevations and associated volumes that dictate when removal of accumulated sediments must occur. 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.

Post-construction storm water BMPs that discharge pollutants from point sources once construction is completed may in themselves need authorization under a separate NPDES permit (one example is storm water discharges from regulated industrial sites).

Construction activities that do not include the installation of any impervious surface (e.g., park lands), abandoned mine land reclamation activities regulated by the Ohio Department of Natural Resources, stream and wetland restoration activities, and wetland mitigation activities are not required to comply with the conditions of Part III.G.2.e of this permit. Linear construction projects (e.g., pipeline or utility line installation) which do not result in the installation of additional impervious surface are not required to comply with the conditions of Part III.G.2.e of this permit. However, linear construction projects shall be designed to minimize the number of stream crossings and the width of disturbance, and to achieve final stabilization of the disturbed area as defined in Part VII.M.1.

For all construction activities that will disturb two or more acres of land or will disturb less than two acres that are part of a larger common plan of development or sale which will disturb two or more acres of land, the post construction BMP(s) chosen shall be able to manage storm water runoff for protection of stream channels, stream stability, and water quality. The BMP(s) chosen must be compatible with site and soil conditions. Structural post-construction storm water treatment practices shall be incorporated into the permanent drainage system for the site. The BMP(s) chosen must be sized to treat the water quality volume ( $WQ_v$ ) and ensure compliance with Ohio's Water Quality Standards in OAC Chapter 3745-1. The  $WQ_v$  shall be equivalent to the volume of runoff from a 0.90-inch rainfall and shall be determined using the following equations:



$$WQ_v = R_v * P * A / 12 \quad (\text{Equation 1})$$

where:

WQ<sub>v</sub> = water quality volume in acre-feet  
R<sub>v</sub> = the volumetric runoff coefficient calculated using equation 2  
P = 0.90 inch precipitation depth  
A = area draining into the BMP in acres

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

where i = fraction of post-construction impervious surface

An additional volume equal to 20 percent of the WQ<sub>v</sub> shall be incorporated into the BMP for sediment storage. Ohio EPA recommends BMPs be designed according to the methodology described in the most current edition of the Rainwater and Land Development manual or in another design manual acceptable for use by Ohio EPA.

The BMPs listed in Tables 4a and 4b below are considered standard BMPs approved for general use. However, communities with a regulated MS4 may limit the use of some of these BMPs. BMPs shall be designed such that the drain time is long enough to provide treatment but short enough to provide storage for successive rainfall events and avoid the creation of nuisance conditions. The outlet structure for the post-construction BMP shall not discharge more than the first half of the WQ<sub>v</sub> in less than one-third of the drain time. The WQ<sub>v</sub> is the volume of storm water runoff that must be detained by a post-construction practice as specified by the most recent edition of the Rainwater and Land Development manual.

Post-construction practices shall be sized to treat 100% of the WQ<sub>v</sub> associated with their contributing drainage area. If there is an existing post-construction BMP that treats runoff from the disturbed area and the BMP meets the post-construction requirements of this permit, no additional post-construction BMP will be required. A regional storm water BMP may be used to meet the post-construction requirement if: (1) the BMP meets the design requirements for treating the WQ<sub>v</sub>; and (2) a legal agreement is established through which the regional BMP owner or operator agrees to provide this service in the long term. Design information for such facilities such as contributing drainage areas, capacities, elevations, outlet details and drain times shall be included in the SWP3.

**Table 4a Extended Detention Post-Construction Practices with Minimum Drain Times**

<b>Extended Detention Practices</b>	<b>Minimum Drain Time of WQv</b>
Wet Extended Detention Basin <sup>1,2</sup>	24 hours
Constructed Extended Detention Wetland <sup>1,2</sup>	24 hours
Dry Extended Detention Basin <sup>1,3</sup>	48 hours
Permeable Pavement – Extended Detention <sup>1</sup>	24 hours
Underground Storage – Extended Detention <sup>1,4</sup>	24 hours
Sand & Other Media Filtration - Extended Detention <sup>1, 5</sup>	24 hours

Notes:

1. The outlet structure shall not discharge more than the first half of the WQv in less than one-third of the drain time.
2. 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.
3. Dry basins must 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.
4. Underground storage must 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 BMP Testing Protocol.
5. The WQv ponding area shall completely empty between 24 and 72 hours.

**Table 4b Infiltration Post-Construction Practices with Maximum Drain Times**

<b>Infiltration Practices</b>	<b>Maximum Drain Time of WQv</b>
Bioretention Area/Cell <sup>1,2</sup>	24 hours
Infiltration Basin <sup>2</sup>	24 hours
Infiltration Trench <sup>3</sup>	48 hours
Permeable Pavement – Infiltration <sup>3</sup>	48 hours
Underground Storage – Infiltration <sup>3,4</sup>	48 hours

**Notes:**

1. Bioretention soil media shall have a permeability of approximately 1 – 4 in/hr. Meeting the soil media specifications in the Rainwater and Land Development manual is considered compliant with this requirement. Bioretention cells must 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.
2. Infiltrating practices with the WQv stored aboveground (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.
3. Subsurface practices 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.
4. Underground storage systems with infiltration must 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 systems, pretreatment shall be 80% effective at capturing total suspended solids according to the testing protocol established in the Alternative Post-Construction BMP Testing Protocol.

**Small Construction Activities.** For all construction activities authorized under this permit which result in a disturbance less than 2 acres, a post-construction practice shall be used to treat storm water runoff for pollutants and to reduce adverse impacts on receiving waters. The applicant must provide a justification in the SWP3 why the use of table 4a and 4b practices are not feasible. The justification must address limiting factors which would prohibit the project going forward should table 4a and 4b practices be required. Please note that additional practices selected will require approval from the regulated MS4. The use of green infrastructure BMPs such as runoff reducing practices is also encouraged.

Transportation Projects. The construction of new roads and roadway improvement projects by public entities (i.e., the state, counties, townships, cities, or villages) may implement post-construction BMPs in compliance with the current version (as of the effective date of this permit) of the Ohio Department of Transportation's "Location and Design Manual, Volume Two Drainage Design" that has been accepted by Ohio EPA as an alternative to the conditions of this permit.

Offsite Mitigation of Post-Construction. Ohio EPA may authorize the offsite mitigation of the post-construction requirements of Part III.G.2.e of this permit on a case by case basis provided the permittee clearly demonstrates the BMPs listed in Tables 4a and 4b are not feasible and the following criteria are met: (1) a maintenance agreement or policy is established to ensure operations and treatment long-term; (2) the offsite location discharges to the same HUC-12 watershed unit; and (3) the mitigation ratio of the WQv is 1.5 to 1 or the WQv at the point of retrofit, whichever is greater. Requests for offsite mitigation must be received prior to receipt of the NOI application.

Previously Developed Areas - Ohio EPA encourages the redevelopment of previously graded, paved or built upon sites through a reduction of the WQv treatment requirement. For a previously developed area, one or a combination of the following two conditions shall be met:

- A 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 area (for these purposes green roofs shall be considered pervious surface) or
- Treatment of 20 percent of the WQv for the previously developed area using a practice meeting Table 4a/4b criteria.

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

$$WQv = P * A * [(Rv_1 * 0.2) + (Rv_2 - Rv_1)] / 12 \quad (\text{Equation 3})$$

where

P = 0.90 inches

A = area draining into the BMP in acres

Rv<sub>1</sub> = volumetric runoff coefficient for existing conditions (current site impervious area)

Rv<sub>2</sub> = volumetric runoff coefficient for proposed conditions (post-construction site impervious area)

Post-construction practices 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.

Runoff Reduction Practices. The size of structural post-construction practices used to capture and treat the WQv can be reduced by incorporating runoff

reducing practices into the design of the site's drainage system. The approach to calculate and document runoff reduction is detailed in the Rainwater and Land Development Manual. BMP-specific runoff reduction volumes are set by specifications in the Rainwater and Land Development Manual for the following practices:

- Impervious surface disconnection
- Rainwater harvesting
- Bioretention
- Infiltration basin
- Infiltration trench
- Permeable pavement with infiltration
- Underground storage with infiltration
- Grass swale
- Sheet flow to filter strip
- Sheet flow to conservation area

A runoff reduction approach may be used to meet the groundwater recharge requirements in the Big Darby Creek Watershed. The runoff reduction practices used for groundwater recharge may be used to reduce the WQv requirement, see appendix A for details on groundwater recharge requirements.

In order to promote the implementation of green infrastructure, the Director may consider the use of runoff reducing practices to demonstrate compliance with Part III.G.2.e of this permit for areas of the site not draining into a common drainage system of the site, e.g., sheet flow from perimeter areas such as the rear yards of residential lots, low density development scenarios, or where the permittee can demonstrate that the intent of pollutant removal and stream protection, as required in Part III.G.2.e of this permit is being addressed through non-structural post-construction BMPs based upon review and approval by Ohio EPA.

Use of Alternative Post-Construction BMPs. This permit does not preclude the use of innovative or experimental post-construction storm water management technologies. Alternative post-construction BMPs shall previously have been tested to confirm storm water treatment efficacy equivalent to those BMPs listed in Tables 4a and 4b using the protocol described in this section. BMP testing may include laboratory testing, field testing, or both.

Permittees shall request approval from Ohio EPA to use alternative post-construction BMPs on a case-by-case basis. To use an alternative post-construction BMP, the permittee must demonstrate that use of a BMP listed in Tables 4a and 4b is not feasible and the proposed alternative post-construction BMP meets the minimum treatment criteria as described in this section. The permittee shall submit an application to Ohio EPA for any proposed alternative post-construction BMP. Where the development project is located within a regulated municipal separate storm sewer system (MS4) community, the use of an alternative practice requires pre-approval by the MS4 before submittal of the

Ohio EPA permit application. Ohio EPA requires that approvals for alternative post-construction BMPs are finalized before permittees submit an NOI for permit coverage.

In addition to meeting sediment removal criteria, the discharge rate from the proposed alternative practice shall be reduced to prevent stream bed erosion and protect the physical and biological stream integrity unless there will be negligible hydrological impact to the receiving surface water of the state. Discharge rate is considered to have a negligible impact if the permittee can demonstrate that one of the following three conditions exist:

- i. The entire WQv is recharged to groundwater;
- ii. The larger common plan of development or sale will create less than one acre of impervious surface;
- iii. The storm water drainage system of the development discharges directly into a large river with drainage area equal to 100 square miles or larger upstream of the development site or to a lake where the development area is less than 5 percent of the watershed area, unless a TMDL has identified water quality problems into the receiving surface waters of the state.

If the conditions above that minimize the potential for hydrological impact to the receiving surface water of the state do not exist, then the alternative post-construction BMP must prevent stream erosion by reducing the flow rate from the WQ<sub>v</sub>. In such cases, discharge of the WQ<sub>v</sub> must be controlled. A second storm water BMP that provides extended detention of the WQv may be needed to meet the post-construction criteria.

Alternative Post-Construction BMP Testing Protocol. For laboratory testing, the alternative BMP shall be tested using sediment with a specific gravity of 2.65, a particle size distribution closely matching the distribution shown in Table 5, and total suspended sediment (TSS) concentrations within 10% of 200 mg/L (180 mg/L – 220 mg/L TSS). For an alternative BMP to be acceptable, the test results must demonstrate that the minimum treatment rate is 80% TSS removal at the design flow rate for the tested BMP.

**Table 5 Particle Size Distribution for Testing Alternative Post-Construction BMPs**

Particle Size (microns)	Percent Finer (%)
1,000	100
500	95
250	90
150	75
100	60
75	50
50	45
20	35
8	20
5	10
2	5

- For field testing, the alternative BMP shall be tested using storm water runoff

from the field, not altered by adding aggregate or subjecting to unusually high sediment loads such as those from unstabilized construction disturbance. The storm water runoff used for field testing shall be representative of runoff from the proposed installation site for the alternative BMP after all construction activities have ceased and the ground has been stabilized. The influent and effluent TSS concentrations of storm water runoff must be collected in the field. For an alternative BMP to be acceptable, the test results must demonstrate the minimum treatment rate is 80% TSS removal for influent concentrations equal to or greater than 100 mg/L TSS. If the influent concentration to the proposed alternative BMP is less than 100 mg/L TSS in the field, then the BMP must achieve an average effluent concentration less than or equal to 20 mg/L TSS.

- Testing of alternative post-construction BMPs shall be performed or overseen by a qualified independent, third-party testing organization;
- Testing shall demonstrate the maximum flow rate at which the alternative post-construction BMP can achieve the necessary treatment efficacy, including consideration for the potential of sediment resuspension;
- Testing shall demonstrate the maximum volume of sediment and floatables that can be collected in the alternative post-construction BMP before pollutants must be removed to maintain 80% treatment efficacy;
- Testing shall indicate the recommended maintenance frequency and maintenance protocol to ensure ongoing performance of the alternative post-construction BMP.

The alternative post-construction BMP testing protocol described in this section is similar to testing requirements specified by the New Jersey Department of Environmental Protection (NJDEP) for storm water Manufactured Treatment Devices (MTD) and therefore testing results certified by NJDEP shall be accepted by Ohio EPA. For examples of BMPs that have been tested using New Jersey Department of Environmental Protection's procedures, see the website: [www.njstormwater.org](http://www.njstormwater.org).

Another nationally recognized storm water product testing procedure is the Technology Assessment Protocol – Ecology (TAPE) administered by the State of Washington, Department of Ecology. The TAPE testing procedure describes testing to achieve 80% TSS removal using a sediment mix with a particle size distribution with approximately 75% of the mass of the aggregate with particle diameters less than 45 microns. Overall, this particle size distribution is finer than the distribution in Table 5. Therefore, if TAPE testing results are available for a proposed alternative post-construction BMP, those results shall be accepted by Ohio EPA. The State of Washington, Department of Ecology website is <https://ecology.wa.gov/>.

Alternative BMPs that utilize treatment processes such as filtering or centrifugal separation, rather than a detention and settling volume, must be designed to ensure treatment of 90 percent of the average annual runoff

volume. For the design of these BMPs, the water quality flow rate (WQF) considered equivalent to the Water Quality Volume (WQv) shall be determined utilizing the Rational Method (Equation 4) with an intensity (i) appropriate for the water quality precipitation event. This intensity shall be calculated using the table given in Appendix C.

$$WQF = C * i * A \quad \text{(Equation 4)}$$

Where

WQF = water quality flow rate in cubic feet per second (cfs)  
C = rational method runoff coefficient  
i = intensity (in/hr)  
A = area draining to the BMP (acres)

Alternative post-construction BMPs may include, but are not limited to: vegetated 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, wetland channels, rain barrels, green roofs, and rain gardens. The Director may also consider non-structural post-construction approaches.

- f. Surface Water Protection. If the project site contains any streams, rivers, lakes, wetlands or other surface waters, certain construction activities at the site may be regulated under the CWA and/or state isolated wetland permit requirements. Sections 404 and 401 of the Act regulate the discharge of dredged or fill material into surface waters and the impacts of such activities on water quality, respectively. Construction activities in surface waters which may be subject to CWA regulation and/or state isolated wetland permit requirements include, but are not limited to: sewer line crossings, grading, backfilling or culverting streams, filling wetlands, road and utility line construction, bridge installation and installation of flow control structures. If the project contains streams, rivers, lakes or wetlands or possible wetlands, the permittee shall contact the appropriate U.S. Army Corps of Engineers District Office. (CAUTION: Any area of seasonally wet hydric soil is a potential wetland - please consult the Soil Survey and list of hydric soils for your County, available at your county's Soil and Water Conservation District. If you have any questions about Section 401 water quality certification, please contact the Ohio Environmental Protection Agency, Section 401 Coordinator.)

U.S. Army Corps of Engineers (Section 404 regulation):

- Huntington, WV District (304) 399-5210 (Muskingum River, Hocking River, Scioto River, Little Miami River, and Great Miami River Basins)
- Buffalo, NY District (716) 879-4330 (Lake Erie Basin)
- Pittsburgh, PA District (412) 395-7155 (Mahoning River Basin)
- Louisville, KY District (502) 315-6686 (Ohio River)

Ohio EPA 401/404 and non-jurisdictional stream/wetland coordinator can be contacted at (614) 644-2001 (all of Ohio)

Concentrated storm water runoff from BMPs to natural wetlands shall be converted to diffuse flow before the runoff enters the wetlands. The flow should be released such that no erosion occurs downslope. Level spreaders may need to be placed in series, particularly on steep sloped sites, to ensure non-erosive velocities. Other structural BMPs may be used between storm water features and natural wetlands, in order to protect the natural hydrology, hydroperiod, and wetland flora. If the applicant proposes to discharge to natural wetlands, a hydrologic analysis shall be performed. The applicant shall attempt to match the pre-development hydroperiods and hydrodynamics that support the wetland. The applicant shall assess whether their construction activity will adversely impact the hydrologic flora and fauna of the wetland. Practices such as vegetative buffers, infiltration basins, conservation of forest cover, and the preservation of intermittent streams, depressions, and drainage corridors may be used to maintain wetland hydrology.

g. Other controls.

- i. **Non-Sediment Pollutant Controls.** In accordance with Part II.E, no solid (other than sediment) or liquid waste, including building materials, shall be discharged in storm water runoff. The permittee must implement all necessary BMPs to prevent the discharge of non-sediment pollutants to the drainage system of the site or surface waters of the state or an MS4. Under no circumstance shall wastewater from the washout of concrete trucks, stucco, paint, form release oils, curing compounds, and other construction materials be discharged directly into a drainage channel, storm sewer or surface waters of the state. Also, no pollutants from vehicle fuel, oils, or other vehicle fluids can be discharged to surface waters of the state. No exposure of storm water to waste materials is recommended. The SWP3 must include methods to minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, and sanitary waste to precipitation, storm water runoff, and snow melt. In accordance with Part II.D.3, the SWP3 shall include measures to prevent and respond to chemical spills and leaks. You may also reference the existence of other plans (i.e., Spill Prevention Control and Countermeasure (SPCC) plans, spill control programs, Safety Response Plans, etc.) provided that such plan addresses conditions of this permit condition and a copy of such plan is maintained on site.
- ii. **Off-site traffic.** Off-site vehicle tracking of sediments and dust generation shall be minimized. In accordance with Part II.D.1, the SWP3 shall include methods to minimize the discharge of pollutants from equipment and vehicle washing, wheel washwater, and other washwaters. No detergents may be used to wash vehicles. Washwaters shall be treated in a sediment basin or alternative control that provides equivalent treatment prior to discharge.
- iii. **Compliance with other requirements.** The SWP3 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 to the extent these are located within the permitted area.

- iv. **Trench and ground water control.** In accordance with Part II.C, there shall be no turbid discharges to surface waters of the state resulting from dewatering activities. 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 construction 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 must be taken when discharging ground water to ensure that it does not become pollutant-laden by traversing over disturbed soils or other pollutant sources.
- v. **Contaminated Sediment.** Where construction activities are to occur on sites with contamination from previous activities, operators shall be aware that concentrations of materials that meet other criteria (is not considered a Hazardous Waste, meeting VAP standards, etc.) may still result in storm water discharges in excess of Ohio Water Quality Standards. Such discharges are not authorized by this permit. Appropriate BMPs include, but are not limited to:
- The use of berms, trenches, and pits to collect contaminated runoff and prevent discharges;
  - Pumping runoff into a sanitary sewer (with prior approval of the sanitary sewer operator) or into a container for transport to an appropriate treatment/disposal facility; and
  - Covering areas of contamination with tarps or other methods that prevent storm water from coming into contact with the material.

Operators should consult with Ohio EPA Division of Surface Water prior to seeking permit coverage.

- h. Maintenance. All temporary and permanent control practices shall be maintained and repaired as needed to ensure continued performance of their intended function. All sediment control practices must be maintained in a functional condition until all up-slope areas they control are permanently stabilized. The SWP3 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.
- i. Inspections. The permittee shall assign "qualified inspection personnel" to conduct inspections to ensure that the control practices are functional and to evaluate whether the SWP3 is adequate and properly implemented in accordance with the schedule proposed in Part III.G.1.h of this permit or whether additional control measures are required. At a minimum, procedures in a SWP3 shall provide that all controls on the site are inspected:

- after any storm event greater than one-half inch of rain per 24-hour period by the end of the next calendar day, excluding weekends and holidays unless work is scheduled; and
- once every seven calendar days.

The inspection frequency may be reduced to at least once every month for dormant sites if:

- the entire site is temporarily stabilized or
- runoff is unlikely due to weather conditions for extended periods of time (e.g., site is covered with snow, ice, or the ground is frozen).

The beginning and ending dates of any reduced inspection frequency shall be documented in the SWP3.

Once a definable area has achieved final stabilization, the area may be marked on the SWP3 and no further inspection requirements shall apply to that portion of the site.

Following each inspection, a checklist must be completed and signed by the qualified inspection personnel representative. At a minimum, the inspection report shall include:

- 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 construction 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 BMPs that need to be maintained;
- vii. location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
- viii. location(s) where additional BMPs 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.

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. Erosion and sediment control measures identified in the SWP3 shall be observed to ensure that those are operating correctly. Discharge locations shall be inspected to ascertain whether erosion and sediment control measures are effective in preventing significant impacts to the receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site vehicle tracking.

The permittee shall maintain for three years following the submittal of a notice of termination form, a record summarizing the results of the inspection, names(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWP3 and a certification as to whether the facility is in compliance with the SWP3 and the permit and identify any incidents of non-compliance. The record and certification shall be signed in accordance with Part V.G. of this permit.

- i. **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 3 days of the inspection. Sediment settling ponds shall be repaired or maintained within 10 days of the inspection.
  - ii. **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 SWP3 shall be amended and the new control practice shall be installed within 10 days of the inspection.
  - iii. **When practices depicted on the SWP3 are not installed.** If the inspection reveals that a control practice has not been implemented in accordance with the schedule contained in Part III.G.1.h of this permit, 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.
3. Approved State or local plans. All dischargers regulated under this general permit must comply, except those exempted under state law, with the lawful requirements of municipalities, counties and other local agencies regarding discharges of storm water from construction activities. All erosion and sediment control plans and storm water management plans approved by local officials shall be retained with the SWP3 prepared in accordance with this permit. Applicable requirements for erosion and sediment control and storm water management approved by local officials are, upon submittal of a NOI form, incorporated by reference and enforceable under this permit even if they are not specifically included in an SWP3 required under this permit. When the project is located within the jurisdiction of a regulated municipal separate storm sewer system (MS4), the permittee shall certify that the SWP3 complies with the requirements of the storm water management program of the MS4 operator.
4. Exceptions. If specific site conditions prohibit the implementation of any of the erosion and sediment control practices contained in this permit or site-specific conditions are such that implementation of any erosion and sediment control practices contained in this permit will result in no environmental benefit, then the permittee shall provide justification for rejecting each practice based on site conditions. Exceptions from implementing the erosion and sediment control standards contained in this permit will be approved or denied on a case-by-case basis.

The permittee may request approval from Ohio EPA to use alternative methods to satisfy conditions in this permit if the permittee can demonstrate that the alternative methods are sufficient to protect the overall integrity of receiving streams and the watershed. Alternative methods will be approved or denied on a case-by-case basis.

#### **PART IV. NOTICE OF TERMINATION REQUIREMENTS**

##### **A. Failure to notify.**

The terms and conditions of this permit shall remain in effect until a signed Notice of Termination (NOT) form is submitted. Failure to submit an NOT constitutes a violation of this permit and may affect the ability of the permittee to obtain general permit coverage in the future.

##### **B. When to submit an NOT.**

1. Permittees wishing to terminate coverage under this permit shall submit an NOT form in accordance with Part V.G. of this permit. Compliance with this permit is required until an NOT form is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT form is submitted. Prior to submitting the NOT form, the permittee shall conduct a site inspection in accordance with Part III.G.2.i of this permit and have a maintenance plan in place to ensure all post-construction BMPs will be maintained in perpetuity.
2. All permittees shall submit an NOT form within 45 days of completing all permit requirements. Enforcement actions may be taken if a permittee submits an NOT form without meeting one or more of the following conditions:
  - a. Final stabilization (see definition in Part VII) has been achieved on all portions of the site for which the permittee is responsible (including, if applicable, returning agricultural land to its pre-construction agricultural use);
  - b. Another operator(s) has assumed control over all areas of the site that have not been finally stabilized;
  - c. A maintenance plan is in place to ensure all post construction BMPs are adequately maintained in the long-term;
  - d. For non-residential developments, all elements of the storm water pollution prevention plan have been completed, the disturbed soil at the identified facility have been stabilized and temporary erosion and sediment control measures have been removed at the appropriate time, or all storm water discharges associated with construction activity from the identified facility that are authorized by the above referenced NPDES general permit have otherwise been eliminated. (i) For residential developments only, temporary stabilization has been completed and the lot, which includes a home, has been transferred to the homeowner; (ii) final stabilization has been completed and the lot, which does not include a home, has been transferred to the property owner; (iii) no stabilization has been implemented on a lot, which includes a home, and the lot has been transferred to the homeowner; or

- e. An exception has been granted under Part III.G.4.

**C. How to submit an NOT.**

To terminate permit coverage, the permittee shall submit a complete and accurate Notice of Termination (NOT) form using Ohio EPA's electronic application form which is available through the Ohio EPA eBusiness Center at: <https://ebiz.epa.ohio.gov/>. Submission through the Ohio EPA eBusiness Center will require establishing an Ohio EPA eBusiness Center account and obtaining a unique Personal Identification Number (PIN) for final submission of the NOT. Existing eBusiness Center account holders can access the NOT form through their existing account and submit using their existing PIN. Please see the following link for guidance: <http://epa.ohio.gov/dsw/ebs.aspx#170669803-streams-guidance>. Alternatively, if you are unable to access the NOT form through the agency eBusiness Center due to a demonstrated hardship, the NOT may be submitted on paper NOT forms provided by Ohio EPA. NOT information shall be typed on the form. Please contact Ohio EPA, Division of Surface Water at (614) 644-2001 if you wish to receive a paper NOT form.

**PART V. STANDARD PERMIT CONDITIONS.**

**A. Duty to comply.**

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of ORC Chapter 6111 and is grounds for enforcement action.

Ohio law imposes penalties and fines for persons who knowingly make false statements or knowingly swear or affirm the truth of a false statement previously made.

**B. Continuation of an expired general permit.**

An expired general permit continues in force and effect until a new general permit is issued.

**C. Need to halt or reduce activity not a defense.**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

**D. Duty to mitigate.**

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

**E. Duty to provide information.**

The permittee shall furnish to the director, within 10 days of written request, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee

shall also furnish to the director upon request copies of records required to be kept by this permit.

**F. Other information.**

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI, SWP3, NOT or in any other report to the director, he or she shall promptly submit such facts or information.

**G. Signatory requirements.**

All NOIs, NOTs, SWP3s, reports, certifications or information either submitted to the director or that this permit requires to be maintained by the permittee, shall be signed.

1. These items shall be signed as follows:
  - a. For a corporation: By a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
    - i. A president, secretary, treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation; or
    - ii. The manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions that govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
  - b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
  - c. For a municipality, State, Federal or other public agency: By either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).
2. All reports required by the permits and other information requested by the director shall be signed by a person described in Part V.G.1 of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

- a. The authorization is made in writing by a person described in Part V.G.1 of this permit and submitted to the director;
  - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator of a well or well field, superintendent, position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
  - c. The written authorization is submitted to the director.
3. Changes to authorization. If an authorization under Part V.G.2 of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.G.2 of this permit must be submitted to the director prior to or together with any reports, information or applications to be signed by an authorized representative.

**H. Certification.**

Any person signing documents under this section shall make the following certification:

*"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."*

**I. Oil and hazardous substance liability.**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities or penalties to which the permittee is or may be subject under section 311 of the CWA or 40 CFR Part 112. 40 CFR Part 112 establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable surface waters of the state or adjoining shorelines.

**J. Property rights.**

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

**K. Severability.**

The provisions of this permit are severable and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

**L. Transfers.**

Ohio NPDES general permit coverage is transferable. Ohio EPA must be notified in writing sixty days prior to any proposed transfer of coverage under an Ohio NPDES general permit. The transferee must inform Ohio EPA it will assume the responsibilities of the original permittee transferor.

**M. Environmental laws.**

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

**N. Proper operation and maintenance.**

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWP3s. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of the permit.

**O. Inspection and entry.**

The permittee shall allow the director or an authorized representative of Ohio EPA, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment); and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

**P. Duty to Reapply.**

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.



**Q. Permit Actions.**

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

**R. Bypass.**

The provisions of 40 CFR Section 122.41(m), relating to "Bypass," are specifically incorporated herein by reference in their entirety. For definition of "Bypass," see Part VII.C.

**S. Upset.**

The provisions of 40 CFR Section 122.41(n), relating to "Upset," are specifically incorporated herein by reference in their entirety. For definition of "Upset," see Part VII.GG.

**T. Monitoring and Records.**

The provisions of 40 CFR Section 122.41(j), relating to "Monitoring and Records," are specifically incorporated herein by reference in their entirety.

**U. Reporting Requirements.**

The provisions of 40 CFR Section 122.41(l), relating to "Reporting Requirements," are specifically incorporated herein by reference in their entirety.

**PART VI. REOPENER CLAUSE**

If there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with construction activity covered by this permit, the permittee of such discharge may be required to obtain coverage under an individual permit or an alternative general permit in accordance with Part I.C of this permit or the permit may be modified to include different limitations and/or requirements.

Permit modification or revocation will be conducted according to ORC Chapter 6111.

**PART VII. DEFINITIONS**

- A. "Act" means Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, Pub. L. 97-117 and Pub. L. 100-4, 33 U.S.C. 1251 et. seq.
- B. "Bankfull channel" means a channel flowing at channel capacity and conveying the bankfull discharge. Delineated by the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape, such as the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial or

the point at which the clearly scoured substrate of the stream ends and terrestrial vegetation begins.

- C. "Bankfull discharge" means the streamflow that fills the main channel and just begins to spill onto the floodplain; it is the discharge most effective at moving sediment and forming the channel.
- D. "Best management practices (BMPs)" means schedules of activities, prohibitions of practices, maintenance procedures and other management practices (both structural and non-structural) to prevent or reduce the pollution of surface waters of the state. BMP's also include treatment requirements, operating procedures and practices to control plant and/or construction site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage.
- E. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.
- F. "Channelized stream" means the definition set forth in Section 6111.01 (M) of the ORC.
- G. "Commencement of construction" means the initial disturbance of soils associated with clearing, grubbing, grading, placement of fill, or excavating activities or other construction activities.
- H. "Concentrated storm water runoff" means any storm water runoff which flows through a drainage pipe, ditch, diversion or other discrete conveyance channel.
- I. "Director" means the director of the Ohio Environmental Protection Agency.
- J. "Discharge" means the addition of any pollutant to the surface waters of the state from a point source.
- K. "Disturbance" means any clearing, grading, excavating, filling, or other alteration of land surface where natural or man-made cover is destroyed in a manner that exposes the underlying soils.
- L. "Drainage watershed" means for purposes of this permit the total contributing drainage area to a BMP, i.e., the "watershed" directed to the practice. This would also include any off-site drainage.
- M. "Final stabilization" means that either:
  - 1. All soil disturbing activities at the site are complete and a uniform perennial vegetative cover (e.g., evenly distributed, without large bare areas) with a density of at least 70 percent cover for the area has been established on all unpaved areas and areas not covered by permanent structures or equivalent stabilization measures (such as the use of mulches, rip-rap, gabions or geotextiles) have been employed. In addition, all temporary erosion and sediment control practices are removed and disposed of and all trapped sediment is permanently stabilized to prevent further erosion; or

2. For individual lots in residential construction by either:
    - a. The homebuilder completing final stabilization as specified above or
    - b. The homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or
  3. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its pre-construction agricultural use. Areas disturbed that were previously used for agricultural activities, such as buffer strips immediately adjacent to surface waters of the state and which are not being returned to their pre-construction agricultural use, must meet the final stabilization criteria in (1) or (2) above.
- N. "General contractor" – for the purposes of this permit, the primary individual or company solely accountable to perform a contract. The general contractor typically supervises activities, coordinates the use of subcontractors, and is authorized to direct workers at a site to carry out activities required by the permit.
- O. "Individual lot NOI" means a Notice of Intent for an individual lot to be covered by this permit (see Part I of this permit).
- P. "Larger common plan of development or sale"- means a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan.
- Q. "MS4" means municipal separate storm sewer system which means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) that are:
1. Owned or operated by the federal government, state, municipality, township, county, district(s) or other public body (created by or pursuant to state or federal law) including special district under state law such as a sewer district, flood control district or drainage districts or similar entity or a designated and approved management agency under section 208 of the act that discharges into surface waters of the state; and
  2. Designed or used for collecting or conveying solely storm water,
  3. Which is not a combined sewer and
  4. Which is not a part of a publicly owned treatment works.
- R. "National Pollutant Discharge Elimination System (NPDES)" means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits and enforcing pretreatment requirements, under sections 307, 402, 318 and 405 of the CWA. The term includes an "approved program."

- S. "Natural channel design" means an engineering technique that uses knowledge of the natural process of a stream to create a stable stream that will maintain its form and function over time.
- T. "NOI" means notice of intent to be covered by this permit.
- U. "NOT" means notice of termination.
- V. "Operator" means any party associated with a construction project that meets either of the following two criteria:
1. The party has day-to-day operational control of all activities at a project which are necessary to ensure compliance with a SWP3 for the site and all permit conditions including the ability to authorize modifications to the SWP3, construction plans and site specification to ensure compliance with the General Permit, or
  2. Property owner meets the definition of operator should the party which has day to day operational control require additional authorization from the owner for modifications to the SWP3, construction plans, and/or site specification to ensure compliance with the permit or refuses to accept all responsibilities as listed above (Part VII.V.1).

Subcontractors generally are not considered operators for the purposes of this permit. As set forth in Part I.F.1, there can be more than one operator at a site and under these circumstances, the operators shall be co-permittees.

- W. "Ordinary high water mark" means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.
- X. "Owner or operator" means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.
- Y. "Permanent stabilization" means the establishment of permanent vegetation, decorative landscape mulching, matting, sod, rip rap and landscaping techniques to provide permanent erosion control on areas where construction operations are complete or where no further disturbance is expected for at least one year.
- Z. "Percent imperviousness" means the impervious area created divided by the total area of the project site.
- AA. "Point source" means any discernible, confined and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or the floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

- BB. "Qualified inspection personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls, who possesses the skills to assess all conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.
- CC. "Rainwater and Land Development" is a manual describing construction and post-construction best management practices and associated specifications. A copy of the manual may be obtained by contacting the Ohio Department of Natural Resources, Division of Soil & Water Conservation.
- DD. "Riparian area" means the transition area between flowing water and terrestrial (land) ecosystems composed of trees, shrubs and surrounding vegetation which serve to stabilize erodible soil, improve both surface and ground water quality, increase stream shading and enhance wildlife habitat.
- EE. "Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.
- FF. "Sediment settling pond" means a sediment trap, sediment basin or permanent basin that has been temporarily modified for sediment control, as described in the latest edition of the Rainwater and Land Development manual.
- GG. "State isolated wetland permit requirements" means the requirements set forth in Sections 6111.02 through 6111.029 of the ORC.
- HH. "Storm water" means storm water runoff, snow melt and surface runoff and drainage.
- II. "Steep slopes" means slopes that are 15 percent or greater in grade. Where a local government or industry technical manual has defined what is to be considered a "steep slope," this permit's definition automatically adopts that definition.
- JJ. "Stream edge" means the ordinary high water mark.
- KK. "Subcontractor" – for the purposes of this permit, an individual or company that takes a portion of a contract from the general contractor or from another subcontractor.
- LL. "Surface waters of the state" or "water bodies" means 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.
- MM. "SWP3" means storm water pollution prevention plan.
- NN. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment

facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

- OO. “Temporary stabilization” means the establishment of temporary vegetation, mulching, geotextiles, sod, preservation of existing vegetation and other techniques capable of quickly establishing cover over disturbed areas to provide erosion control between construction operations.
- PP. “Water Quality Volume (WQ<sub>v</sub>)” means the volume of storm water runoff which must be captured and treated prior to discharge from the developed site after construction is complete.

**Appendix A**  
**Big Darby Creek Watershed**

**CONTENTS OF THIS APPENDIX**

- A.1 Permit Area
- A.2 TMDL Conditions
- A.3 Sediment Settling Ponds and Sampling
- A.4 Riparian Setback Requirements
- A.5 Riparian Setback Mitigation
- A.6 Groundwater Recharge Requirements
- A.7 Groundwater Recharge mitigation

Attachment A-A: Big Darby Creek Watershed Map

Attachment A-B: Stream Assessment and Restoration

**A.1 Permit Area.**

This appendix to Permit OHC00005 applies to the entire Big Darby Creek Watershed located within the State of Ohio. Please see Attachment A for permit area boundaries.

**A.2 TMDL Conditions.**

This general permit requires control measures/BMPs for construction sites that reflect recommendations set forth in the U.S. EPA approved Big Darby Creek TMDL.

**A.3 Sediment Settling Ponds and Sampling**

Sediment settling ponds additional conditions. The sediment settling pond shall be sized to provide a minimum sediment storage volume of 134 cubic yards of effective sediment storage per acre of drainage and maintain a target discharge performance standard of 45 mg/l Total Suspended Solids (TSS) up to a 0.75-inch rainfall event within a 24-hour period. Unless infeasible, sediment settling ponds must be dewatered at the pond surface using a skimmer or equivalent device. The depth of the sediment settling pond must be less than or equal to five feet. Sediment must be removed from the sediment settling pond when the design capacity has been reduced by 40 percent (This is typically reached when sediment occupies one-half of the basin depth).

Silt Fence and Diversions. For sites five or more acres in size, the use of sediment barriers as a primary sediment control is prohibited. Centralized sediment basins shall be used for sites 5 or more acres in size. Diversions shall direct all storm water runoff from the disturbed areas to the impoundment intended for sediment control. The sediment basins and associated diversions shall be implemented prior to the major earth disturbing activity.

The permittee shall sample in accordance with sampling procedures outlined in 40 CFR 136. Sampling shall occur as follows:

- i. Occur at the outfall of each sediment settling pond associated with the site. Each associated outfall shall be identified by a three-digit number (001, 002, etc.);
- ii. The applicable rainfall event for sampling to occur shall be a rainfall event of 0.25-inch to a 0.75-inch rainfall event to occur within a 24-hour period. Grab sampling shall be initiated at a site within 14 days, or the first applicable rainfall event thereafter, once upslope disturbance of each sampling location is initiated and shall continue on a quarterly basis. Quarterly periods shall be represented as January - March, April - June, July - September and October - December. Sampling results shall be retained on site and available for inspection.

If any sample is greater than the performance standard of 45 mg/l TSS, the permittee shall modify the SWP3 and install/implement new control practice(s) within 10 days to ensure the TSS performance standard is maintained. Within 3 days of improvement(s), or the first applicable rainfall event thereafter, the permittee shall resample to ensure SWP3 modifications maintain the TSS performance standard target.

For each sample taken, the permittee shall record the following information:

- the outfall and date of sampling;
- the person(s) who performed the sampling;
- the date the analyses were performed on those samples;
- the person(s) who performed the analyses;
- the analytical techniques or methods used; and
- the results of all analyses.

Both quarterly and sampling results following a discharge target exceedance shall be retained on site and available for inspection.

#### **A.4 Riparian Setback Requirements.**

The SWP3 shall clearly delineate the boundary of required stream setback distances. No construction activity shall occur, without appropriate mitigation, within the delineated setback boundary except activities associated with restoration or recovery of natural floodplain and channel form characteristics as described in Attachment B, storm water conveyances from permanent treatment practices and approvable utility crossings. Such conveyances must be designed to minimize the width of disturbance. If intrusion within the delineated setback boundary is necessary to accomplish the purposes of a project, then mitigation shall be required in accordance with Appendix A.5 of this permit. Streams requiring protection under this section are defined as perennial, intermittent or ephemeral streams with a defined bed, bank or channel. National Resources Conservation Service (NRCS) soil survey maps should be used as one reference and the presence of a stream requiring protection should also be confirmed in the field. Any required setback distances shall be clearly displayed in the field prior to any construction related activity.

Riparian setbacks distance shall be delineated based upon one of the following two methods:

- i. The setback distance shall be sized as the greater of the following:



1. The regulatory 100-year floodplain based on FEMA mapping;
2. A minimum of 100 feet from the top of the streambank on each side; or
3. A distance calculated using the following equation:

$$W = 133DA^{0.43} \quad \text{(Equation 1, Appendix A)}$$

where:

DA = drainage area (mi<sup>2</sup>)

W = total width of riparian setback (ft)

W shall be centered over the meander pattern of the stream such that a line representing the setback width would evenly intersect equal elevation lines on either side of the stream.

If the DA remains relatively constant throughout the stretch of interest, then the DA of the downstream edge of the stretch should be used. Where there is a significant increase in the DA from the upstream edge to the downstream edge of the area of interest, the setback width shall increase accordingly.

- ii. **Stream Restoration with 100 feet (each side) Riparian Setback.** Each stream segment within the proposed site boundaries can be assessed in accordance with Attachment B, Part 1. In the event the stream segment is classified as a "Previously Modified Low Gradient Headwater Stream", the permittee has the option to restore the stream segment in accordance with Attachment B and include a 100-foot water quality setback distance from the top of the streambank on each side. In the event the stream segment exceeds the minimum criteria in Attachment B to be classified as a "Previously Modified Low Gradient Headwater Stream," this Appendix A, Attachment B may be considered on a case-by-case basis.

No structural sediment controls (e.g., the installation of sediment barriers or a sediment settling pond) or structural post-construction controls shall be used in a surface water of the State or the delineated setback corridor.

Previously developed projects (as defined in Part III.G.2.e.) located within the delineated setback boundary are exempt from Riparian Setback Mitigation (A.5) provided the proposed project does not further intrude into the delineated setback boundary.

Linear transportation projects which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities are exempt from Riparian Setback Mitigation (Appendix A, A.5) if less than one acre of total new right-of-way is associated with the project.

#### **A.5 Riparian Setback Mitigation.**

The mitigation required for intrusion into the riparian setback shall be determined by the horizontal distance the intrusion is from the stream. Up to three zones will be used in determining the required mitigation. Zone 1 extends from 0 to 25 feet from the stream edge. Zone 2 extends from 25 to 100 feet from the stream edge, and Zone 3 extends from 100 feet to the outer edge of the setback corridor. Intrusion into these zones will require the following mitigation within the same Watershed Assessment Unit (12-digit HUC scale):

- i. Four times the total area disturbed in the stream and within Zone 1 of the site being developed shall be mitigated within Zone 1 of the mitigation location.
- ii. Three times the area disturbed within Zone 2 of the site being developed shall be mitigated within Zones 1 and/or 2 of the mitigation location.
- iii. Two times the area disturbed within Zone 3 of the site being developed shall be mitigated within any zone of the mitigation location.

In lieu of mitigation ratios found within in this section, linear transportation projects which result in total new right-of-way greater than one acre and less than two acres, which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities, shall provide Riparian Setback Mitigation at a ratio of 1.5 to 1.

All mitigation shall, at a minimum, include conserved or restored setback zone and should be designed to maximize the ecological function of the mitigation. Including mitigation at the stream edge along with associated setback areas is one way to maximize ecological function. Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of receiving permit authorization. Granting of binding conservation easements or environmental covenants protected in perpetuity for land outside of disturbed area but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas. Mitigation resulting from State or Federal environmental regulations may be adjusted in recognition of these requirements.

#### **A.6 Groundwater Recharge Requirements.**

The SWP3 shall ensure that the overall site post-development groundwater recharge equals or exceeds the pre-development groundwater recharge. The SWP3 shall describe the conservation development strategies, BMPs and other practices deemed necessary by the permittee to maintain or improve pre-development rates of groundwater recharge. Pre-development and post-development groundwater recharge shall be calculated using the following equation:

i.  $Vre_x = A_x * Dre_x / 12$  (Equation 2, Appendix A)

where:

X = represents a land use and hydrologic soil group pair

$Vre_x$  = volume of total annual recharge from land use-soil group X  
(in acre-ft)

$Dre_x$  = depth of total annual recharge associated with land use-soil  
group X from Tables 1 or 2 (in inches)

$A_x$  = area of land use-soil group X (in acres)

Table A-1 values should be used for land where the underlying geology indicates a potential for downward migration of groundwater. Table A-1 values represent the combined total groundwater recharge potential including groundwater contribution to stream baseflow and to the underlying bedrock aquifer. The potential for downward migration can be determined from a comparison of the potentiometric maps for the glacial and bedrock aquifers. Use Table A-2 when this potential is unlikely to exist. Detailed potentiometric maps for the Franklin county portion of the Darby watershed, and coarse potentiometric maps for the Darby watershed outside of Franklin County and hydrologic soil group data are available at:

[http://www.epa.state.oh.us/dsw/permits/GP\\_ConstructionSiteStormWater\\_Darby.aspx](http://www.epa.state.oh.us/dsw/permits/GP_ConstructionSiteStormWater_Darby.aspx).

**Table A-1 (Appendix A) Annual Average Expected Total Groundwater Recharge<sup>3</sup>**

Land Use	Density (DU <sup>1</sup> /acre)	% Impervious	Recharge (inches) by Hydrologic Soil Group <sup>2</sup>			
			A	B	C	D
Woods / Forest	-	-	17.0	16.6	15.6	14.6
Brush	-	-	17.0	16.6	15.6	14.6
Meadow	-	-	17.0	16.5	15.4	14.4
Managed Wood	-	-	16.9	16.0	14.7	13.4
Pasture	-	-	16.5	15.9	14.4	13.0
Row Crop	-	-	15.8	14.2	11.9	8.1
Urban Grasses	-	-	15.7	15.7	14.2	12.7
Low Density Residential	0.5	12%	15.7	15.7	14.2	12.7
Low Density Residential	1	20%	14.8	14.8	13.7	12.2
Medium Density Residential	2	25%	11.5	11.5	11.5	11.5
Medium Density Residential	3	30%	11.2	11.2	11.2	11.2
Medium Density Residential	4	38%	9.6	9.6	9.6	9.6
High Density Residential	≥5	65%	7.3	7.3	7.3	7.3
Commercial & Road Right-of-Way <sup>4</sup>	-	90%	4.3	4.3	4.3	4.3

<sup>1</sup> DU = Dwelling Units

<sup>2</sup> Hydrologic soil group designations of A/D, B/D, and C/D should be considered as D soils for this application.

<sup>3</sup> These values apply when recharge of the aquifer is expected; recharge to the bedrock aquifer can be expected when the potentiometric head of the glacial aquifer is greater than the bedrock aquifer.

<sup>4</sup> The 4.3 infiltration value may only be used for an area as a whole (includes impervious and pervious areas) which includes a minimum of 10 percent pervious area. If all land uses (pervious and impervious) are tabulated separately, then impervious areas have 0 inches of recharge.

**Table A-2 (Appendix A) Annual Average Expected Baseflow Recharge<sup>3</sup>**

Land Use	Density (DU <sup>1</sup> /acre)	% Impervious	Recharge (inches) by Hydrologic Soil Group <sup>2</sup>			
			A	B	C	D
Woods / Forest	-	-	11.8	11.4	10.7	9.9
Brush	-	-	11.7	11.4	10.7	9.9
Meadow	-	-	11.8	11.3	10.6	9.8
Managed Wood	-	-	11.7	11.0	10.0	9.1
Pasture	-	-	11.3	11.0	9.9	8.9
Row Crop	-	-	11.1	10.1	9.0	6.2
Urban Grasses	-	-	11.2	11.2	10.3	9.3
Low Density Residential	0.5	12%	11.2	11.2	10.3	9.3
Low Density Residential	1	20%	9.5	9.5	9.0	8.6
Medium Density Residential	2	25%	7.8	7.8	7.8	7.8
Medium Density Residential	3	30%	7.6	7.6	7.6	7.6
Medium Density Residential	4	38%	6.5	6.5	6.5	6.5
High Density Residential	≥5	65%	5.0	5.0	5.0	5.0
Commercial & Road Right-of-Way <sup>4</sup>	-	90%	2.9	2.9	2.9	2.9

<sup>1</sup> DU = Dwelling Units

<sup>2</sup> Hydrologic soil group designations of A/D, B/D, and C/D should be considered as D soils for this application.

<sup>3</sup> These values apply when no recharge of the aquifer is expected.

<sup>4</sup> The 2.9 infiltration value may only be used for an area as a whole (includes impervious and pervious areas) which includes a minimum of 10 percent pervious area. If all land uses (pervious and impervious) are tabulated separately, then impervious areas have 0 inches of recharge.

**Table A-3 (Appendix A) Land Use Definitions**

Land Use	Definition
Woods / Forest	Areas dominated by trees. Woods are protected from grazing and litter and brush adequately cover the soil.
Brush	Brush, weeds, grass mixture where brush is the major element and more than 75% of the ground is covered.
Meadow	Continuous grass, protected from grazing, generally mowed for hay.
Managed Wood	Orchards, tree farms, and other areas planted or maintained for the production of fruits, nuts, berries, or ornamentals.
Pasture	Pasture, grassland, or range where at least 50% of the ground is covered and the area is not heavily grazed.
Row Crop	Areas used to produce crops, such as corn, soybeans, vegetables, tobacco, and cotton.
Urban Grasses	Vegetation (primarily grasses) planted in developed settings for recreation, erosion control, or aesthetic purposes. Examples include parks, lawns, golf courses, airport grasses, and industrial site grasses.
Residential	Areas with a mixture of constructed materials and vegetation; the average % imperviousness and number of dwelling units per acre to determine the appropriate density is specified.
Commercial	Includes infrastructure (e.g. roads, railroads, etc.) and all highly developed areas not classified as High Intensity Residential.

- ii. The pre-development ground water recharge volume shall be calculated by determining the area of each land use-soil type pairing on the site of interest. The recharge associated with each such pairing multiplied by the area will give the pre-development volume of total groundwater

recharge. The same shall be done for the post-development land use-soil type pairings.

Any activity that is expected to produce storm water runoff with elevated concentrations of carcinogens, hydrocarbons, metals, or toxics is prohibited from infiltrating untreated storm water from the area affected by the activity. The groundwater recharge mitigation requirement for areas affected by such activities must be met by methods which do not present a risk of groundwater contamination. The following land uses and activities are typically deemed storm water hotspots:

Vehicle salvage yards and recycling facilities

- vehicle service and maintenance facilities (i.e. truck stops, gas stations)
- fleet storage areas (i.e. bus, truck)
- industrial sites subject to industrial storm water permitting requirements
- bulk terminals
- marinas
- facilities that generate or store hazardous materials
- other land uses and activities as designated by individual review

The following land uses and activities are not normally considered hotspots:

- residential streets and rural highways
- residential development
- institutional development
- commercial and office developments
- non-industrial rooftops
- pervious areas, except golf courses and nurseries

The applicant may use structural BMPs within drinking water source protection areas for community public water systems only to the extent that the structural BMP(s) does not cause contaminants in the recharge waters to impact the ground water quality at levels that would cause an exceedance of the drinking water Maximum Contaminant Levels (OAC Section 3745-81 and 3745-82). To obtain a map of drinking water source protection areas for community public water systems contact Ohio EPA's Division of Drinking and Ground Waters at (614) 644-2752.

Linear transportation projects which are caused solely by correcting safety related issues, mandates of modern design requirements and/or resulting from other mitigation activities are exempt from Groundwater Recharge Mitigation (Appendix B, A.7) if less than one acre of total new right-of-way is associated with the project.

Protection of open space (infiltration areas) shall be by binding conservation easements that identify a third-party management agency, such as a homeowners' association/condominium association, political jurisdiction or third-party land trust.

## A.7 Groundwater Recharge Mitigation.

If the post-development recharge volume is less than the pre-development recharge volume, then mitigation will be required. Two options are available for most applications:

- i. The preferred method is to convert additional land to land use with higher recharge potential. The difference in groundwater recharge between the existing and converted land use recharge is the amount which can be used as recharge credit. Off-site Groundwater Recharge Mitigation shall occur within the same Watershed Assessment Unit (12-digit HUC scale) as the permitted site and preferably up-gradient and within a 2-mile radius.

Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of receiving permit authorization. Granting of binding conservation easements or environmental covenants protected in perpetuity for land outside of the disturbed area, but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas.

- ii. On-site structural and non-structural practices may also be used to achieve groundwater mitigation requirements by retaining and infiltrating on-site a minimum volume of storm water runoff based on the area and hydrologic soil groups of disturbed soils. If these infiltrating practices are incorporated upstream of the water quality volume treatment practice, the volume of groundwater being infiltrated may be subtracted from the water quality volume for the purpose of meeting post-construction requirements. The on-site retention requirement is determined by the following formula:

$$V_{\text{retention}} = A_{\text{HSG-A}} * 0.90 \text{ in} + A_{\text{HSG-B}} * 0.75 \text{ in} + A_{\text{HSG-C}} * 0.50 \text{ in} + A_{\text{HSG-D}} * 0.25 \text{ in}$$

(Equation 3, Appendix A)

Where,

$V_{\text{retention}}$  = volume of runoff retained onsite using an approved infiltration practice

$A_{\text{HSG-x}}$  = area of each hydrologic soil group within the disturbed area

**Table A-4: Hydrologic Soil Groups and On-site Retention Depth per Acre**

Hydrologic Soil Group	HSG A	HSG B	HSG C	HSG D
Retention Depth (inches)	0.90	0.75	0.50	0.25

Retention volume ( $V_{\text{retention}}$ ) provided by selected practices shall be determined using the runoff reduction method criteria as outlined in Part III.G.2.e, Ohio EPA's Runoff Reduction spreadsheet and supporting documentation in the Rainwater and Land Development manual. Hydrologic soil group (HSG) areas are to be determined by using the current version of SURGO or Web Soil Survey soils information.

### Appendix A Attachment A: Big Darby Creek Watershed



A more detailed map can be viewed at:

[http://www.epa.state.oh.us/dsw/permits/GP\\_ConstructionSiteStormWater\\_Darby.aspx](http://www.epa.state.oh.us/dsw/permits/GP_ConstructionSiteStormWater_Darby.aspx)

## **Appendix A Attachment B**

### **Part 1 Stream Assessment**

This assessment will determine if a stream is considered a previously channelized, low-gradient headwater stream (a drainage ditch) which would be applicable for stream restoration in lieu of protecting a setback as per Appendix A. A.4.i and ii.

In the event the assessment of the stream, meets all the criteria listed below, restoration (provided 401/404 permits are authorized) as depicted in Part 2 of this attachment, may be a means of reducing the setback distance required by A.4.i. (Appendix A).

Previously Channelized Low-Gradient Headwater Streams (drainage ditches) shall for the purposes of this permit be defined as having all of the following characteristics:

- Less than 10 square miles of drainage area
- Low gradient and low stream power such that despite their straightened and entrenched condition incision (down-cutting) is not evident
- Entrenched, entrenchment ratio < 2.2
- Straight, sinuosity of the bankfull channel < 1.02

### **Part 2 Restoration**

Restoration shall be accomplished by any natural channel design approach that will lead to a self-maintaining reach able to provide both local habitat and watershed services (e.g. self-purification and valley floodwater storage).

- a. Construction of a floodplain, channel and habitat via natural channel design;
- b. Floodplain excavation necessary to promote interaction between stream and floodplain;
- c. Include a water quality setback of 100 feet from top of the streambank on each side.

The primary target regardless of design approach shall be the frequently flooded width, which shall be maximized, at 10 times the channel's self-forming width. Five times the self-forming channel width may still be acceptable particularly on portions of the site if greater widths are achieved elsewhere.



## Appendix B Olentangy River Watershed

### CONTENTS OF THIS APPENDIX

- B.1 Permit Area
- B.2 TMDL Conditions
- B.3 Riparian Setback Requirements
- B.4 Riparian Setback Mitigation

Attachment B-A: Area of Applicability for the Olentangy Watershed (Map)

Attachment B-B: Stream Assessment and Restoration

#### B.1 Permit Area.

This appendix to Permit OHC00005 applies to specific portions of the Olentangy River Watershed located within the State of Ohio. The permit area includes the following 12-digit Hydrologic Unit Codes (HUC-12) within the Olentangy River Watershed:

#### 12-Digit Hydrologic Unit Codes

12-Digit Hydrologic Unit Codes (HUC)	Narrative Description of Sub-Watershed
05060001 09 01	Shaw Creek
05060001 09 02	Headwaters Whetstone Creek
05060001 09 03	Claypool Run-Whetstone Creek
05060001 10 07	Delaware Run-Olentangy River
05060001 11 01	Deep Run-Olentangy River
05060001 11 02 (Only portion as depicted in Attachment A)	Rush Run-Olentangy River

Please see Attachment A (Appendix B) for permit area boundaries. An electronic version of Attachment A can be viewed at

**[http://epa.ohio.gov/dsw/permits/GP\\_ConstructionSiteStormWater\\_Olentangy.aspx](http://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater_Olentangy.aspx)**

#### B.2 TMDL Conditions.

This general permit requires control measures/BMPs for construction sites that reflect recommendations set forth in the U.S. EPA approved Olentangy TMDL.

#### B.3 Riparian Setback Requirements.

The permittee shall comply with the riparian setback requirements of this permit or alternative riparian setback requirements established by a regulated MS4 and approved by Ohio EPA. The SWP3 shall clearly delineate the boundary of required stream setback distances. The stream setback shall consist of a streamside buffer and an outer buffer. No construction activity shall occur, without appropriate mitigation, within the streamside buffer except activities associated with storm water conveyances from permanent treatment practices, approvable utility crossings and restoration or recovery of floodplain and channel form characteristics as described in Attachment B. Storm water conveyances must be designed to minimize the width of disturbance.

Construction activities requiring mitigation for intrusions within the outer buffer for the Olentangy River mainstem and perennial streams are described in Appendix B.4.

If intrusion within the delineated setback boundary is necessary to accomplish the purposes of a project, then mitigation shall be required in accordance with Appendix B.3. of this permit. Streams requiring protection under this section have a defined bed and bank or channel and are defined as follows:

- The Olentangy River mainstem;
- Perennial streams have continuous flow on either the surface of the stream bed or under the surface of the stream bed;
- Intermittent streams flow for extended periods of time seasonally of a typical climate year; and
- Ephemeral streams are normally dry and only flow during and after precipitation runoff (episodic flow).

National Resources Conservation Service (NRCS) soil survey maps should be used as one reference and the presence of a stream requiring protection should also be confirmed in the field. Any required setback distances shall be clearly displayed in the field prior to any construction related activity.

Riparian setbacks shall be delineated based upon one of the following two methods:

- i. The required setback distances shall vary with stream type as follows:
  - a. The setback distances associated with the mainstem of the Olentangy River shall consist of:
    - (1) A streamside buffer width of 100 feet as measured horizontally from the ordinary high water mark per side; and
    - (2) An outer buffer width sized to the regulatory 100-year floodplain based on FEMA mapping. No impervious surfaces shall be constructed without appropriate mitigation and moderate to substantial fill activities with no impervious surface may require appropriate mitigation pending an individual approval by Ohio EPA.
  - b. The setback distance associated with perennial streams, other than the Olentangy mainstem, shall consist of:
    - (1) A streamside buffer width of 80 feet per side measured horizontally from the ordinary high water mark; and
    - (2) An outer buffer width sized to the regulatory 100-year floodplain based on FEMA mapping. In the event the regulatory 100-year floodplain is not established, the outer buffer width shall be calculated using the following equation and measured horizontally from the ordinary high water mark. No impervious surfaces, structure, fill, or activity that would impair the floodplain or stream stabilizing ability of the outer buffer shall occur without appropriate mitigation:

$$W = 143DA^{0.41} \quad (\text{Equation 1 Appendix B})$$

where:

DA = drainage area (mi<sup>2</sup>)

W = total width of riparian setback (ft)

W shall be centered over the meander pattern of the stream such that a line representing the setback width would evenly intersect equal elevation lines on either side of the stream.

If the DA remains relatively constant throughout the stretch of interest, then the DA of the downstream edge of the stretch should be used. Where there is a significant increase in the DA from the upstream edge to the downstream edge of the area of interest, the setback width shall increase accordingly.

c. The setback distance associated with intermittent streams and ephemeral streams shall be a streamside buffer width of 30 feet per side measured horizontally from the centerline of the stream. No outer buffer is required for intermittent and ephemeral streams.

- ii. Stream Restoration with 100 feet (each side) Riparian Setback. Each stream segment within the proposed site boundaries can be assessed in accordance with Attachment B. In the event the stream segment is classified as a "Previously Modified Low Gradient Headwater Stream", the permittee has the option to restore the stream segment in accordance with Attachment B and include a 100 feet water quality setback distance from the top of the streambank on each side. In the event the stream segment exceeds the minimum criteria in Attachment B to be classified as a "Previously Modified Low Gradient Headwater Stream", this may be considered on a case-by-case basis.

No structural sediment controls (e.g., the installation of sediment barriers or a sediment settling pond) or structural post-construction controls shall be used in a stream or the streamside buffer. Activities and controls that would not impair the floodplain or stream stabilizing ability of the outer buffer can be considered.

Redevelopment projects (i.e., developments on previously developed property) located within the delineated setback boundary is exempt from Riparian Setback Mitigation (B.3) provided the proposed project does not further intrude the delineated setback boundary.

#### **B.4 Riparian Setback Mitigation.**

The mitigation required for intrusion into the riparian setback of the **Olentangy River mainstem or perennial streams** shall be determined by the horizontal distance the intrusion is from the stream. Up to three zones will be used in determining the required mitigation. Zone 1 extends from 0 to 30 feet from the stream edge. Zone 2 extends

from 30 feet to the outer edge of the streamside buffer. Zone 3 extends from the outer edge of the streamside buffer to the outer edge of the outer buffer. Intrusion into these zones will require the following mitigation within the same Watershed Assessment Unit (12-digit HUC scale). Alternative mitigation, within the permit area, may be considered on a case-by-case basis:

1. Four (4) times the total area disturbed in the stream within Zone 1 of the site being developed shall be mitigated; or, two (2) times the total area disturbed in the stream within Zone 1 shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected by binding conservation easements or environmental covenants.
2. Three (3) times the area disturbed within Zone 2 of the site being developed shall be mitigated within Zones 1 and/or 2 of the mitigation location; or, one and one-half (1.5) times the total area disturbed within Zone 2 shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.
3. Two (2) times the area to be mitigated within Zone 3 of the site being developed shall be mitigated within any Zone of the mitigation location; or, one (1) times the total area to be mitigated within any zone shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

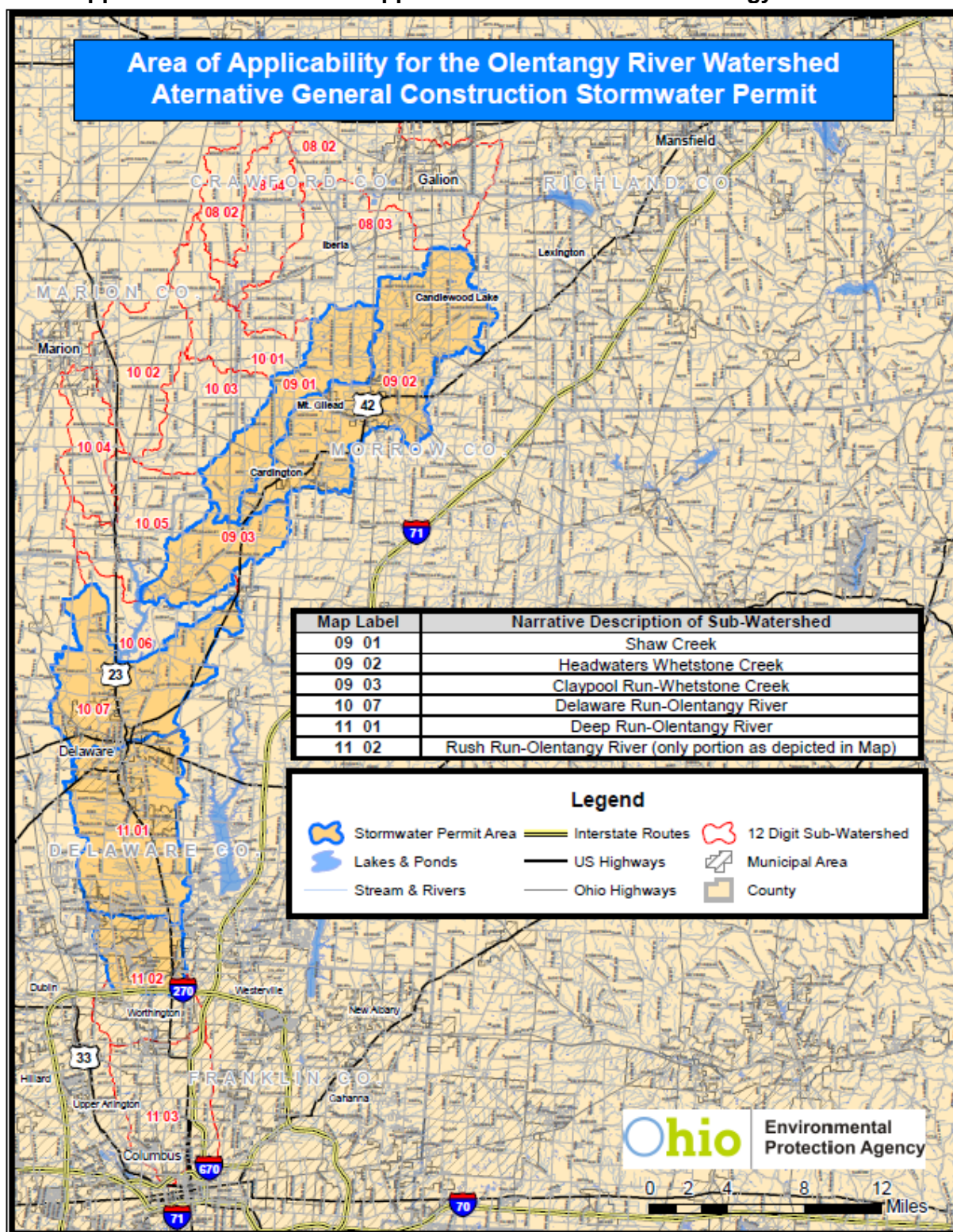
The mitigation required for intrusion into the riparian setback of an **intermittent stream** shall be four (4) times the total area disturbed within the riparian setback of the site being developed shall be mitigated; or two (2) times the total area disturbed within the riparian setback shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

The mitigation required for intrusion into the streamside buffer of an **ephemeral stream** shall be two (2) times the total area disturbed within the riparian setback of the site being developed shall be mitigated; or one (1) times the total area disturbed within the riparian setback shall be mitigated within the watershed of the immediate receiving stream, and the entire required setback of the site shall be protected in perpetuity by binding conservation easements or environmental covenants.

All mitigation shall, at a minimum, include conserved or restored setback zone, and should be designed to maximize the ecological function of the mitigation. Including mitigation at the stream edge along with associated setback areas is one way to maximize ecological function. Mitigation shall be protected in perpetuity by binding conservation easements or environmental covenants which must be recorded within 6 months of permit authorization. Granting of binding conservation easements or environmental covenants protected for land outside of disturbed area, but within a required riparian setback counts towards required mitigation.

Mitigation may also be satisfied by approved pooled mitigation areas and in-lieu fee sponsored mitigation areas. Mitigation resulting from State or Federal environmental regulations may be adjusted in recognition of these requirements.

Appendix B Attachment A Applicable Portions of the Olentangy Watershed



A more detailed map can be viewed at:  
[http://epa.ohio.gov/dsw/permits/GP\\_ConstructionSiteStormWater\\_Olentangy.aspx](http://epa.ohio.gov/dsw/permits/GP_ConstructionSiteStormWater_Olentangy.aspx)

## **Appendix B Attachment B**

### **Part 1 Stream Assessment**

This assessment will determine if a stream is considered a previously channelized, low-gradient headwater stream (a drainage ditch) which would be applicable for stream restoration in lieu of protecting an outer 'no build' setback as per Appendix B B.2i. and ii.

In the event the assessment of the stream meets all the criteria listed below, restoration as depicted in Part 2 of this attachment or natural channel design could be performed, provided 401/404 permits are authorized, and may be a means of reducing the setback distance required by B.2.i. (Appendix B).

Previously Modified, Low-Gradient Headwater Streams shall, for the purposes of this permit, be defined as having all of the following characteristics:

- Less than 10 square miles of drainage area;
- Low gradient and low stream power such that incision (down-cutting) is not evident;
- Entrenched such that the ratio of the frequently flooded width to the bankfull width is less than 2.2; and
- Straight with little or no sinuosity present such that the ratio of the bankfull channel length to the straight-line distance between two points is less than 1.02.

### **Part 2 Restoration**

Restoration shall be accomplished by any natural channel design approach that will lead to a self-maintaining reach able to provide both local habitat and watershed services (e.g. self-purification and valley floodwater storage).

- a. Construction of a floodplain, channel and habitat via natural channel design;
- b. Floodplain excavation necessary to promote interaction between stream and floodplain;
- c. Include a water quality setback of 100 feet from top of the streambank on each side.

The primary target shall be a frequently flooded width of 10 times the channel's self-forming width. Five times the self-forming channel width may be acceptable if sufficient elements of natural channel design are included in the restoration project.

### Appendix C Rainfall Intensity for Calculation of Water Quality Flow (WQF)

DURATION $t_c$ (minutes)	WATER QUALITY INTENSITY [ $i_{wq}$ ] (inches/hour)	DURATION $t_c$ (minutes)	WATER QUALITY INTENSITY [ $i_{wq}$ ] (inches/hour)
5	2.37	33	0.95
6	2.26	34	0.93
7	2.15	35	0.92
8	2.04	36	0.90
9	1.94	37	0.88
10	1.85	38	0.86
11	1.76	39	0.85
12	1.68	40	0.83
13	1.62	41	0.82
14	1.56	42	0.80
15	1.51	43	0.78
16	1.46	44	0.77
17	1.41	45	0.76
18	1.37	46	0.75
19	1.33	47	0.74
20	1.29	48	0.73
21	1.26	49	0.72
22	1.22	50	0.71
23	1.19	51	0.69
24	1.16	52	0.68
25	1.13	53	0.67
26	1.10	54	0.66
27	1.07	55	0.66
28	1.05	56	0.65
29	1.03	57	0.64
30	1.01	58	0.64
31	0.99	59	0.63
32	0.97	60	0.62

Note: For  $t_c < 5$  minutes, use  $i = 2.37$  in/hr; for  $t_c > 60$  minutes, use  $i = 0.62$  in/hr. For all other  $t_c$ , use the appropriate value from this table.



## **Appendix B**

### **Grading and Stabilization Activities Log**

## ***Hardin County Wind Project***

Date	Description of Grading and Stabilization Activities and Notes

## **Appendix C**

### **Record of SWP3 Amendments**

## ***Hardin County Wind Project***

Number of Amendment	Date	Description of Amendment
0	11-17-17	SWPPP creation

## **Appendix E**

### **SWP3 Training Log**

## ***Hardin County Wind Project***

### SWP3 Training Log

I have reviewed and understand the conditions of the SWP3 and my role and responsibilities in complying with the SWP.

---

Name

---

Title

---

Signature

---

Date

## ***Hardin County Wind Project***

I have reviewed and understand the conditions of the SWP3 and my role and responsibilities in complying with the SWP.

---

Name

---

Title

---

Signature

---

Date

## ***Hardin County Wind Project***

I have reviewed and understand the conditions of the SWP3 and my role and responsibilities in complying with the SWP.

---

Name

---

Title

---

Signature

---

Date



## **Appendix E**

### **BMP Specifications**

## 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.

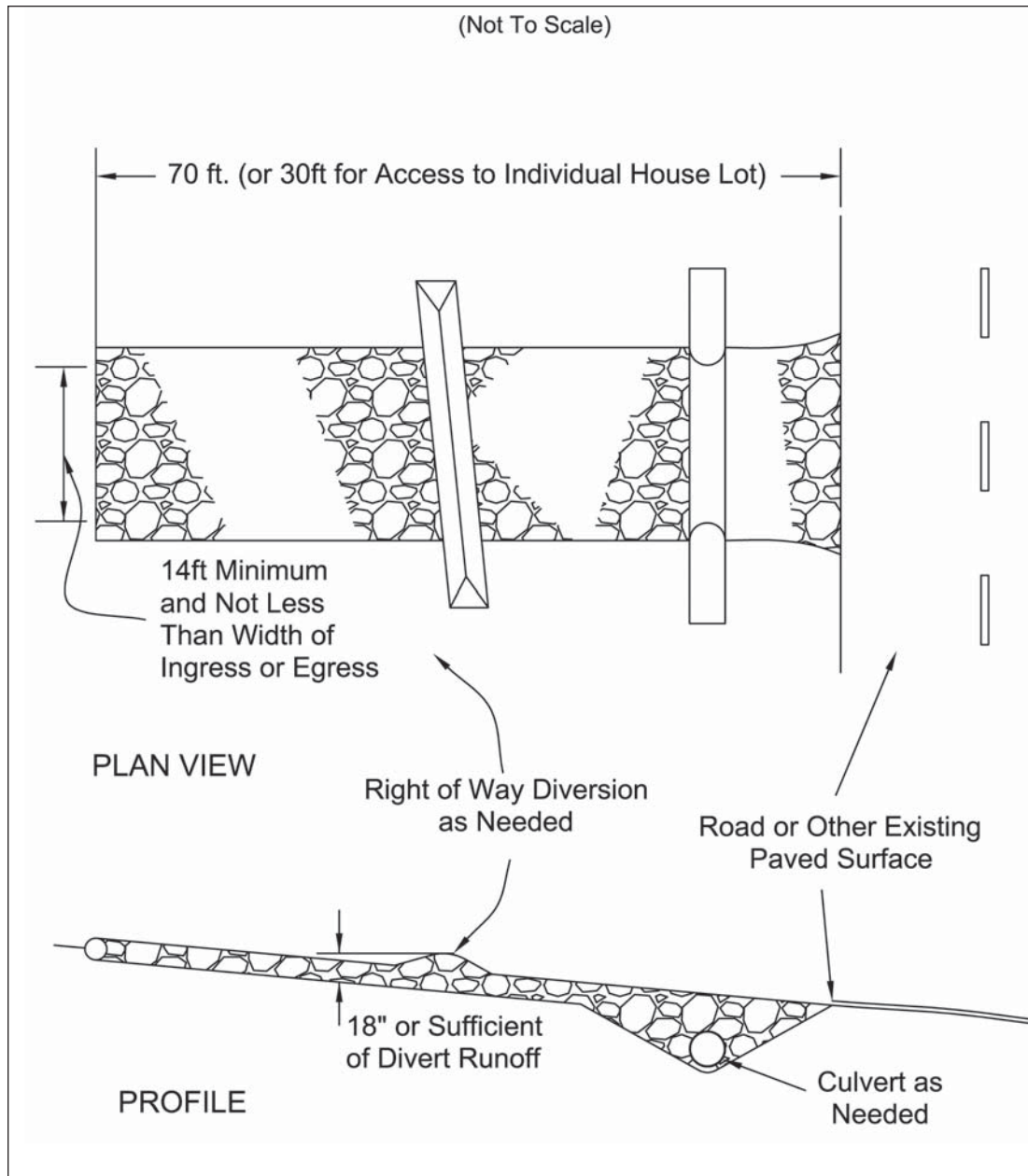
### **Common Problems / Concerns**

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.

Specifications  
for  
**Construction Entrance**

---



# Specifications for **Construction Entrance**

---

1. **Stone Size**—ODOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.
2. **Length**—The Construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to single residence lots).
3. **Thickness** -The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.
4. **Width** -The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.
5. **Geotextile** -A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the following specifications:
6. **Timing**—The construction entrance shall be installed as soon as is practicable before major grading activities.
7. **Culvert** -A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.
8. **Water Bar** -A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.
9. **Maintenance** -Top dressing of additional stone shall be applied as conditions demand. Mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal shall be accomplished by scraping or sweeping.
10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter and leave the construction-site shall be restricted from muddy areas.
11. **Removal**—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

**Figure 7.4.1**

<b>Geotextile Specification for Construction Entrance</b>	
Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm.
Permittivity	1×10 <sup>-3</sup> cm/sec.



## 7.8 Temporary Seeding

---



### Description

Temporary seedings establish temporary cover on disturbed areas by planting appropriate rapidly growing annual grasses or small grains. Temporary seeding provides erosion control on areas in between construction operations. Grasses, which are quick growing, are seeded and usually mulched to provide prompt, temporary soil stabilization. It effectively minimizes the area of a construction site prone to erosion and should be used everywhere the sequence of construction operations allows vegetation to be established.

### Conditions Where the Practice Applies

Temporary seeding should be applied on exposed soil where additional work (grading, etc.) is not scheduled for more than 21 days. Permanent seeding should be applied if the areas will be idle for more than one year.

### Planning Considerations

This practice has the potential to drastically reduce the amount of sediment eroded from a construction site. Erosion control efficiencies greater than 90% will be achieved with proper applications of temporary seeding. Because practices used to trap sediment are usually much less effective, temporary seeding is to be used even on areas where runoff is treated by sediment trapping practices. Because temporary seeding is highly effective and practical on construction sites, its liberal use is highly recommended.

## Design Criteria

Specifications follow these explanations of important aspects of temporary seeding.

**Plant Selection:** Select the plants appropriate from the table in the Specifications for Temporary seeding. Choose varieties of tall fescue that are endophyte free or have non-toxic endophytes. Seeding rates for dormant seedings are increased by 50 percent. More information on dormant seedings is given in the permanent seeding section.

The length of time the area will idle and the season in which seeding occurs should influence the selection of seeding species. For areas remaining idle for over a year, a mixture containing perennial ryegrass is recommended. Cereal grains (rye, oats and wheat) are included in some of the mixtures as cover crops. These are annual plants that will die after producing seed. Realize that oats will not over-winter and continue to grow as wheat and rye do.

**Site preparation:** Temporary seeding is best done on a prepared soil seedbed of loose pulverized soil. However, seedings should not be delayed, if additional grading operations are not possible. At a minimum, remove large rock or debris that will interfere with seeding operations. If the ground has become crusted, a disk or a harrow should be used to loosen the soil. Overall the best soil conditions will exist immediately after grading operations cease, when soils remain loose and moist.

**Soil amendments:** A soil test is necessary to adequately predict the need for lime and fertilizer. Seedings that are expected to be long lasting (over 1-3 months), should have lime and fertilizer applied as recommended by a soil test. In lieu of a soil test, fertilizer can be broadcast and worked into the top inch of soil at the rate of 6 pounds/1000 ft<sup>2</sup> or 250 pounds per acre of 10-10-10 or 12-12-12.

**Seeding Methods:** Seed shall be applied uniformly with a cyclone spreader, drill, culti-packer seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.

## Maintenance

Areas failing to establish vegetative cover adequate to prevent erosion shall be reseeded as soon as such areas are identified.

Seeding performed during hot and dry summer months shall be watered at a rate of 1 inch per week.

## Common Problems / Concerns

- Insufficient topsoil or inadequately tilled, limed, and/ or fertilized seedbed results in poor establishment of vegetation.
- An overly high seeding rate of nurse crop (oat, rye or wheat) in the seed mixture results in over competition with the perennials.
- Seeding outside of seeding dates results in poor vegetation establishment and a decrease in plant hardiness.
- An inadequate rate of mulch results in poor germination and failure.

# Specifications for Temporary Seeding

**Table 7.8.1 Temporary Seeding Species Selection**

Seeding Dates	Species	Lb./1000 ft2	Lb/Acre
March 1 to August 15	Oats	3	128 (4 Bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Ryegrass	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Annual Ryegrass	1.25	55
	Perennial Ryegrass	3.25	142
	Creeping Red Fescue	0.4	17
	Kentucky Bluegrass	0.4	17
August 16th to November	Oats	3	128 (3 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Rye	3	112 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Wheat	3	120 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Rye	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
November 1 to Feb. 29	Annual Ryegrass	1.25	40
	Perennial Ryegrass	3.25	40
	Creeping Red Fescue	0.4	40
	Kentucky Bluegrass	0.4	
	Use mulch only or dormant seeding		

Note: Other approved species may be substituted.

1. Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.
2. Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These idle areas shall be seeded within 7 days after grading.
3. The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if ideal seedbed preparation is not possible.
4. Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.
5. Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cultipacker seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.



Specifications  
for  
**Temporary Seeding**

---

### Mulching Temporary Seeding

1. Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seedings made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.
2. Materials:
  - Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./ 1,000 sq. ft. (2-3 bales)
  - Hydroseeders—If wood cellulose fiber is used, it shall be used at 2000 lbs./ ac. or 46 lb./ 1,000-sq.-ft.
  - Other—Other acceptable mulches include mulch mattings applied according to manufacturer's recommendations or wood chips applied at 6 ton/ ac.
3. Straw Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods:
  - Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
  - Mulch Netting—Netting shall be used according to the manufacturers recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
  - Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates recommended by the manufacturer.
  - Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

## 7.10 Permanent Seeding

---



### Description

Perennial vegetation is established on areas that will not be re-disturbed for periods longer than 12 months. Permanent seeding includes site preparation, seedbed preparation, planting seed, mulching, irrigation and maintenance.

Permanent vegetation is used to stabilize soil, reduce erosion, prevent sediment pollution, reduce runoff by promoting infiltration, and provide stormwater quality benefits offered by dense grass cover.

### Conditions Where Practice Applies

Permanent seeding should be applied to:

- Any disturbed areas or portions of construction sites at final grade. Permanent seeding should not be delayed on any one portion of the site at final grade while construction on another portion of the site is being completed. Permanent seeding shall be completed in phases, if necessary.
- Areas subject to grading activities but will remain dormant for a year or more.

### Planning Considerations

Vegetation controls erosion by reducing the velocity and the volume of overland flow and protects bare soil surface from raindrop impact. A healthy, dense turf promotes infiltration and reduces the amount of runoff. The establishment of quality vegetation requires selection of the right plant materials for the site, adequate soil amendments, careful seedbed preparation, and maintenance.

**Soil Compaction**—Storm water quality and the amount of runoff both vary significantly with soil compaction. Non-compacted soils improve stormwater infiltration by promoting:

- dense vegetative growth;
- high soil infiltration & lower runoff rates;
- pollutant filtration, deposition & absorption; and
- beneficial biologic activity in the soil.

Construction activity creates highly compacted soils that restrict water infiltration and root growth. The best time for improving soil condition is during the establishment of permanent vegetation. It is highly recommended that subsoilers, plows, or other implements are specified as part of final seedbed preparation. Use discretion in slip-prone areas.

**Minimum Soil Conditions**—Vegetation cannot be expected to stabilize soil that is unstable due to its texture, structure, water movement or excessively steep slope. The following minimum soil conditions are needed for the establishment and maintenance of a long-lived vegetative cover. If these conditions cannot be met, see the standards and specifications for Topsoiling.

- Soils must include enough fine-grained material to hold at least a moderate amount of available moisture.
- The soil must be free from material that is toxic or otherwise harmful to plant growth.

## **Design Criteria**

See specifications for permanent seeding below.

## **Maintenance**

1. Expect emergence within 4 to 28 days after seeding, with legumes typically following grasses. Check permanent seedlings within 4 to 6 weeks after planting. Look for:
  - Vigorous seedlings;
  - Uniform ground surface coverage with at least 30% growth density;
  - Uniformity with legumes and grasses well intermixed;
  - Green, not yellow, leaves. Perennials should remain green throughout the summer, at least at the plant bases.
2. Permanent seeding shall not be considered established for at least 1 full year from the time of planting. Inspect the seeding for soil erosion or plant loss during this first year. Repair bare and sparse areas. Fill gullies. Re-fertilize, re-seed, and re-mulch if required. Consider no-till planting. A minimum of 70% growth density, based on a visual inspection, must exist for an adequate permanent vegetative planting.
  - If stand is inadequate or plant cover is patchy, identify the cause of failure and take corrective action: choice of plant materials, lime and fertilizer quantities, poor seedbed preparation, or weather. If vegetation fails to grow, have the soil tested to determine whether pH is in the correct range or nutrient deficiency is a problem.
  - Depending on stand conditions, repair with complete seedbed preparation, then over-seed or re-seed.
  - If it is the wrong time of year to plant desired species, over-seed with small grain cover crop to thicken the stand until timing is right to plant perennials or use temporary seeding. See Temporary Seeding standard.

3. Satisfactory establishment may require re-fertilizing the stand in the second growing season.
  - Do not fertilize cool season grasses in late May through July (i.e. Kentucky Bluegrass, Orchardgrass, Perennial Ryegrass, Smooth Brome, Fescues, Timothy, Reed Canarygrass and Garrison Grass)
  - Grass that looks yellow may be nitrogen deficient. In lieu of a soil test, an application of 50 lbs. of N-P-K per acre in early spring will help cool season grasses compete against weeds or grow more successfully.
  - Do not use nitrogen fertilizer if the stand contains more than 20 percent legumes.
4. Long-term maintenance fertilization rates shall be established by following soil test recommendations or by using the rates shown in Table 2.

**Table 7.10.1 Maintenance for Permanent Seedings Fertilization and Mowing**

Mixture	Formula	Lbs./ Acre	Lbs./1,000 sq.ft.	Time	Mowing
Creeping Red Fescue Ryegrass Kentucky Bluegrass	10-10-10	500	12	Fall, yearly or as needed	Not closer than 3"
Tall Fescue	10-10-10	500	12		Not closer than 4"
Turf-type Fescue	10-10-10	500	12		
Crown Vetch Fescue	0-20-20	400	10	Spring, yearly following establishment and every 4-7 years thereafter	Do not mow
Flat Pea Fescue	0-20-20	400	10		Do not mow

Note: Following soil test recommendations is preferred to fertilizer rates shown above.

5. Consider mowing after plants reach a height of 6 to 8 inches. Mow grasses tall, at least 3 inches in height and minimize compaction during the mowing process. Vegetation on structural practices such as embankments and grass-lined channels need to be mowed only to prevent woody plants from invading the stand.

### **Common Problems / Concerns**

- Insufficient topsoil or inadequately tilled, limed, and/or fertilized seedbed - results in poor establishment of vegetation.
- Unsuitable species or seeding mixture - results in competition with the perennials.
- Nurse crop rate too high in the mixture - results in competition with the perennials.
- Seeding done at the wrong time of year - results in poor establishment of vegetation, also plant hardiness is significantly decreased.
- Mulch rate inadequate - results in poor germination and failure.

# Specifications for Permanent Seeding

---

## Site Preparation

1. Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. (Maximizing infiltration will help control both runoff rate and water quality.) Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
2. The site shall be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding.
3. Topsoil shall be applied where needed to establish vegetation.

## Seedbed Preparation

1. Lime—Agricultural ground limestone shall be applied to acid soil as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
2. Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1000 pounds per acre of a 10-10-10 or 12-12-12 analyses.
3. The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

## Seeding Dates and Soil Conditions

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seedbed preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, see the following section on dormant seeding.

## Dormant Seedings

1. Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
2. The following methods may be used for “Dormant Seeding”:

- From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type of seeding.
- From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilize, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
- Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
- Where feasible, except when a cultipacker type seeder is used, the seedbed should be firmed following seeding operations with a cultipacker, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

## Mulching

1. Mulch material shall be applied immediately after seeding. Dormant seeding shall be mulched. 100% of the ground surface shall be covered with an approved material.
2. Materials
  - Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically applied so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
  - Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
  - Other—Other acceptable mulches include rolled erosion control mattings or blankets applied according to manufacturer's recommendations or wood chips applied at 6 tons per acre.

### 3. Straw and Mulch Anchoring Methods

Straw mulch shall be anchored immediately to minimize loss by wind or water.

- **Mechanical**—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but, generally, be left longer than 6 inches.
- **Mulch Netting**—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- **Asphalt Emulsion**—Asphalt shall be applied as recommended by the manufacturer or at the rate of 160 gallons per acre.

- **Synthetic Binders**—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equivalent may be used at rates specified by the manufacturer.
- **Wood Cellulose Fiber**—Wood cellulose fiber shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water with the mixture containing a maximum of 50 pounds cellulose per 100 gallons of water.

#### Irrigation

Permanent seeding shall include irrigation to establish vegetation during dry weather or on adverse site conditions, which require adequate moisture for seed germination and plant growth.

Irrigation rates shall be monitored to prevent erosion and damage to seeded areas from excessive runoff.

**Table 7.10.2 Permanent Seeding**

Seed Mix	Seeding Rate		Notes:
	Lbs./acre	Lbs./1,000 Sq. Feet	
General Use			
Creeping Red Fescue	20-40	1/2-1	For close mowing & for waterways with <2.0 ft/sec velocity
Domestic Ryegrass	10-20	1/4-1/2	
Kentucky Bluegrass	20-40	1/2-1	
Tall Fescue	40-50	1-1 1/4	
Turf-type (dwarf) Fescue	90	2 1/4	
Steep Banks or Cut Slopes			
Tall Fescue	40-50	1-1 1/4	
Crown Vetch	10-20	1/4-1/2	Do not seed later than August
Tall Fescue	20-30	1/2-3/4	
Flat Pea	20-25	1/2-3/4	Do not seed later than August
Tall Fescue	20-30	1/2-3/4	
Road Ditches and Swales			
Tall Fescue	40-50	1-1 1/4	
Turf-type (Dwarf) Fescue	90	2 1/4	
Kentucky Bluegrass	5	0.1	
Lawns			
Kentucky Bluegrass	100-120	2	
Perennial Ryegrass		2	
Kentucky Bluegrass	100-120	2	For shaded areas
Creeping Red Fescue		1-1/2	

Note: Other approved seed species may be substituted.



## 7.9 Mulching

---



### Description

A protective layer of mulch, usually of straw, applied to bare soil is used to abate erosion by shielding it from raindrop impact. Mulch also helps establish vegetation by conserving moisture and creating favorable conditions for seeds to germinate.

### Conditions Where Practice Applies

Mulch should be used liberally throughout construction to limit the areas that are bare and susceptible to erosion. Mulch can be used in conjunction with seeding to establish vegetation or by itself to provide erosion control when the season does not allow grass to grow. Mulch and other vegetative practices must be applied on all disturbed portions of construction-sites that will not be re-disturbed for more than 21 days.

### Design Criteria

See specifications for Mulching.

### Maintenance

Additional mulching is necessary to cover exposed soil conditions when observed during routine maintenance inspections.

### **Common Problems / Concerns**

The application of synthetic binders must be conducted in such a manner as to not be introduced into watercourses.

Weather considerations must be addressed to ensure the application of synthetic binders are not washed away and introduced into watercourses.

The use of a mulch cover is not recommended for areas, which will exhibit higher velocities than 3.5 feet/second. An erosion control matting is recommended for areas which will exhibit higher velocities.

Areas which have been mulched should be inspected and maintained if necessary every 7 days or within 24 hours of a rain event greater than or equal to 0.5 inches to ensure adequate protection.



Specifications  
for  
**Mulching**

---

1. Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.
2. Mulch shall consist of one of the following:
  - Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/ac. or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sq.ft. sections and place two 45-lb. bales of straw in each section.
  - Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
  - Other - Acceptable mulches include mulch mattings and rolled erosion control products applied according to manufacturer's recommendations or wood mulch/chips applied at 10-20 tons/ac.
3. Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch.
  - Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
  - Mulch Nettings - Use according to the manufacturer's recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
  - Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equal may be used at rates recommended by the manufacturer. All applications of Sythetic Binders must be conducted in such a manner where there is no contact with waters of the state.
  - Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

## 7.12 Temporary Rolled Erosion Control Products (Erosion Control Matting)

---



### Description

A Temporary Rolled Erosion Control Product (TRECP) is a degradable manufactured material used to stabilize easily eroded areas while vegetation becomes established. Temporary Rolled Erosion Control Products are degradable products composed of biologically, photochemically or otherwise degradable materials. Temporary RECPs consist of erosion control netting, open weave textiles, and erosion control blankets and mattings. These products reduce soil erosion and assist vegetative growth by providing temporary cover from the erosive action of rainfall and runoff while providing soil-seed contact.

### Condition where practice applies:

Temporary rolled erosion control products (matting or blankets) should be used on:

- Areas where erosion potential is high or a failure to establish vegetation is costly such as slopes greater than 3:1, constructed channels or stream banks
- Areas where establishing vegetation is difficult such as southern exposures or areas prone to drying
- Areas of concentrated flow, especially where flows exceeds 3.5 feet per second (e.g near culverts)
- Problem areas with highly erosive soils
- Areas where mulch is difficult to hold in place due to wind or water

## Planning Considerations:

Temporary RECPs can be applied to critical or problem areas to enhance the erosion control as vegetation is being established. Although these materials add cost, they insure more immediate stability following construction reducing grading repairs and a faster greening of projects. Permanent non-degradable rolled erosion control products (turf reinforcement mats) are beyond the scope of this practice, but may be useful where design discharges or runoff exert velocities and shear stresses exceeding the ability of mature vegetation to withstand.

Temporary RECPs provide stable and rapid greening for areas conveying stormwater runoff. Care must be taken to choose the type of RECP, which is most appropriate for the specific needs of a project. Designers must take into account the vegetated and unvegetated velocities and sheer stresses in channel applications. With the abundance of soil stabilization products available, it is impossible to cover all the advantages, disadvantages and specifications of all manufactured RECPs. Therefore, as with many erosion control-type products, there is no substitute for a thorough understanding of the manufacturer's instructions and recommendations and a site visit by a product's designer or plan reviewer to verify appropriateness.

Temporary RECPs should be used to help establish vegetation on previously disturbed slopes - especially slopes of 3:1 or greater. The materials that compose the RECP will deteriorate over time. If used in permanent conveyance channels, designers should consider the system's resistance to erosion as it relates to the type of vegetation planted and the existing soil characteristics. As much as possible during establishment of vegetation, soil stabilization blankets should not be subjected to concentrated flows moving at greater than 3.5 feet/second.

## Design Criteria

Choose a product that will provide the appropriate time period of protection. Allowable velocity range during vegetation establishment should be 3.5 feet per second or less.

Erosion Control Blankets - shall consist of photodegradable plastic netting or biodegradable natural fiber netting that covers and is entwined in a natural organic or man-made mulching material. The mulching material shall consist of wood fibers, wood excelsior, straw, coconut fiber, or man-made fibers, or a combination of the same. The blanket shall be of consistent thickness with the mulching material/fibers evenly distributed over its entire length. Mulching material/fibers must interlock or entwine to form a dense layer, which not only resists raindrop impact, but also will allow vegetation to penetrate the blanket. The mulching material degradation rate must be consistent with the designers desired slope protection time. Temporary Rolled Erosion Control Products (or erosion control blankets) shall meet the specifications that follow.

Table 7.12.1

Material	Maximum Length Of Protection
Straw	10-12 Months
Straw/Coconut	24 Months
Coconut	36 Months
Excelsior	36 Months

Erosion Control Netting - shall consist of a woven natural fiber or extruded geosynthetic mesh used as a component in the manufacture of RECPs, or separately as a temporary RECP to anchor loose fiber mulches.

Open Weave Textile - shall consist of processed natural or polymer yarns woven into a matrix, used to provide erosion control and facilitate vegetation establishment.

**Maintenance:**

All RECPs should be inspected regularly after installation, especially after storms to check for erosion or undermining of the product. Make needed repairs immediately, addressing rills or gullies that have developed prior to replacing the RECP. In the case erosion repairs, assure that subsequent runoff across the area is dispersed or adequately spread.

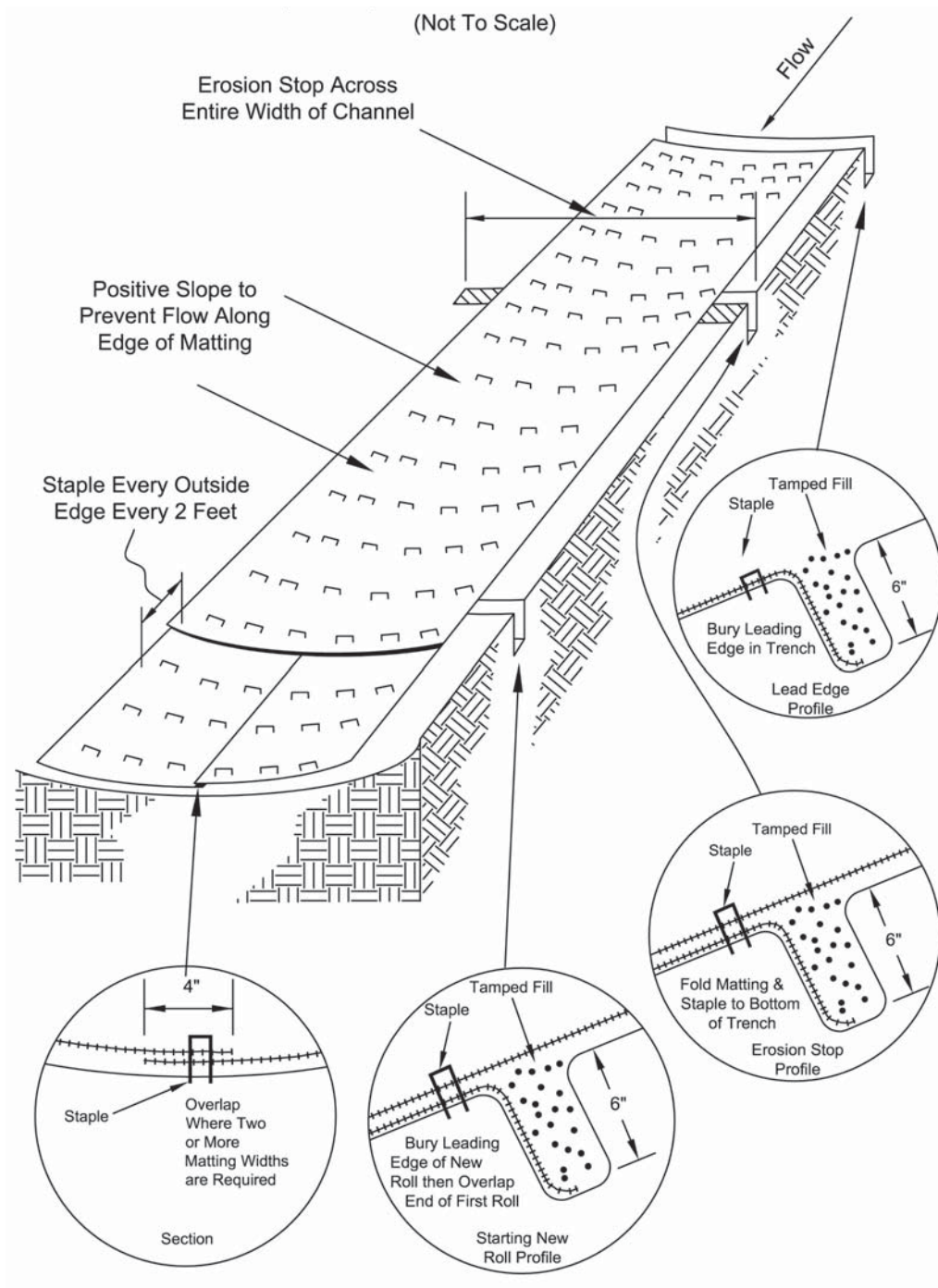
**Common Problems/Concerns:**

- Manufacturer's selection and installation recommendations not followed. Results in failure of the RECP.
- Poor contact between soil and the RECP. Results in erosion below the RECP and lower seed germination rates, causing failure.
- Proper stapling guidelines not followed. Results in movement or displacement of RECP.
- Erosion check slots are not used. Results in erosion under the RECP, causing failure.
- Unstable slopes that result in RECP or slope failure. Determine cause of slope failure, correct, and reinstall RECP
- In channels, the width of RECP used is not sufficient, this causes water to flow along the sides of RECP causing erosion. Install RECP up side slopes of ditch line as well as the bottom.

Specifications  
for

# Temporary Rolled Erosion Control Product

---





Specifications  
for

## Temporary Rolled Erosion Control Product

---

1. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2"-3" of topsoil above final grade. Incorporate amendments such as lime and fertilizer into soil. Remove all rocks, clods, vegetation or other debris so that installed RECP will have direct contact with the soil surface.
2. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

### Slope Installation

3. Excavate top and bottom trenches (12"x6"). Intermittent erosion check slots (6"x6") may be required based on slope length. Excavate top anchor trench 2' x 3' over crest of the slope.
4. If intermittent erosion check slots are required, install RECP in 6"x6" slot at a maximum of 30' centers or the mid point of the slope. RECP should be stapled into trench on 12" centers.
5. Install RECP in top anchor trench, anchor on 12" spacings, backfill and compact soil.
6. Unroll RECP down slope with adjacent rolls overlapped a minimum of 3". Anchor the seam every 18". Lay the RECP loose to maintain direct soil contact, do not pull taught.
7. Overlap roll ends a minimum of 12" with upslope RECP on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12".
8. Install RECP in bottom anchor trench (12"x6"), anchor every 12". Place all other staples throughout slope at 1 to 2.5 per square yard dependant on slope. Refer to manufacturer's anchor guide.

### Channel Installation

9. Excavate initial anchor trench (12"x6") across the lower end of the project area.
10. Excavate intermittent check slots (6"x6") across the channel at 30' intervals along the channel.
11. Excavate longitudinal channel anchor slots (4"x4") along both sides of the channel to bury the edges. Whenever possible extend the RECP 2'-3' above the crest of channel side slopes.
12. Install RECP in initial anchor trench (downstream) anchor every 12", backfill and compact soil.
13. Roll out RECP beginning in the center of the channel toward the intermittent check slot. Do not pull taught. Unroll adjacent rolls upstream with a 3" minimum overlap (anchor every 18") and up each channel side slope.
14. At top of channel side slopes install RECP in the longitudinal anchor slots, anchor every 18".
15. Install RECP in intermittent check slots. Lay into trench and secure with anchors every 12", backfill with soil and compact.
16. Overlap roll ends a minimum of 12" with upstream RECP on top for a shingling effect. Begin all new rolls in an intermittent check slot, double anchored every 12".
17. Install upstream end in a terminal anchor trench (12"x6"); anchor every 12", backfill and compact.
18. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Longer anchors may be required in loose sandy or gravelly soils.

## 6.3 Silt Fence

---



### Description

Silt fence is a sediment-trapping practice utilizing a geotextile fence, topography and sometimes vegetation to cause sediment deposition. Silt fence reduces runoff's ability to transport sediment by ponding runoff and dissipating small rills of concentrated flow into uniform sheet flow. Silt fence is used to prevent sediment-laden sheet runoff from entering into downstream creeks and sewer systems.

### Conditions Where Practice applies

Silt fence is used where runoff occurs as sheet flow or where flow through small rills can be converted to sheet flow. Major factors in its use are slope, slope length, and the amount of drainage area from which the fence will capture runoff. Silt fence cannot effectively treat flows in gullies, ditches or channels. For concentrated flow conditions see specifications for temporary diversions, sediment traps and sediment basins.

### Planning Considerations

*Alternatives: Silt Fence vs. Temporary Diversions and Settling Ponds.* While silt fence requires less space and disturbs less area than other control measures there are significant disadvantages to its use. Silt fence is not as effective controlling sediment as routing runoff through a system of diversions and settling ponds. Settling ponds and earth diversions are more durable, easier to construct correctly and significantly more effective at removing sediments from runoff. Additionally earth diversions and settling ponds are less apt to fail during construction and typically require less repair and maintenance.

Proper installation is critical. Experience from ODNR and other field testing has shown that nearly 75 percent of silt fence does not function properly due to poor installation. Proper installation consists of it being installed: (1) on the contour; (2) with sufficient geotextile material buried; (3) with the fence pulled taut and supported on the downstream side by strong posts: (4) and with the fence backfilled and compacted.

Two general methods are used to install silt fence: (1) utilizing traditional method of digging the trench, installation of the fence materials, then backfilling and compaction; or (2) a method using an implement to static slice or narrow plow while installing the geotextile in the slot opening, followed by compaction and installation of posts. The latter methods generally installs silt fence more effectively and efficiently.

Silt fence is most applicable for relatively small areas with flat topography. Silt fence should be used below areas where erosion will occur in the form of sheet and rill erosion. For moderately steep areas, the area draining to the silt fence should be no larger than one quarter acre per 100 feet of fence length, the slope length no longer than 100 feet, and the maximum drainage gradient no steeper than 50 percent (2:1). This practice should be sited so that the entire fence ponds runoff and facilitates settling of suspended solids.

## Design Criteria

Proper installation of silt fence requires utilizing the site topography. This is critical because the sediment removal process relies on ponding runoff behind the fence. As a ponding occurs behind the fence, coarser materials are allowed to settle out. Leaving a long, flat slope behind the silt fence maximizes areas for ponding (sediment deposition), and for water to disperse and flow over a much larger surface area of the silt fence. For silt fence to work effectively, runoff must be allowed to maintain sheet flow, to pond and to be released slowly. However, if silt fence is used without regard to a site's topography, it will typically concentrate runoff, increasing the likelihood of blocking and overtopping of the fence, thus reducing or eliminating its effectiveness.

**Level Contour** – For silt fence to promote deposition, it must be placed on the level contour of the land, so that flows are dissipated into uniform sheet flow that has less energy for transporting sediment. Silt fence should never concentrate runoff, which will result if it is placed up and down slopes rather than on the level contour.

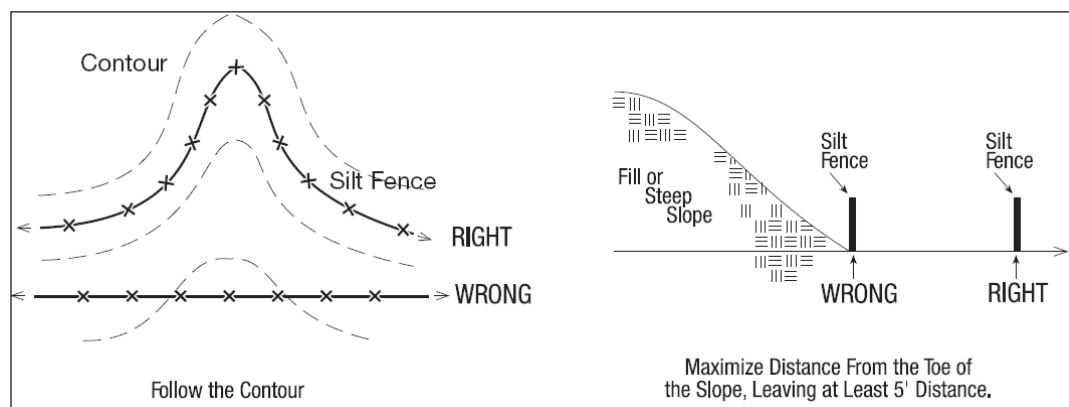


Figure 6.3.1 Silt fence layout



**Flat Slopes** – Slope has the greatest influence on runoff’s ability to transport sediment, therefore silt fence should be placed several feet away from the toe of a slope if at all possible, to encourage deposition. Silt fence generally should be placed on the flattest area available to increase the shallow ponding of runoff and maximize space available for deposited sediment.

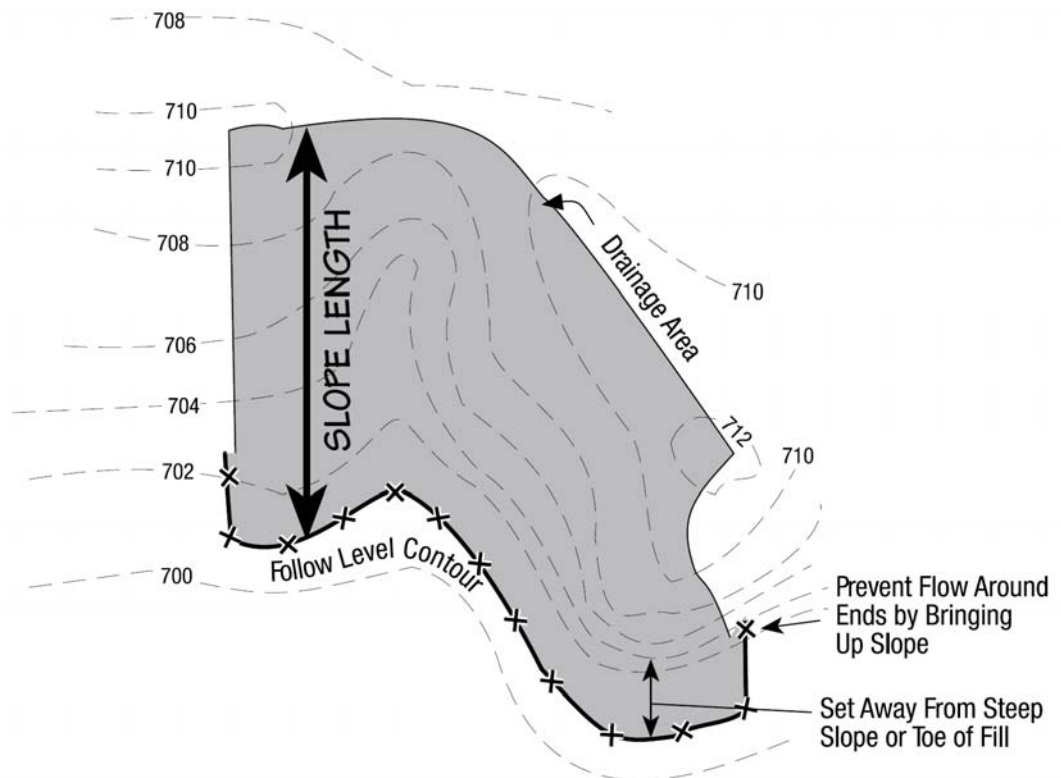
**Flow Around Ends** – To prevent water ponded by the silt fence from flowing around the ends, each end must be constructed upslope so that the ends are at a higher elevation.

**Vegetation** – Dense vegetation also has the effect of dissipating flow energies and causing sediment deposition. Sediment-trapping efficiency will be enhanced where a dense stand of vegetation occurs for several feet both behind and in front of a silt fence.

**Table 6.3.1 Maximum area contributing area using slope length**

Maximum Slope Length Above Silt Fence		
Slope		Slope Length (ft.)
0% - 2%	Flatter than 50:1	250
2% - 10%	50:1 - 10:1	125
10% - 20%	10:1 - 5:1	100
20% - 33%	5:1 - 3:1	75
33% - 50%	3:1 - 2:1	50
> 50%	> 2:1	25

Note: For larger drainage areas, see standards for temporary diversions, sediment traps and sediment basins.



**Figure 6.3.2 Silt fence and allowable drainage area**

**Dispersing Flow** – Proper applications of silt fence allow all the intercepted runoff to pass as diffused flow through the geotextile. Runoff should never overtop silt fence, flow around the ends, or in any other way flow as concentrated flow from the practice. If any of these failures occurs, an alternative silt fence layout, or other practices are needed.

In cases where additional support of the fabric is needed, either wire or geogrid fencing may be used as a backing on the fabric. In these instances, the reinforcing material should be attached/erected first, then the fabric installed.

### Materials

Fence posts shall be a minimum length of 32 inches long, composed of nominal dimensioned 2-by-2-inch hardwood of sound quality. They shall be free of knots, splits and other visible imperfections which would weaken the posts. Steel posts may be utilized in place of wood provide the geotextile can be adequately secured to the post.

Silt fence geotextile must meet the minimum criteria shown in the table below.

Table 6.3.2

Minimum criteria for Silt Fence Fabric (ODOT, 2002)		
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	$1 \times 10^{-2} \text{ sec.}^{-1}$	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

### Maintenance

Silt Fence requires regular inspection and maintenance to insure its effectiveness. Silt fences must be inspected after each rainfall and at least daily during prolonged rainfall. Silt fence found damaged or improperly installed shall be replaced or repaired immediately.

Sediment deposits shall be routinely removed when they reach approximately one-half the height of the silt fence.

### Common Problems/Concerns

The predominant problems with silt fence regard inadequate installation or location that allows runoff to concentrate, overtop the fence, flow under the fabric or around the fence ends. If this occurs one of the following shall be performed, as appropriate:

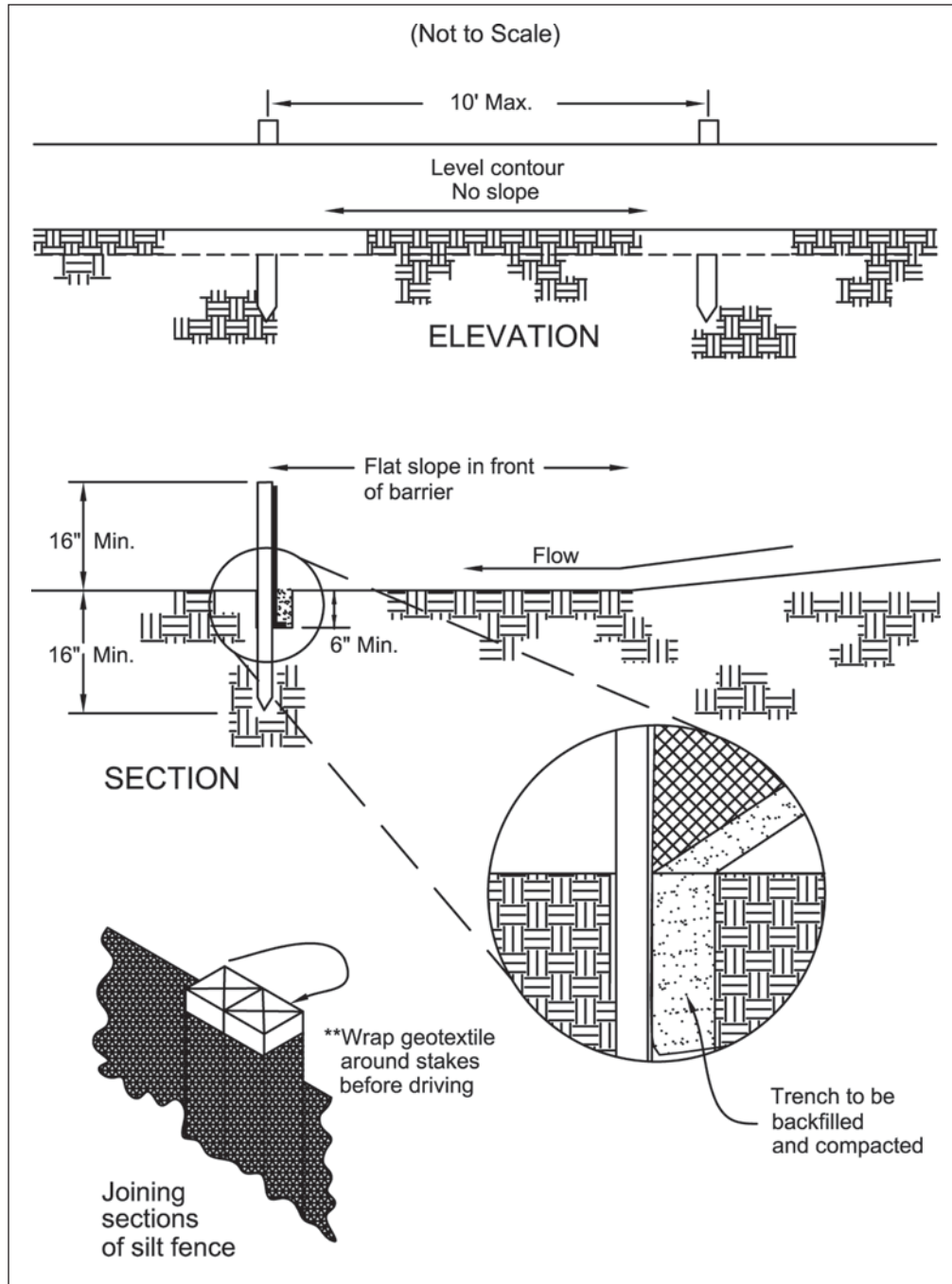
- The location and layout of the silt fence shall be changed to conform to the level contour
- The silt fence shall be reinstalled with proper burial, backfill and compaction and support
- Accumulated sediment shall be removed
- Alternative practices shall be installed.

### References

Construction and Material Specifications, January 1, 2002. State of Ohio Department of Transportation, P.O. Box 899, Columbus, Ohio 43216-0899, <http://www.dot.state.oh.us/construction/OCA/Specs/2002CMS/Specbook2002/Specbook2002.htm>

Specifications  
for  
**Silt Fence**

---



## Specifications for **Silt Fence**

---

1. Silt fence shall be constructed before upslope land disturbance begins.
2. All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
3. Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
4. Silt fence shall be placed on the flattest area available.
5. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
6. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.
7. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
8. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.
9. Seams between sections of silt fence shall be spliced together only at a support post with a minimum 6-in. overlap prior to driving into the ground, (see details).
10. Maintenance—Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flows under the fabric or around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

Sediment deposits shall be routinely removed when the deposit reaches approximately one-half of the height of the silt fence.

Silt fences shall be inspected after each rainfall and at least daily during a prolonged rainfall. The location of existing silt fence shall be reviewed daily to ensure its proper location and effectiveness. If damaged, the silt fence shall be repaired immediately.

### Criteria for silt fence materials

1. Fence post – The length shall be a minimum of 32 inches. Wood posts will be 2-by-2-in. nominal dimensioned hardwood of sound quality. They shall be free of knots, splits and other visible imperfections, that will weaken the posts. The maximum spacing between posts shall be 10 ft. Posts shall be driven a minimum 16 inches into the ground, where possible. If not possible, the posts shall be adequately secured to prevent overturning of the fence due to sediment/water loading.
2. Silt fence fabric – See chart below.

**Table 6.3.2** Minimum criteria for Silt Fence Fabric (ODOT, 2002)

FABRIC PROPERTIES	VALUES	TEST METHOD
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	1X10 <sup>-2</sup> sec.-1	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

## 6.5 Filter Berm

---



### Description

Filter berms are sediment trapping practices that utilize a compost/mulch material. They are typically installed with pneumatic equipment. Filter berms reduce sediment from runoff by slowing and filtering runoff, and dissipating flow.

### Conditions Where Practice Applies

Filter berms are appropriate on nearly level ground or slopes up to 5:1, where runoff occurs as sheet flow. Filter berms cannot effectively treat flows in gullies, ditches or channels. For more severe conditions see specifications for temporary diversions, sediment traps, and sediment basins.

### Design Criteria

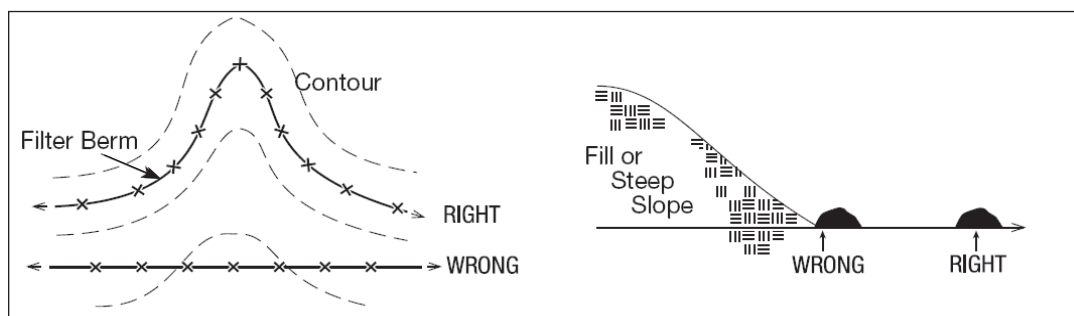
Compost filter berms used as sediment control practice require an adequately constructed berm constructed on the contour, that is, on a level line across the site's topography. While silt fences rely primarily on settling, compost filter berms filter runoff as it passes through the practice. To accomplish this, runoff must be intercepted on the contour to insure that sheet flow is not concentrated into rills or channels.

**Materials** – Compost/mulch used for filter berms shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen and insect larvae kill. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth.



Materials should meet the following requirements: pH between 5.0-8.0; 100% passing a 3" sieve, 90% to 100% passing a 1" sieve, 70% to 100% passing a 3/4", no more than 50% shall pass a 1/4" sieve; moisture content is less than 60%; material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.

**Level Contour** – Filter berms must be placed on the level contour of the land so that flows are dissipated into uniform sheet flow that has less energy for transporting sediment. Filter berms should never concentrate runoff, which will occur if it is placed up and down slopes rather than on the level contour.



**Flat Slopes** – If at all possible, filter berms should be placed away from the toe of a slope and on the flattest area available. This allows the sheet flow energy to dissipate and allows for a greater storage area for sediments.

**Steeper Slopes** – For placement on steeper slopes follow the spacing recommendations on the following table.

**Drainage Area** – Follow recommendations on following table

Table 6.5.1 Filter Berm Spacing for General Applications *Install Parallel Along Contours As Follows		
Ratio (H:V)	% Slope	Recommended Spacing
< 20:1	5% or less	300 foot with a maximum of 1 acre per 500 lineal feet
20:1 - 10:1	5 to 10%	75 foot intervals
9:1 - 5:1	10 to 20%	50 foot intervals

**Flow Around Ends** – To prevent water from flowing around the ends of the Filter berm each end must be constructed up-slope so that the ends are at a higher elevation.

**Vegetation** – Filter berm may be vegetated for a more permanent placement such as wetlands and natural areas.

## References

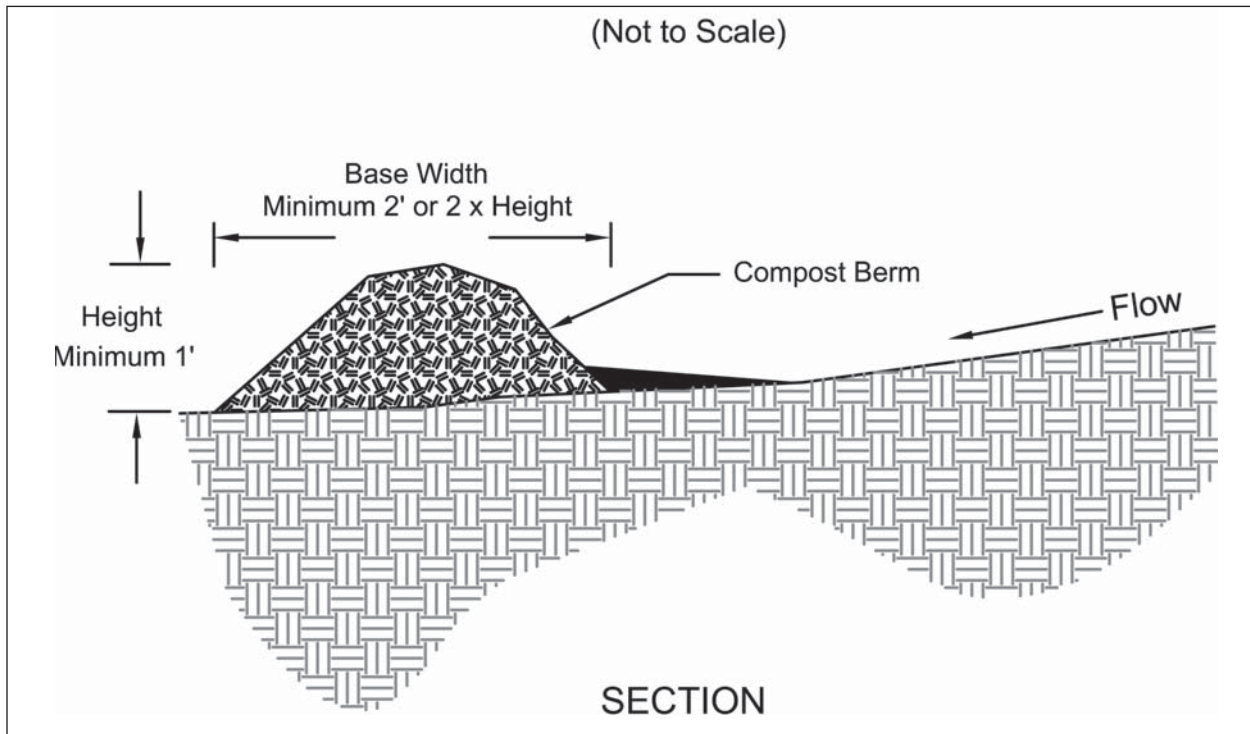
Standard Specification for Compost for Erosion/Sediment Control (Filter Berms)  
<http://www.iaasla.org/NEWS/FILES/AASHTO-Filterberm6.doc>

[www.dot.state.pa.us/Pennndot/Bureaus/ChiefEng.nsf/spec%20filter%20berms?OpenPage-28k](http://www.dot.state.pa.us/Pennndot/Bureaus/ChiefEng.nsf/spec%20filter%20berms?OpenPage-28k)

[http://tammi.tamu.edu/erosion\\_control\\_fact\\_sheet.pdf](http://tammi.tamu.edu/erosion_control_fact_sheet.pdf) Using compost for erosion controls and revegetation, S. Mukhtar Texas Cooperative Extension, The Texas A & M University System. Prepared in cooperation with the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency.

<http://www.ces.uga.edu/pubcd/B1200.htm>

## Specifications for **Filter Berm**



1. **Materials** – Compost used for filter berms shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of particles ranging from 1/4" to 3".
2. **Installation** – Filter berms will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional berms shall be provided at the top and as needed mid-slope.  
  
Filter berms are not to be used in concentrated flow situations or in runoff channels.
3. **Maintenance** – Inspect filter berms after each significant rain, maintaining the berms in a functional condition at all times.  
  
Remove sediments collected at the base of the filter berms when they reach 1/3 of the exposed height of the practice.  
  
Where the filter berm deteriorates or fails it will be, it will be repaired or replaced with a more effective alternative.
4. **Removal** – Filter berms no longer needed will be dispersed on site in a manner that will facilitate seeding.

## 6.6 Filter Sock

---



### Description

Filter socks are sediment-trapping devices using compost inserted into a flexible, permeable tube with a pneumatic blower device or equivalent. Filter socks trap sediment by filtering water passing through the berm and allowing water to pond, creating a settling of solids.

### Conditions where practice applies

Filter socks are appropriate for limited drainage areas, requiring sediment control where runoff is in the form of sheet flow or in areas that silt fence is normally considered acceptable. The use of filter socks is applicable to slopes up to 2:1 (H:V), around inlets, and in other disturbed areas of construction sites requiring sediment control. Filter socks also may be useful in areas, where migration of aquatic life such as turtles, salamanders and other aquatic life would be impeded by the use of silt fence.

### Planning Considerations

Filter socks are sediment barriers, capturing sediment by ponding and filtering water through the device during rain events. They may be a preferred alternative where equipment may drive near or over sediment barriers, as they are not as prone to complete failure as silt fence if this occurs during construction. Driving over filter socks is not recommended; but if it should occur, the filter sock should be inspected immediately, repaired and moved back into place as soon as possible.



## Design Criteria

Typically, filter socks can handle the same water flow or slightly more than silt fence. For most applications, standard silt fence is replaced with 12" diameter filter socks. However, proper installation is especially important for them to work effectively.

**Materials** – Compost/mulch used for filter socks shall be weed free and derived from a well-decomposed source of organic matter. The compost shall be produced using an aerobic composting process meeting CFR 503 regulations, including time and temperature data indicating effective weed seed, pathogen and insect larvae kill. The compost shall be free of any refuse, contaminants or other materials toxic to plant growth. Non-composted products are not acceptable.

Materials should meet the following requirements: pH between 5.0-8.0; 100% passing a 2" sieve and a minimum of 70% greater than the 3/8" sieve; moisture content is less than 60%; material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.

**Level Contour** – Place filter socks on the level contour of the land so that flows are dissipated into uniform sheet flow. Flow coming to filter socks must not be concentrated and the filter sock should lie perpendicular to flows.

**Flat Slopes** – When possible, place filter socks at a 5' or greater distance away from the toe of the slopes in order for the water coming from the slopes to maximize space available for sediment deposit (see the illustration). When this is not possible due to construction limitations, additional filter socks may be required upslope of the initial filter sock (see the chart below for appropriate slope lengths and spacing).

**Flow Around Ends** – In order to prevent water flowing around the ends of filter socks, the ends of the filter socks must be constructed pointing upslope so the ends are at a higher elevation.

**Vegetation** – For permanent areas, seeding filter socks is recommended to establish vegetation directly in the sock and immediately in front and back of the sock at a distance of 5 feet. Vegetating on and around the filter socks will assist in slowing down water for filtration creating a more effective longer-term sediment control.

**Drainage Area:** Generally filter socks are limited to ¼ to ½ acre drainage area per 100 foot of the sediment barrier. Specific guidance is given in the chart below.

**Table 6.6.1 Maximum Slope Length Above Filter Sock and Recommended Diameter**

Slope	Ratio (H:V)	8"	12"	18"	24"
0% - 2%	10% - 20%	125	250	300	350
10% - 20%	50:1 - 10:1	100	125	200	250
2% - 10%	10:1 - 5:1	75	100	150	200
20% - 33%	5:1 - 2:1		50	75	100
>50%	>2:1		25	50	75

Note: For larger drainage areas, see standards for temporary diversions, sediment traps and sediment basins.

*Dispersing flow* – Sheet flow and runoff should not exceed berm height or capacity in most storm events. If overflow of the berm is a possibility, a larger filter sock should be installed or an alternative sediment control should be used.

*Maintenance* – Filter socks should be regularly inspected to make sure they hold their shape, are ponding, and allowing adequate flow through. If ponding becomes excessive, filter socks should be replaced. Used filter socks may be cut and the compost dispersed and seeded to prevent captured sediment from being resuspended.

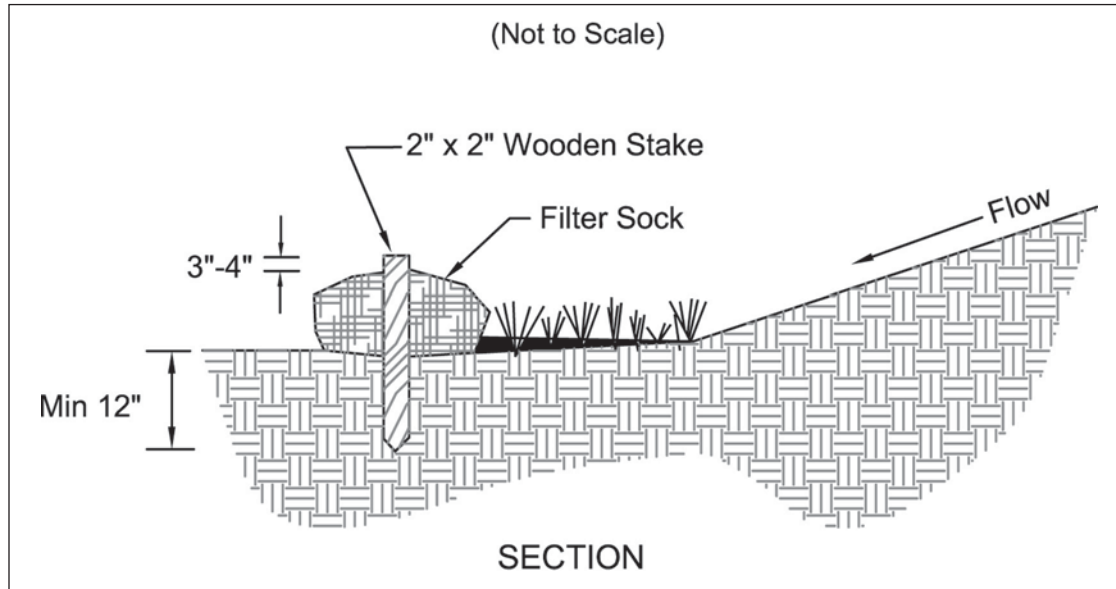
*Removal* – When construction is completed on site, the filter socks may be cut and dispersed with a loader, rake, bulldozer or other device to be incorporated into the soil or left on top of the soil for final seeding. The mesh netting material will be disposed of in normal trash container or removed by the contractor.

## References

Standard Specification for Compost for Erosion/Sediment Control (Filter Berms) AASHTO Designation: MP-9 <http://www.iaasla.org/NEWS/FILES/AASHTO-Filterberm6.doc>

Specifications  
for  
**Filter Sock**

---



1. Materials – Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of particles ranging from 3/8" to 2".
2. Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

**INSTALLATION:**

3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed mid-slope.
4. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

5. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

**MAINTENANCE:**

6. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.
7. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.
8. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.
9. Removal – Filter socks will be dispersed on site when no longer required in such a way as to facilitate and not obstruct seedings.

## 7.5 Dust Control

---



### Description

Dust control involves preventing or reducing dust from exposed soils or other sources during land disturbing, demolition and construction activities to reduce the presence of airborne substances which may present health hazards, traffic safety problems or harm animal or plant life.

### Conditions Where Practice Applies

In areas subject to surface and air movement of dust where on-site and off-site damage is likely to occur if preventive measures are not taken.

### Planning Considerations

Construction activities inevitably result in the exposure and disturbance of soil. Fugitive dust results from both construction activities and as a result of wind erosion over the exposed earth surfaces. Large quantities of dust are typically generated in heavy construction activities, such as road construction and subdivision, commercial or industrial development, which involve disturbing significant areas of the soil surface. Research of construction sites has established an average dust emission rate of 1.2 tons/acre/month for active construction. Earth-moving activities comprise the major source of construction dust emissions, but traffic and general disturbance of the soil also generate significant dust emissions.

Planning for dust control involves limiting the amount of soil disturbance at any one time as a key objective. Therefore, phased clearing and grading operations (minimize disturbance-phasing) and the utilization of other stabilization practices can significantly reduce dust emissions. Undisturbed vegetative buffers (minimum 50-foot widths) left between graded areas and protected areas can also be very helpful in dust control by providing windbreaks and non-erosive areas.

## Design Criteria

A number of measures can be utilized to limit dust either during or between construction stages or once construction is complete. Generally the same methods that are used to limit erosion by limiting exposure of soils to rainfall can be used to limit dust including: stabilizing exposed soils with mulch, vegetation or permanent cover. Additional methods particular to dust control include managing vehicles and construction traffic, road treatment and treatment of exposed soil with chemical stabilizers.

**Vegetative Cover** – The most effective way to prevent dust from exposed soil is to provide a dense cover of vegetation. In areas subject to little or no construction traffic, vegetative stabilization reduces dust drastically. Timely temporary and permanent seedings must be utilized to accomplish this. See TEMPORARY SEEDING & PERMANENT SEEDING.

**Mulch** - When properly applied, mulch offers a fast, effective means of controlling dust. Mulching is not recommended for areas within heavy traffic pathways. Binders or tackifiers should be used to tack organic mulches. See MULCHING.

**Rough Graded Soils** – Leaving the soil in a temporary state of rough grade, where clods rather than flattened soils predominate the surface can reduce the amount of dust generated from areas during periods of higher winds. This must be balanced by the need to reach a stage where the soil can be stabilized and may be only be necessary when high winds are predicted.

**Watering** - This is the most commonly used dust control practice. The site is sprinkled with water until the surface is wet before and during grading and is repeated as needed. It offers fast protection for haul roads and other heavy traffic routes. Watering should be done at a rate that prevents dust but does not cause soil erosion. Wetting agents are also available to increase the effectiveness of watering and must follow manufacturers instructions.

**Chemical Stabilizers/Wetting Agents** – Many products of this type are available and are usually most effective on typical mineral soils but may not be on predominantly organic soils such as muck. Users are advised to pay attention to the limitations and instructions regarding each product. The following table lists various adhesives and provides corresponding information on mixing and application:

Table 7.5.1 Adhesives for Dust Control

Adhesive	Water Dilution (Adhesive: Water)	Nozzle Type	Application Rate Gallon/Acre
Latex Emulsion	12.5:1	Fine	235
Resin in Water	4:1	Fine	300
Acrylic Emulsion (No-traffic)	7:1	Coarse	450
Acrylic Emulsion (Traffic)	3.5:1	Coarse	350

**Stone** - Stone can be used to stabilize roads or other areas during construction using crushed stone or coarse gravel. Research has shown the addition of bentonite to limestone roads (not igneous gravel) has shown benefits in reducing dust.

***Windbreaks and Barriers*** – Where dust is a known problem, existing windbreak vegetation should be preserved. Maintaining existing rows of trees or constructing a wind fence, sediment fence, or similar barrier can help to control air currents and blowing soil. Place barriers perpendicular to prevailing air currents at intervals of about 15 times the barrier height.

***Calcium Chloride*** - This chemical may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage. Liquid application of a 35% calcium chloride solution is common. Note: application rates should be strictly in accordance with suppliers' specified rates.

***Street Cleaning*** - Paved areas that have accumulated sediment from construction sites should be cleaned daily, or as needed, utilizing a street sweeper or bucket -type loader or scraper.

### **Operation and Maintenance**

Most dust control measures, such as applications of water or road treatments will require monitoring and repeat applications as needed to accomplish good control.

### **Common Problems / Concerns**

Vegetation is removed from large areas of the construction site and left barren for long periods of time.

Continuous, scheduled monitoring of the construction site conditions is not made.

# Specifications for **Dust Control**

---

1. Vegetative Cover and/mulch – Apply temporary or permanent seeding and mulch to areas that will remain idle for over 21 days. Saving existing trees and large shrubs will also reduce soil and air movement across disturbed areas. See Temporary Seeding; Permanent Seeding; Mulching Practices; and Tree and Natural Area Protection practices.
2. Watering – Spray site with water until the surface is wet before and during grading and repeat as needed, especially on haul roads and other heavy traffic routes. Watering shall be done at a rate that prevents dust but does not cause soil erosion. Wetting agents shall be utilized according to manufacturers instructions.
3. Spray-On Adhesives – Apply adhesive according to the following table or manufacturers' instructions.
4. Stone – Graded roadways and other suitable areas will be stabilized using crushed stone or coarse gravel as soon as practicable after reaching an interim or final grade. Crushed stone or coarse gravel can be used as a permanent cover to provide control of soil emissions.
5. Barriers – Existing windbreak vegetation shall be marked and preserved. Snow fencing or other suitable barrier may be placed perpendicular to prevailing air currents at intervals of about 15 times the barrier height to control air currents and blowing soil.
6. Calcium Chloride - This chemical may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage. Application rates should be strictly in accordance with suppliers' specified rates.

**Table 7.5.1 Adhesives for Dust Control**

Adhesive	Water Dilution (Adhesive: Water)	Nozzle Type	Application Rate Gal./Ac.
Latex Emulsion	12.5:1	Fine	235
Resin in Water Acrylic Emulsion (No-traffic)	4:1	Fine	300
Acrylic Emulsion (No-traffic)	7:1	Coarse	450
Acrylic Emulsion (Traffic)	3.5:1	Coarse	350

7. Operation and Maintenance - When Temporary Dust Control measures are used; repetitive treatment should be applied as needed to accomplish control.

Street Cleaning - Paved areas that have accumulated sediment from construction should be cleaned daily, or as needed, utilizing a street sweeper or bucket -type endloader or scraper.



## 7.7 Topsoiling

---



### Description

Topsoiling occurs during grading operations as the upper most organic layer of soil is stripped and stockpiled from areas being graded and subsequently replaced on the newly graded areas. Topsoil provides a more suitable growing medium than subsoil or on areas with poor moisture, low nutrient levels, undesirable pH, or in the presence of other materials that would inhibit establishment of vegetation. Replacing topsoil helps plant growth by improving the water holding capacity and nutrient content and consistency of the soils.

### Conditions Where Practice Applies

This practice applies anywhere a good stand of vegetation is desired, whether turf, ornamental plants, and/ or vegetative cover especially in areas where high-quality turf is desirable to withstand intense use or meet aesthetic requirements, although it may not be appropriate for areas with slopes greater than 2:1.

This practice is especially applicable to areas where:

- existing soil structure, pH, or nutrient balance cannot be easily improved with soil amendments to be a suitable growth medium.
- existing soils are too shallow to provide adequate rooting depth or;
- the existing soil contains substances toxic to the desired vegetation.



## **Planning Considerations**

Topsoil is the upper layer of natural soil (A horizon), which is typically darker and more fertile than the subsoil due to increased amounts of organic material. This layer is typically very evident as a person excavates through soil horizons. Project sites will have varying degrees of topsoil resources prior to construction, with some historically eroded sites having limited topsoil resources. These sites may have less justification for moving, stockpiling and re-spreading the top horizon of soil. If in question, assistance by a trained soils professional should be sought to determine the extent of topsoil resources on the project site.

Although replacing topsoil is critical to establishing good vegetation and limiting runoff from development sites, it comes with additional costs. Stripping, stockpiling and reapplying topsoil or importing topsoil will require greater work in grading operations and therefore will increase costs. Topsoiling will also add time to grading operations and may increase the exposure time of denuded areas. Additionally, depending on the original vegetative cover, topsoil often contains weed seeds that may compete with desirable species.

In site planning, the option of topsoiling should be compared with that of preparing a seedbed in subsoil. The clay content of subsoil does provide high moisture availability and deters leaching of nutrients. When adjusted for optimal pH and nutrient availability, subsoil may provide an adequate growth medium that is generally free of weeds. Topsoiling may not be required to establish less demanding, lower maintenance plants, although runoff will be increased due to the lack of topsoil from the site.

If topsoiling is planned, locations for topsoil stockpiles must be determined where drainage and site work will not be encumbered. Construction scheduling must be adjusted to allow sufficient time for moving, stockpiling and spreading topsoil between grading and re-vegetation operations.

## **Design Criteria**

These are provided in the specifications that follow.

## **Maintenance**

Topsoil stockpiles should be stabilized with temporary vegetation and provided sufficient sediment controls. Sediment Controls will need regular inspection and appropriate repairs as needed.

## **Common Problems / Concerns**

- Care must be taken not to apply topsoil to subsoil if the two soils have contrasting textures. Clayey topsoil over sandy subsoil is a particularly poor combination, as water may creep along the junction between the soil layers, leading to sloughing of the topsoil. Sandy topsoil over clay subsoil is equally likely to fail.
- If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. Topsoiling of steep slopes is highly discouraged, unless good bonding of soils can be achieved.
- Topsoil should not be applied in excessively wet/moist conditions.

Specifications  
for  
**Topsoiling**

---

**Salvaging and Stockpiling**

1. Determine the depth and suitability of topsoil at the site. (For help, contact your local SWCD office to obtain a county soil survey report).
2. Prior to stripping topsoil, install appropriate downslope erosion and sedimentation controls such as sediment traps and basins.
3. Remove the soil material no deeper than what the county soil survey describes as “surface soil” (ie. A or Ap horizon).
4. Construct stockpiles in accessible locations that do not interfere with natural drainage. Install appropriate sediment controls to trap sediment such as silt fence immediately adjacent to the stockpile or sediment traps or basins downstream of the stockpile. Stockpile side slopes shall not exceed a ratio of 2:1.
5. If topsoil is stored for more than 21 days, it should be temporary seeded, or covered with a tarp.

**Spreading the Topsoil**

1. Prior to applying topsoil, the topsoil should be pulverized.
2. To ensure bonding, grade the subsoil and roughen the top 3-4 in. by disking.
3. Do not apply when site is wet, muddy, or frozen, because it makes spreading difficult, causes compaction problems, and inhibits bonding with subsoil.
4. Apply topsoil evenly to a depth of at least 4 inches and compact slightly to improve contact with subsoil.
5. After spreading, grade and stabilize with seeding or appropriate vegetation.

## 8.1 Additional Construction Site Pollution Controls

---



### Description

Although sediment is the primary pollutant of concern resulting from construction activity, other pollutants need to be considered as well. These include petrochemicals: fuel, oil, and asphalt; and construction chemicals and materials: paints, solvents, fertilizer, soil additives, concrete wash water, etc. Also included are solid wastes and construction debris. Keeping these substances from polluting runoff can be accomplished to a large extent through good housekeeping and following the manufacturer's recommendations for their use and disposal.

### Condition Where Practice Applies

Wastes generated by construction activities (i.e. construction materials such as paints, solvents, fuels, concrete, wood, etc.) must be disposed of in accordance with ORC 3734 and ORC 3714. Hazardous and toxic substances are used on virtually all construction-sites. Good management of these substances is always needed.

### Planning Considerations

Good erosion and sediment control will prevent some pollutants in addition to sediment from leaving the site; however, pollutants carried in solution or as surface films on runoff water will be carried through most erosion and sediment control practices. These pollutants become nearly impossible to control once carried offsite in runoff. Adding to the problem is the fact that construction wastes, many containing toxic chemicals, are routinely buried on-site, dumped on the ground, poured down a storm drain, or disposed of with construction debris. So while typical erosion and sediment-control practices are important for controlling other pollutants, additional preventative measures are needed.

Reducing pollutants other than sediments depends heavily on construction personnel and how they carry out their operations. To help facilitate this, plans should contain standard notes clearly stating requirements to contractors. It also may be appropriate to include requirements for specific provisions for hazardous materials storage, handling and disposal.

## Requirements

1. **Educate Construction Personnel**, including subcontractors who may use or handle hazardous or toxic materials, making them aware of the following general guidelines:

Disposal and Handling of Hazardous and Other Construction Waste	
<b>DO:</b>	<ul style="list-style-type: none"> <li>• Prevent spills</li> <li>• Use products up</li> <li>• Follow label directions for disposal</li> <li>• Remove lids from empty bottles and cans when disposing in trash</li> <li>• Recycle wastes whenever possible</li> </ul>
<b>DON'T</b>	<ul style="list-style-type: none"> <li>• Don't pour into waterways, storm drains or onto the ground</li> <li>• Don't pour down the sink, floor drain or septic tanks</li> <li>• Don't bury chemicals or containers</li> <li>• Don't burn chemicals or containers</li> <li>• Don't mix chemicals together</li> </ul>

2. **Waste disposal containers** shall be provided for the proper collection of all waste material including construction debris, sanitary garbage, petroleum products and any hazardous materials to be used on-site. Containers shall be covered and not leaking. All waste material shall be disposed of at facilities approved for that material. Construction Demolition and Debris (CD&D) waste must be disposed of in accordance with ORC 3714 at an approved Ohio EPA CD&D landfill.

3. **No construction related waste materials are to be buried on-site.** By exception, clean fill (bricks, hardened concrete, soil) may be utilized in a way that does not encroach upon natural wetlands, streams or their floodplains. Filling of stream side areas is Fill may not result in the contamination of waters of the state. unless prohibited by local ordinance or zoning.
4. **Construction and Demolition Debris (CD&D) Disposal.** CD&D waste must be disposed of in accordance with ORC 3714 at an approved Ohio EPA CD&D landfill. CD&D waste is defined as all materials attached to a structure, which is being demolished (for materials containing asbestos see Item 12).
5. **Handling Construction Chemicals.** Mixing, pumping, transferring or other handling of construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.

- 6. Equipment Fueling and Maintenance**, oil changing, etc., shall be performed away from watercourses, ditches or storm drains, in an area designated for that purpose. The designated area shall be equipped for recycling oil and catching spills. Secondary containment shall be provided for all fuel oil storage tanks. These areas must be inspected every seven days and within 24 hrs. of a 0.5 inch or greater rain event to ensure there are no exposed materials which would contaminate storm water. Site operators must be aware that Spill Prevention Control and Countermeasures (SPCC) requirements may apply. An SPCC plan is required for sites with one single aboveground tank of 660 gallons or more, accumulative aboveground storage of 1330 gallons or more, or 42,000 gallons of underground storage. Soils that have become contaminated must be disposed of accordance with Item 8 “Contaminated Soils”.
- 7. Concrete Wash Water/Wash Outs.** Concrete wash water shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance. A sump or pit with no potential for discharge shall be constructed if needed to contain concrete wash water. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged. For small projects, truck chutes may be rinsed on the lot away from any water conveyances.
- 8. Contaminated Soils.** If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto the soil, the soil should be dug up and disposed of at licensed sanitary landfill or other approved petroleum contaminated soil remediation facility (not a construction/demolition debris landfill). Please be aware that storm water run off associated with contaminated soils are not authorized under Ohio EPA’s General Storm Water Permit associated with Construction Activities. In the event there are large extensive areas of contaminated soils additional measures above and beyond the conditions of Ohio EPA’s General Construction Storm Water Permit will be required. Depending on the extent of contamination, additional treatment and/or collection and disposal may be required. All storm water discharges associated with the contaminated soils must be authorized under an alternate NPDES (National Pollutant Discharge Elimination System) Permit.
- 9. Spill Reporting Requirements:** Spills on pavement shall be absorbed with sawdust, kitty litter or other absorbant material and disposed of with the trash at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA (1-800-282-9378), the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills, which result in contact with waters of the state, must be reported to OHIO EPA’s Hotline.
- 10. Open Burning.** No materials may be burned which contain rubber, grease, asphalt, or petroleum products such as tires, cars, autoparts, plastics or plastic coated wire. (See OAC 3745-19) Open burning is not allowed in restricted areas. Restricted areas are defined as: 1) within corporation limits; 2) within 1000 feet outside a municipal corporation having a population of 1000 to 10,000; and 3) a one mile zone outside of a

corporation of 10, 000 or more. Outside a restricted area, no open burning can take place within a 1000 feet of an inhabited building located off the property where the fire is set. Open burning is permissible in a restricted area for the following activities: heating tar, welding and acetylene torches, smudge pots and similar occupational needs, and heating for warmth or outdoor barbeques. Outside of restricted areas, open burning is permissible for landscape wastes (plant material), land-clearing wastes (plant material, with prior written permission from Ohio EPA), and agricultural wastes (material generated by crop, horticultural, or livestock production practices. This includes fence posts and scrap lumber, but not buildings).

- 11. Dust Control/Suppressants.** Dust control is required to prevent nuisance conditions. Dust controls must be used in accordance with the manufacturer's specifications and not be applied in a manner, which would result in a discharge to waters of the state. Isolation distances from bridges, catch basins, and other drainageways must be observed. Application (excluding water) may not occur when precipitation is imminent as noted in the short term forecast. Used oil may not be applied for dust control.
- 12. Other Air Permitting Requirements:** All contractors and sub contractors must be made aware that certain activities associated with construction will require air permits. Activities including but not limited to mobile concrete batch plants, mobile asphalt plants, concrete crushers, large generators, etc., will require specific Ohio EPA Air Permits for installation and operation. These activities must seek authorization from the corresponding district of Ohio EPA. Notification for Restoration and Demolition must be submitted to Ohio EPA for all commercial sites to determine if asbestos corrective actions are required.
- 13. Process Waste Water/Leachate Management.** All contractors shall be made aware that Ohio EPA's Construction General Permit only allows the discharge of storm water. Other waste streams/discharges including but not limited to vehicle and/or equipment washing, leachate associated with on-site waste disposal, concrete wash outs, etc are a process wastewater. They are not authorized for discharge under the General Storm Water Permit associated with Construction Activities. All process wastewaters must be collected and properly disposed at an approved disposal facility. In the event there are leachate outbreaks associated with onsite disposal, measures must be taken to isolate this discharge for collection and proper disposal. Investigative measures and corrective actions must be implemented to identify and eliminate the source of all leachate outbreaks.
- 14. Permit To Install (PTI) Requirements:** All contractors and sub contractors must be made aware that a PTI must be submitted and approved by Ohio EPA prior to the construction of all centralized sanitary systems, including sewer extensions, and sewerage systems (except those serving one, two, and three family dwellings) and potable water lines. The issuance of an Ohio EPA Construction General Storm Water Permit does not authorize the installation of any sewerage system where Ohio EPA has not approved a PTI.



Specifications  
for

## **Additional Construction Site Pollution Controls**

---

1. Construction personnel, including subcontractors who may use or handle hazardous or toxic materials, shall be made aware of the following general guidelines regarding disposal and handling of hazardous and construction wastes:
  - Prevent spills
  - Use products up
  - Follow label directions for disposal
  - Remove lids from empty bottles and cans when disposing in trash
  - Recycle wastes whenever possible
  - Don't pour into waterways, storm drains or onto the ground
  - Don't pour down the sink, floor drain or septic tanks
  - Don't bury chemicals or containers
  - Don't burn chemicals or containers
  - Don't mix chemicals together
2. **Containers shall be provided for the proper collection of all waste material including construction debris, trash, petroleum products and any hazardous materials used on-site.** Containers shall be covered and not leaking. All waste material shall be disposed of at facilities approved for that material. Construction Demolition and Debris (CD&D) waste must be disposed of at an Ohio EPA approved CD&D landfill.
3. **No construction related waste materials are to be buried on-site.** By exception, clean fill (bricks, hardened concrete, soil) may be utilized in a way which does not encroach upon natural wetlands, streams or floodplains or result in the contamination of waters of the state.
4. **Handling Construction Chemicals.** Mixing, pumping, transferring or other handling of construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.
5. **Equipment Fueling and Maintenance,** oil changing, etc., shall be performed away from watercourses, ditches or storm drains, in an area designated for that purpose. The designated area shall be equipped for recycling oil and catching spills. Secondary containment shall be provided for all fuel oil storage tanks. These areas must be inspected every seven days and within 24 hrs. of a 0.5 inch or greater rain event to ensure there are no exposed materials which would contaminate storm water. Site operators must be aware that Spill Prevention Control and Countermeasures (SPCC) requirements may apply. An SPCC plan is required for sites with one single above ground tank of 660

gallons or more, accumulative above ground storage of 1330 gallons or more, or 42,000 gallons of underground storage. Contaminated soils must be disposed of in accordance with Item 8.

6. **Concrete Wash Water** shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance. A sump or pit with no potential for discharge shall be constructed if needed to contain concrete wash water. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged. For small projects, truck chutes may be rinsed away from any water conveyances.
7. **Spill Reporting Requirements:** Spills on pavement shall be absorbed with sawdust or kitty litter and disposed of with the trash at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA, the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills which contact waters of the state must be reported to Ohio EPA.
8. **Contaminated Soils.** If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto the soil, the soil should be dug up and disposed of at licensed sanitary landfill or other approved petroleum contaminated soil remediation facility. (not a construction/demolition debris landfill). Note that storm water run off associated with contaminated soils are not be authorized under Ohio EPA's General Storm Water Permit associated with Construction Activities.
9. **Open Burning.** No materials containing rubber, grease, asphalt, or petroleum products, such as tires, autoparts, plastics or plastic coated wire may be burned (OAC 3745-19). Open burning is not allowed in restricted areas, which are defined as: 1) within corporation limits; 2) within 1000 feet outside a municipal corporation having a population of 1000 to 10,000; and 3) a one mile zone outside of a corporation of 10,000 or more. Outside of restricted areas, no open burning is allowed within a 1000 feet of an inhabited building on another property. Open burning is permissible in a restricted area for: heating tar, welding, smudge pots and similar occupational needs, and heating for warmth or outdoor barbecues. Outside of restricted areas, open burning is permissible for landscape or land-clearing wastes (plant material, with prior written permission from Ohio EPA), and agricultural wastes, excluding buildings.
10. **Dust Control or dust suppressants** shall be used to prevent nuisance conditions, in accordance with the manufacturer's specifications and in a manner, which prevent a discharge to waters of the state. Sufficient distance must be provided between applications and nearby bridges, catch basins, and other waterways. Application (excluding water) may not occur when rain is imminent as noted in the short term forecast. Used oil may not be applied for dust control.
11. **Other Air Permitting Requirements:** Certain activities associated with construction will require air permits including but not limited to: mobile concrete batch plants, mobile asphalt plants, concrete crushers, large generators, etc. These activities will require specific Ohio EPA Air Permits for installation and operation. Operators must seek authorization from the corresponding district of Ohio EPA. For demolition of all



commercial sites, a Notification for Restoration and Demolition must be submitted to Ohio EPA to determine if asbestos corrective actions are required.

- 12. Process Waste Water/Leachate Management.** Ohio EPA's Construction General Permit only allows the discharge of storm water and does not include other waste streams/discharges such as vehicle and/or equipment washing, on-site septic leachate concrete wash outs, which are considered process wastewaters. All process wastewaters must be collected and properly disposed at an approved disposal facility. In the event, leachate or septage is discharged; it must be isolated for collection and proper disposal and corrective actions taken to eliminate the source of waste water.
- 13. A Permit To Install (PTI)** is required prior to the construction of all centralized sanitary systems, including sewer extensions, and sewerage systems (except those serving one, two, and three family dwellings) and potable water lines. Plans must be submitted and approved by Ohio EPA. Issuance of an Ohio EPA Construction General Storm Water Permit does not authorize the installation of any sewerage system where Ohio EPA has not approved a PTI.

## 4.4 Rock Outlet Protection

---



### Description

A rock or riprap apron typically needed at the outlet of storm drains, culverts, or open channels. Rock Outlet Protection provides an erosion resistant transition area where concentrated or high velocity flows enters less modified channels or natural streams.

### Conditions Where Practice Applies

This practice applies where discharge velocities from channels, storm drains or culverts are high enough to erode receiving streams or areas. Suggested areas of application are:

- Outfalls of stormwater detention facilities or sediment traps or basins.
- Constructed channel outlets
- Culvert outlets

This practice is not intended for use on slopes greater than 10% or at the top of cut or fill slopes. Caution should be used when design flows exceed 100 cubic feet per second (cfs) from a 10-yr.-frequency storm..

### Planning Considerations

Rock Outlet Protection may be used in conjunction with other practices, such as level spreaders. Rock Outlet Protection and Level Spreaders can both be used at the end of pipe outlets. This practice should be used alone where flow will continue as concentrated flow. Level Spreaders can be used with Rock Outlet Protection only when flow can be converted to and continue as sheet flow.

### ***Permits***

A construction permit may be required by the local government. Additionally, the U.S. Army Corps of Engineers and the Ohio Environmental Protection Agency, through Sections 404 and 401, respectively, of the Clean Water Act, may require a permit for an outlet protection that is located adjacent to a stream.

### ***Water Quality***

Rock outlet protection may also provide water quality benefits by providing for channel stability, prevention of excessive erosion, and limiting subsequent downstream sedimentation.

## **Design Criteria**

### ***Runoff***

Runoff computation will be based upon the most severe soil and cover conditions that will exist in the area draining into the channel during the planned life of the structure. Use the NRCS Technical Release 55 (TR 55) or other suitable method shall be used to determine peak rate of runoff.

### ***Velocity***

Outlet protection shall be designed to be stable for discharge velocity expected from a 10-year frequency storm. Where high-hazard conditions exist, higher frequency storms should be chosen to provide protection compatible with conditions. Outlet protection shall meet the following criteria

### ***Design Velocity***

Outlet protection shall be designed to be stable for the velocity of flow expected from a 10-year frequency storm. Outlet protection shall be designed to meet the criteria below or by other accepted engineering methods.

### ***Width***

The width of the outlet protection shall be the width of the headwall or 4 feet wider than the pipe diameter (2 feet on each side of the pipe).

### ***Bottom Grade***

The outlet protection should be constructed with no slope along its length. The elevation on the downstream end of the outlet protection shall be equal to the elevation of the receiving stream or channel.

### ***Length of Rock Outlet Protection and Rock Size***

Use the velocity calculated at the pipe outlet, the pipe diameter, and Figure 4.4.1. Outlet Protection Length, to find the length of outlet protection needed and rock size to use.

### ***Rock Lining***

The outlet protection shall consist of the rock riprap layer and an underlying filter or bedding. Minimum thickness of the rock riprap layer shall be the maximum stone size. Stone used for riprap shall be dense and hard enough to withstand exposure to air, water, freezing and thawing. Rock riprap must have a well-graded distribution and be placed to obtain a solid, compact layer of riprap. This may require some hand placing and tamping with construction equipment. Spreading gravel or soil over top of the placed riprap surface will fill the voids by interlocking the riprap together.

Table 4.4.1 Rock Riprap Size

Type of Rock or Riprap (ODOT)	“n” value	Size of Rock	
		50% by weight	85% by weight
Type D	.036	> 6 in.	3 - 12 in.
Type C	.04	> 12 in.	6 - 18 in.
Type B	.043	> 18 in.	12 - 24 in.
Type A	.045	> 24 in.	18 - 30 in.

### ***Filter or Granular Bedding***

Filter or granular bedding must be placed beneath all riprap to prevent the underlying soil from eroding and undermining the riprap, and to collect seepage and base flow. Minimum bedding thickness shall be 4 inches. Use of large size riprap may necessitate the use of a thicker bedding layer or 2 differently sized bedding layers. Care should be taken to select granular bedding that is suitable with the subgrade material.

### ***Geotextile***

Geotextile may be used as a filter to be placed beneath the riprap to prevent piping of the soil where wetness, seepage, or prolonged base flow is the reason for lining the channel with riprap. If design of the outlet protection results in high velocities and steep grades, granular bedding should be used instead of geotextile. Care should be taken to properly anchor the geotextile to prevent unraveling under flowing water. Geotextile shall be woven or nonwoven monofilament yarn and shall meet Class I criteria in the attached table “Requirements for Geotextile”.

## **Maintenance**

A maintenance program shall be established to maintain riprap, vegetative cover above the riprap, and associated structural components such as pipe outlets, and tile lines. Items to consider in the maintenance program include:

- Determine responsible party to inspect and maintain the outlet protection after construction
- Missing riprap should be replaced as soon as possible.
- Protect the outlet protection from damage by equipment and traffic
- Fertilize the vegetated area annually to and maintain a vigorous stand of grass
- Mow the vegetated area to maintain a healthy and vigorous stand of grass.
- Seed and mulch any bare areas that develop.
- Remove sediment and debris that have accumulated.
- Easements, or other means, should be obtained to ensure the channel is maintained as constructed

## References

Additional guidance for evaluation, planning, and design of outlet protection is given in:

- NRCS Ohio Practice Standard 468, Lined Waterway Or Outlet
- NRCS Engineering Field Handbook, Chapter 6 - Structures
- NRCS Design Note 24, Guide for Use of Geotextiles
- ODOT Location and Design Manual, Rock Channel Protection at Culvert and Storm Sewer Outlets

**Table 4.4.2 Requirements for Geotextiles**

Property	Test method	Woven - Class I	Nonwoven - Class I
Tensile strength (pounds) 1/	ASTM D 4632 grab test	200 minimum in any principal direction	180 minimum
Elongation at failure (percent) 1/	ASTM D 4632 grab test	<50	≥ 50
Puncture (pounds) 1/	ASTM D 4833	90 minimum	80 minimum
Ultraviolet light (% residual tensile strength)	ASTM D 4355 150-hr exposure	70 minimum	70 minimum
Apparent opening size (AOS)	ASTM D 4751	As specified, but no smaller than 0.212 mm (#70) 2/	As specified max. #40 2/
Percent open area (percent)	CWO-02215-86	4.0 minimum	-----
Permittivity sec-1	ASTM D 4491	0.10 minimum	0.70 minimum

1/ Minimum average roll value (weakest principal direction).

2/ U.S. standard sieve size.

Note: CWO is a USACE reference.



## 5.3 Temporary Diversion

---



### Description

A temporary diversion is a dike and/or channel constructed to:

- Direct sediment-laden runoff to a settling pond.
- Route clean runoff away from disturbed areas.
- Divert runoff to reduce the effective length of the slope.
- Direct runoff away from steep cut or fill slopes.

### Conditions Where Practice Applies

This practice applies to construction areas where runoff must be redirected in order to prevent offsite sedimentation, erosion or flooding of work areas. Temporary diversions are particularly applicable to prevent flow from damaging erodible or unstable areas.

Temporary diversions are appropriate for drainage areas less than 10 acres.

### Planning Considerations

It is important that diversions are properly designed, constructed, and maintained since they concentrate water flow and may increase erosion potential. Particular care must be taken in planning diversion grades. Too much slope can result in erosion in the diversion channel or at the outlet. A change of slope from a steeper grade to a flatter may cause deposition to occur, reducing carrying capacity increasing chances of overtopping and failure.

It is usually less costly to excavate a channel and form a dike or dike on the downhill side with the spoil than to build diversions by other methods. Where space is limited, it may be necessary to build the dike by hauling in diking material. Use gravel to armor the diversion dike where vehicles must cross frequently.

Build and stabilize diversions and outlets or downstream sediment facilities before initiating other land-disturbing activities.

These structures generally have a life expectancy of 18 months or less, but can be prolonged with proper maintenance.

***Compare: Temporary Diversion vs. Silt Fence at the perimeter of disturbed areas***

Two approaches are commonly used to intercept and treat sediment-laden runoff at the perimeter of disturbed areas: silt fence or diversions that direct runoff to settling ponds. When determining which approach is more appropriate, consider the following:

**Table 5.3.1 Temporary Diversion versus Silt Fence comparison.**

<b>Temporary Diversion</b>	<b>Silt Fence</b>
Flows up to 10 acres of drainage area	Sheet flow from 1/4 acre per 100 feet of fence (see silt fence specification)
Constructed on positive grade to direct runoff	Must follow the contour of the land
Durable and usually low maintenance	High maintenance
Easily constructed with earth moving equipment	Labor Intensive
Requires additional Settling facilities	Treats Runoff for Sediment
Wider Disturbed area.	Requires little space and causes less disturbance around vegetation or structures

**Design Criteria**

These are provided in the specifications that follow.

**Operation and Maintenance**

Inspect temporary diversions once a week and after every storm event. Immediately remove sediment from the flow area and repair the diversion dike as needed.

Carefully check outlets and make necessary repairs immediately.

When the area protected is permanently stabilized, remove the dike and the channel to blend with the natural ground level and stabilize all disturbed areas with vegetation or other erosion control practice.

Mow grass as needed to maintain flow in channel.

**Common Problems – Suggested Solutions**

Sedimentation results in channel grade decreasing or reversing, leading to overtopping – realign or deepen the channel to maintain grade.

Low point in dike where diversion crosses a natural depression results in overtopping of the dike – build up the dike.

Erosion in channel before vegetation is established results in uneven channel grade, may lead to breach of dike---repair channel and install sod or synthetic liner.

If seepage or poor drainage in channel results in poor vegetation establishment, it may be necessary to re-grade in order to create positive drainage or to install subsurface drains or stone channel bottom.

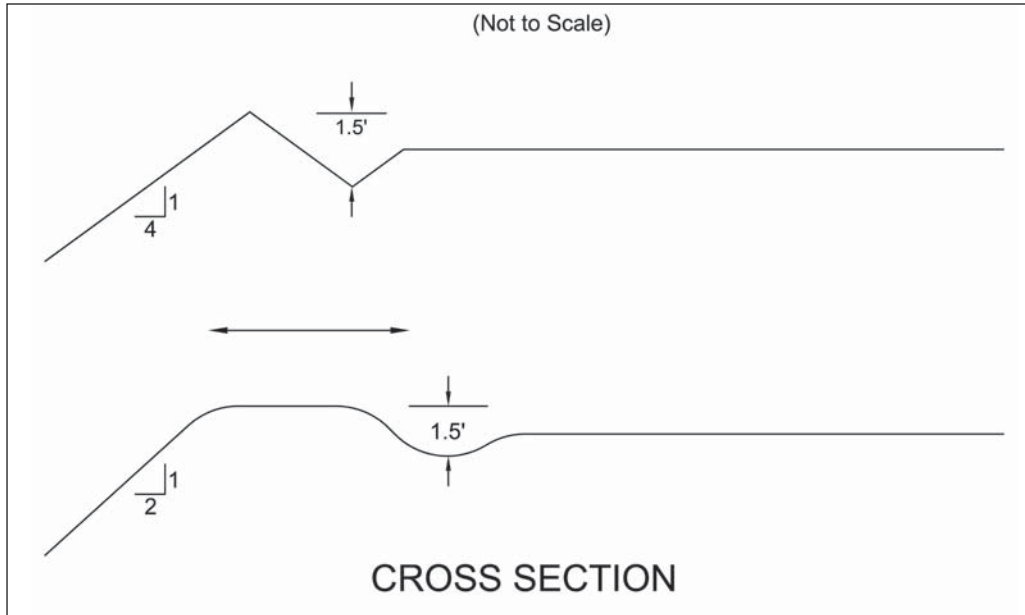
Vehicle crossings result in rutting and increased erosion – maintain the dike height, flatten the side slopes, protect the dike with gravel or hard surface at the crossing point.

Excessive velocity at the outlet results in erosion – install or repair ROCK OUTLET PROTECTION.

Excessive grade in channel results in gully erosion – repairs channel, and install an erosion resistant lining or realign to reduce the grade.



# Specifications for Temporary Diversion



1. Drainage area should not exceed 10 acres. Larger areas require a more extensive design.
2. The channel cross section may be parabolic or trapezoidal. Disk the base of the dike before placing fill. Build the dike 10% higher than designed for settlement. The dike shall be compacted by traversing with tracked earth-moving equipment.
3. The minimum cross section of the levee or dike will be as follows: (Minimum design freeboard shall be 0.3 foot.) Where construction traffic will cross, the top width may be made wider and the side slopes flatter than specified above.

Table 5.3.2

Dike Top Width (ft.)	Height (ft.)	Side Slopes	Shape
0	2	4:1	Trapezoidal
4	2	2:1	Parabolic

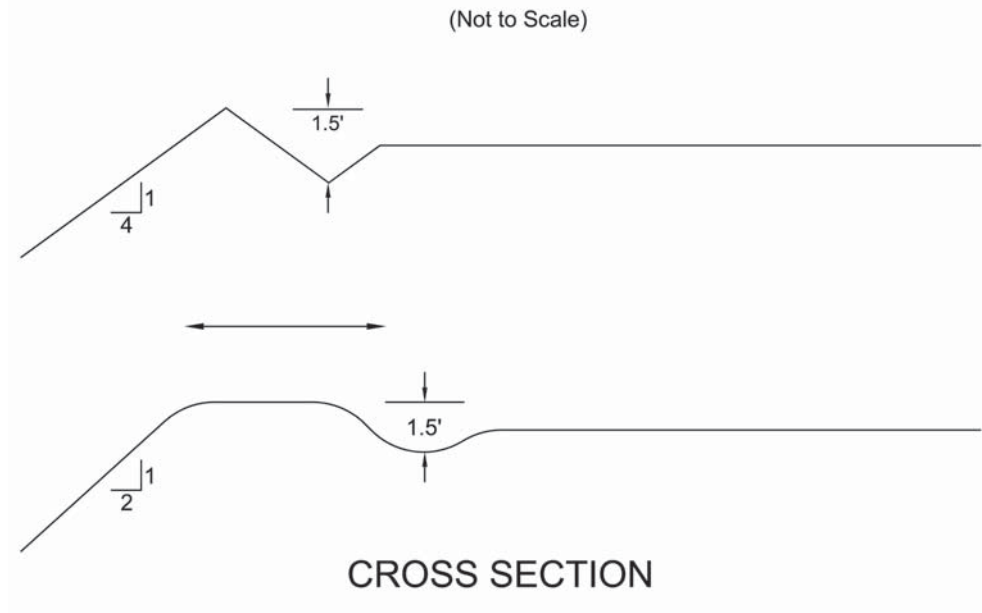
4. The grade may be variable depending upon the topography, but must have a positive drainage to the outlet and be stabilized to be non-erosive.

Table 5.3.3

Temporary Diversion Stabilization Treatment			
Diversion Slope	< 2 ac.	2 - 5 ac.	5 - 10 ac.
0 - 3%	use seed and erosion control blanket for stabilization		
3 - 5%			
5 - 8%			
8 - 20%	Seed and Straw	Matting	Engineered
Note: Diversions with steeper slopes or greater drainage areas are beyond the scope of this standard and must be designed for stability. Seed, straw and matting used shall meet the Specifications for Temporary Seeding, Mulching and Matting.			

5. Outlet runoff onto a stabilized area, into a properly designed waterway, grade stabilization structure, or sediment trapping facility.
6. Diversions shall be seeded and mulched in accordance with the requirements in practice standards TEMPORARY SEEDING (or PERMANENT SEEDING) and MULCHING as soon as they are constructed or other suitable stabilization in order to preserve dike height and reduce maintenance.

# Specifications for Temporary Diversion Above Steep Slopes



1. Drainage area should not exceed 5 acres. Larger areas require a more extensive design.
2. The channel cross section may be parabolic, v-shaped, or trapezoidal. Disk the base of the dike before placing fill. Build the dike 10% higher than designed for settlement. The dike shall be compacted by traversing with tracked earth-moving equipment.
3. The minimum cross section of the levee or dike will be as follows: (Minimum design freeboard shall be 0.3 foot.)
4. The grade may be variable depending upon the topography, but must have a positive drainage to the outlet and be stabilized to be non-erosive.

Table 5.3.3

Temporary Diversion Stabilization Treatment			
Diversion Slope	< 2 ac.	2 - 5 ac.	5 - 10 ac.
0 - 3%	Seed and Straw	Seed and Straw	Seed and Straw
3 - 5%	Seed and Straw	Seed and Straw	Matting
5 - 8%	Seed and Straw	Matting	Matting
8 - 20%	Seed and Straw	Matting	Engineered
Note: Diversions with steeper slopes or greater drainage areas are beyond the scope of this standard and must be designed for stability. Seed, straw and matting used shall meet the Specifications for Temporary Seeding, Mulching and Matting.			

Table 5.3.2

Dike Top Width (ft.)	Height (ft.)	Side Slopes	Shape
0	1.5	4:1	Trapezoidal
4	1.5	2:1	Parabolic

5. Outlet runoff onto a stabilized area, settling pond, or into a drop structure.
6. Diversions shall be seeded and mulched in accordance with the requirements in practice standards TEMPORARY SEEDING (or PERMANENT SEEDING) and MULCHING as soon as they are constructed or other suitable stabilization in order to preserve dike height and reduce maintenance.

## 5.7 Dewatering Measures

---



### Description

Dewatering measures provide a stable area for receiving and treating water pumped from excavation or work areas prior to being released off the site. These practices reduce sediment impacts to downstream water resources.

### Conditions Where Practice Applies

De-watering measures are used whenever water, either surface or subsurface, prevents or hinders construction activities and has the potential of contributing sediment to streams. This practice is appropriate for any kind of pumping used in conjunction with construction activities.

### Planning Considerations

Construction activities often require that water be pumped from an area to facilitate work. This water often has large amounts of suspended sediments. Rather than discharge this water directly to a stream, a means to settle or remove sediment must be provided.

A dewatering plan should be prepared utilizing ground water conditions and soils information to predict areas where de-watering will likely occur. Plans should include the length of time de-watering will occur, the method of de-watering (pumping, siphon...), the discharge point(s), methods to control sediment impacts and the contents of a written log to be kept on-site. These plans may need to be approved by local authorities prior to construction.

All dewatering discharges with suspended solids should pass through a practice to remove sediments. While a vegetated filter areas may be sufficient for some situations (e.g. short duration low pumping rates) many will need additional measures, such as sediment traps,

filter bag or flocculation. All structures must have adequate outlet protection to prevent gully erosion. Please note that the Ohio Environmental Protection Agency will find turbid discharges to the stream resulting from any dewatering activity a violation of Ohio Revised Code 6111.04 independent of the methods employed. Therefore even if one method is selected, additional measures may be required to fully treat turbid water.

The particle size distribution, that is the relative proportion of sands, silts and clays, of a soil that is suspended will determine the difficulty of removing sediments. Soils with coarser particle size distributions (large proportion of sand) will be easier to settle out with filter strips and settling ponds. Finer particle size distributions (predominantly silt and clays) will be increasingly difficult and may need a series of measures.

**Ground Water Lowering:** Often dewatering wells are established to lower the ground water table for utility installation or construction. Generally, this water is free from suspended solids and may be discharged to waters of the state provided the water is not contaminated.

Measures should be taken to ensure the discharge from the de-watering wells does not flow over disturbed areas and suspend sediments, resulting in contaminated discharge. Waterways established to transport dewatering flow should be protected from erosion from the point of discharge all the way to waters of the state. Extending hoses to waters of the state will ensure the discharge remains free from suspended solids. This practice is recommended for discharges of short duration.

Water pumped from wells is about 55° F, which may cause thermal impacts in some situations. High pumping rates near small streams in summer will have major changes in stream metabolism, i.e., throw off spawning. Where this potential occurs, groundwater should not be discharged directly to the stream but roughed through settling ponds or other shallow holding ponds.

The Ohio Department of Natural Resources, Division of Water requires a Water Withdraw Registration for the de-watering activities in the event the facility has the capacity of pumping in excess of 100, 000 gallons per day. This registration must be submitted to ODNR within 90 days following the completion of the project. A water withdraw registration can be obtained by contacting ODNR, Division of Water at 614-265-6735. Assistance regarding proper well installation and abandonment is also available.

## **Design Criteria**

**Vegetated Filter Areas:** Densely vegetated areas may offer sufficient conditions to treat short duration discharges provided that: flow is not channelized directly to a water resource and the area encourages infiltration, slow overland flow and settling. A minimum of 100 feet is required to utilize a vegetated area. Dense grass or areas with natural depressions will provide the best conditions. Critical areas like wetlands (e.g. vernal pools) or areas with sensitive vegetation that will be damaged (smothering) by sedimentation should not be used.

**Sediment trap or basin:** In most cases, contaminated discharge should be directed to a sediment trap where the suspended solids can settle/filter out prior to the discharge to waters of the state. Sediment traps should have sufficient storage to receive all the discharged water from pumping and detain this water a minimum of 24 hours. The sediment storage volume is directly related to the pumping capacity and the amount of turbidity. The sediment pond should be designed to optimize the amount of travel time through the impoundment.

The sediment pond should not be more than 4 feet deep with the distance between the intake and outlet maximized to the extent practical.

*Pump intakes* should withdraw water from the surface of the trench or work area in order not to re-suspend or continually mix water. Continually drawing water from the floor of the area will draw the muddiest water and increase the amount of sediment that must be removed.

*Geotextile Filter Bags* are an increasingly common way to remove sediment from dewatering discharge. Commonly discharge is pumped into a filter bag chosen for the predominant sediment size. Filter bags are manufactured products made typically from woven monofilament polypropylene textile (coarse materials, e.g. sands) or non-woven geotextile (silts/clays). They are single use products that must be replaced when they become clogged or half full of sediment.

While they may be useful, they are generally high flow products, which have limited ability to treat fine-grained sediments. Gravity drained filter bags should apply the following:

- They should be placed outside of a vegetated filter area and not in close proximity to the stream or water resource.
- They must sit on a relatively flat grade so that water leaving the bag does not cause additional erosion. Placing the bag on a flat bed of aggregate will maximize the flow and useful surface area of the bag.
- They should be used in conjunction with a large vegetative buffer or a secondary pond or barrier

*Enhanced Treatment Through Multiple Practices.* The need for further reduction in turbidity will likely require more than one treatment measure. The following are devices or measures that when used in sequence with others will reduce turbidity.

Filter bags (gravity flow) are highly variable depending on the pore size and flow rate. Typically filter bags are limited to removing large particles (small sands and large silts).

Sediment traps, weir tanks, filter boxes are effective for the removal of large particles such as sand. Their effectiveness increases as detention times increase.

Sand Media Filters are effective for removal of smaller particles such as sand and large silts. These often have the ability to backflush and thus maintain effectiveness and flow rate.

Some commercially available additives are available for further decreasing turbidity. Chitosan and chitin based additives have been shown to significantly increase the effectiveness of filtration and settling. Chitosan (Poly-D-glucosamine) is a low-toxicity product extracted from Chitin (Poly-N-acetyl-D-glucosamine), a by-product of the shellfish industry. Other products such as anionic polyacrylamide (anionic PAM) are commercially available to increase settling. Often these are utilized through wet or dry dosing mechanisms or as water runs over a gel block upstream of a settling or filtration practice. Each product should be utilized within the manufacturer's specifications and tailored to the soil and site conditions.

Particulate filter units utilizing cartridges or enclosed filter bags can remove smaller particles depending on the filter size. This type of measure is usually necessary to treat clays. Filters may need to be changed daily or more frequently.

An example of an enhanced treatment might include: dewatering a trench with a trash pump to a settling tank or pit then pumping from the settling practice to a sand media filter or to a particulate filter.

### **Common Problems/Concerns**

Complete settling of solids within the Sediment Basin does not occur prior to discharge. The length to width ratio of the pond must be increased to lengthen travel time through the structure. In addition, flocculent may be necessary to promote settlement.

Water discharged from subsurface/ground water pumping maybe significantly lower in temperature than that of the receiving stream. The water will need pre-conditioned in order to minimize the biological affects on the stream.

### **References**

Virginia Department of Conservation and Recreation, 2002. *Erosion & Sediment Control Technical Bulletin #2: Application of Anionic Polyacrylimide for soil stabilization and stormwater management*. <http://www.dcr.state.va.us/sw/docs/anoinic.pdf>

Specifications  
for  
**De-Watering**

---

1. A de-watering plan shall be developed prior to the commencement of any pumping activities.
2. The de-watering plan shall include all pumps and related equipment necessary for the dewatering activities and designate areas for placement of practices. Outlets for practices shall be protected from scour either by riprap protection, fabric liner, or other acceptable method of outlet protection.
3. Water that is not discharged into a settling/treatment basin but directly into waters of the state shall be monitored hourly. Discharged water shall be within +/- 5° F of the receiving waters.
4. Settling basins shall not be greater than four (4) feet in depth. The basin shall be constructed for sediment storage as outlined in Chapter 6, SEDIMENT BASIN OR SEDIMENT TRAP. The inlet and outlet for the basin shall be located at the furthest points of the storage. A floating outlet shall be used to ensure that settled solids do not re-suspend during the discharge process. The settling basin shall be cleaned out when the storage has been reduced by 50% of its original capacity.
5. All necessary National, State and Local permits shall be secured prior to discharging into waters of the state

## **Appendix F**

### **Release Reporting of a Hazardous Substance**



## Release Reporting of a Hazardous Substance

The State Emergency Response Commission (SERC) finalized a set of eight (8) release reporting rules (3750-25-01; 3750-25-05; 3750-25-10; 3750-25-12; 3750-25-13; 3750-25-15; 3750-25-20; and 3750-25-25), effective June 30, 1993. The purpose of this section is to make you aware of your reporting obligations in case of a discharge or release.

All verbal notifications made under these rules are to be reported to the Ohio EPA's Emergency Response Section, Local Emergency Planning District which may be affected, and the jurisdictional fire department.

An owner or operator is required to report a release or discharge under 3750.06 of the Ohio Revised Code anytime there is a release or spill of a regulated chemical which exceeds its assigned Reportable Quantity (RQ) and leaves the facility property line. The regulated substances subject to the release reporting requirements are referenced below.

### Materials Subject to Release Reporting

- Extremely Hazardous Substances 40 CFR; Part 355; Appendix A and B,
- CERCLA Hazardous Substances 40 CFR Part 302; Table 302.4, and
- Oil (definition includes without limitation to, gasoline, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil).
- The Reportable Quantity (RQ) for the discharge of oil including crude oil into or upon navigable waters is an amount which causes a visible film or sheen upon the surface of the water.
- The RQ for the release of oil into the environment, excluding navigable waters, is an amount of 25 gallons or more.
- The RQ for the release of crude oil from an oil and gas extraction storage facility into the environment, excluding navigable waters, is 210 gallons.

### Verbal Notification Requirement

The verbal notification to the fire department, LEPC, and Ohio EPA shall be made within 30 minutes of knowledge of the release, unless notification within that timeframe is impractical due to uncertain circumstances. In addition, calls to The National Response Center (NRC) shall be made for those reportable quantity releases involving CERCLA hazardous substances or oil to navigable waters as soon as possible. The National Response Center (NRC) 24-hour number is 1-800-424-8802.

The release notification for 24-hour reporting of spills in the State of Ohio is:

In Ohio call: 1-800-282-9378

If the 1-800 number does not work, call:  
(614) 224-0946

In addition, facility must call:

- LEPC emergency coordinator
- Jurisdictional fire department

Be prepared to relay as much of the information listed below as is known or can be estimated at the time of reporting. Please remember this is an initial report and estimates can be corrected in your follow-up emergency notice report.

- Name and phone number of the person to contact for further information.
- Location and source of the release or discharge.
- Chemical name or identity of any substance involved in the release or discharge.
- Is the substance an extremely hazardous substance.
- Estimate of the quantity (gallons or pounds) discharged into the environment.
- Time and duration of the release or discharge.
- The environmental medium or media into which the substance was released or discharged.
- Potential health effects associated with the release or discharge of the substance.
- Report precautions taken, including evacuation, remediation, or other proposed response actions.

This information is required under ORC Section 3750.06(C) and Rule 3750-25-25(A)(1) of the Ohio Administrative Code (OAC).

## Written Follow-up Requirements

After the release or discharge, written follow-up emergency notice must be submitted within 30 days to the Ohio EPA Emergency Response Section and the local planning committee of the planning district in which the release or discharge occurred, unless the release was from a vessel, then the report is sent only to the SERC. This follow-up emergency notice is your company's opportunity to explain in its own words the circumstances and actions relating to the release of pollutants to the environment. Your written emergency notice should follow the question sequence as indicated below. If any of the questions are not applicable to your incident, indicate N/A (not applicable) for that item.

### 1. Who

- Complete facility name, address and telephone number of the facility from which the release occurred. Complete name of owner and/or operator.

### 2. When

- Actual time, date, and duration of the discharge or release.
- Actual time and date of discovery of the release or discharge.
- Actions taken to respond to and contain the release or discharge.
- Indicate the spill number assigned by Ohio EPA. (If you do not know this number, call a duty officer during business-hours and ask. The telephone number is (614) 644-3194). If the National Response Center was notified, please provide their assigned case number.

### 3. Location

- Location of facility from which the release or discharge occurred.
- Location of release: county, township, and city.
- Longitude and latitude of the release, if known.
- Distance and direction from nearest intersection or milepost if it was a transportation-related release or discharge.

### 4. Product Release

- Common and/or technical name of the material released or discharged and CAS Numbers.
- What was the quantity and duration of the discharge? Indicate volume in gallons or pounds.

### 5. Environmental Impact

- Name of the environmental medium or media affected (i.e. navigable waters, land, and/or air). If navigable waters, please identify.
- What was the length of area of the navigable waterway affected?
- What was the ground surface area (square feet or yards) and depth of soil contamination?
- To the extent information is available; identify damage to wildlife and/or vegetation.
- To the extent information is available; identify impact to human health and safety (i.e. evacuations, exposure, etc.)
- Where appropriate, identify medical advice provided for exposed individuals and or local medical personnel.

### 6. Monitoring and Detection

- If the release or discharge was monitored, indicate the method of detection and concentrations detected.
- If the release was air-borne, how was the wind direction and speed determined?
- Was the public warned, and if so, how?

**7. Mitigation, Containment Action**

- How much product or waste was recovered or neutralized?
- How was the material recovered or neutralized?
- Were any other actions taken to reduce the impact of the discharge (containment, adsorbents, on-site treatment, etc.)?

**8. Prevention Measures**

- Please provide plans to prevent recurrence of the discharge or release which may occur at this specific source. This may include: employee training, replacement of equipment, construction, or security measures such as lighting, fencing or locks.

**9. Health Risks**

- List known or anticipated acute and chronic health risks of exposure associated with the substances which were released.

**10. Permit Numbers**

- Indicate any air, water, or other permit numbers which may be pertinent to this incident (voluntary information).
- If this is a NPDES/air permit, please enclose a copy of your current effluent/emission limitations.

**11. Chronology**

- Provide a chronological review of the incident. Include a chronology of communications with state and local government.

**12. Documentation**

- Provide any reports or other documents which pertain to the incident (e.g. accident reports, manifest, bills of lading, and laboratory analyses).

**13. Causes**

- Describe any extenuating circumstances which caused the discharge.

**14. Economic Impact**

(This information is voluntary)

- Estimate the dollar value, if any, of the spilled product.
- What was the equipment damage cost (estimate)?
- What was the cost of spill cleanup (estimate)?
- What are the estimated costs of spill prevention to eliminate possible reoccurrence of this event?

This information is required pursuant to ORC Section 3750.06(D) and OAC Rule 3750-25-25(A) (2).

The written emergency notice must be submitted within 30 days of the release or discharge to:

Ohio EPA, DERR—ER  
Lazarus Government Center  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049  
ATTN: ER Records Mgmt.

Note: the 30-day written spill release notice to the Ohio EPA/SERC can be submitted by attaching the report and emailing to: [cindy.stanwick@epa.ohio.gov](mailto:cindy.stanwick@epa.ohio.gov). Please reference the Ohio EPA, Emergency Response spill number on the email subject line.

### **County LEPC Emergency Coordinator (see pages 23-30)**

The statute provides that if significant additional information regarding the mandatory or voluntary information submitted becomes known during the period between submission of the written report and one (1) year after the release or discharge, the owner or operator shall submit to the LEPC and the Ohio EPA an updated written notice within three (3) days after learning of the additional information.

If this is the second oil spill release at this location within a 12 month period, or a release of over 1,000 gallons which has reached water, then you must submit a copy of your Spill Prevention Control and Counter-measure Plan (SPCC) to the U.S. EPA Regional Administrator and to Ohio EPA within 60 days from the time of the discharge as required by 40 CFR 112.4. Your SPCC plan may be submitted with your response to the 30-day written follow-up report. You may obtain SPCC information from U.S. EPA, by contacting their Hotline Center at 800-424-9346.

## **Appendix G**

### **Construction Site Inspection Checklist**



## Construction Site Inspection Checklist for OHC000004

By making use of some simple Best Management Practices (BMPs) a construction site operator can do his or her share to protect Ohio's water resources from the harmful effects of sediment. The topography of the site and the extent of the construction activities will determine which of these practices are applicable to any given site, but the BMPs listed here are applicable to most construction sites. For details on the installation and maintenance of these BMPs, please refer to the current ***Rainwater and Land Development, Ohio's Standards for Storm Water Management Land Development and Urban Stream Protection*** by the Ohio Department of Natural Resources (ODNR) Division of Soil and Water Conservation. The manual is available at <http://ohiodnr.com/soilandwater/water/rainwater/default/tabid/9186/Default.aspx> or by contacting your county Soil and Water Conservation District.

### Temporary Stabilization

This is the most effective BMP. All disturbed areas that will lie dormant for over 14 days must be stabilized within 7 days of the date the area becomes inactive. The goal of temporary stabilization is to provide cover, quickly. Areas within 50 feet of a stream must be stabilized within 2 days of inactivity. This is accomplished by seeding with fast-growing grasses then covering with straw mulch. Apply only mulch between November 1 and March 31. To minimize your costs of temporary stabilization, leave natural cover in place for as long as possible. Only disturb areas you intend to work within the next 14 days.

### Construction Entrances

Construction entrances are installed to minimize off-site tracking of sediments. A stone access drive should be installed at every point where vehicles enter or exit the site. Every individual lot should also have its own drive once construction on the lot begins.

### Sediment Ponds

Sediment ponds are required for construction areas with concentrated runoff, when the design capacity of silt fence or inlet protection is exceeded, or for drainage areas with 10 or more disturbed areas. There are two types of sediment ponds: sediment basins and sediment traps. A sediment trap is appropriate where the contributing drainage area is 10 acres or less. The outlet is an earthen embankment with a simple stone spillway. A sediment basin is appropriate for drainage areas larger than 10 acres. The outlet is an engineered riser pipe with a skimmer or similar device used to dewater the pond at the surface. Often a permanent storm water management pond, such as a retention or detention basin, can be modified to act as a sediment basin during construction. All sediment ponds must be installed within 7 days of first grubbing the area they control, provide a minimum dewatering zone of 67 cubic yards per acre of total contributing drainage area and a sediment settling zone of 34 cubic yards per disturbed acre below the level of the outlet. Sediment basins must be designed to drain the dewatering zone over a 48-hour period.

### Silt Fence

This is typically used at the perimeter of a disturbed area. It's only for small drainage areas on relatively flat slopes or around small soil storage piles. Not suitable where runoff is concentrated in a ditch, pipe or through streams. For large drainage areas where flow is concentrated, collect runoff in diversion berms or channels and pass it through a sediment pond prior to discharging it from the site. Combination barriers constructed of silt fence supported by straw bales or silt fence embedded within rock check dams may be effective within small channels. As with all sediment controls, silt fence must be capable of pooling runoff so that sediment can settle out of suspension. Silt fence must be installed within 7 days of first grubbing the area it controls.

### Inlet Protection

This must be installed on all yard drains and curb drains when these inlets do not drain to a sediment trap or basin. Even if there is a sediment trap or basin, inlet protection is still recommended, as it will increase the overall sediment removal efficiency. These are best used on roads with little or no traffic. If working properly, inlet protection will cause water to pond. If used on curb inlets, streets will flood temporarily during heavy storms. Check with your municipality before installing curb inlet protection. They may prefer an alternate means of sediment control such as silt fence or ponds.

### Permanent Stabilization

All areas at final grade must be permanently stabilized within 7 days of reaching final grade. This is usually accomplished by using seed and mulch, but special measures are sometimes required. This is particularly true in drainage ditches or on steep slopes. These measures include the addition of topsoil, erosion control matting, rock rip-rap or retaining walls. Permanent seeding should be done March 1 to May 31 and August 1 to September 30. Dormant seeding can be done from November 20 to March 15. At all other times of the year, the area should be temporarily stabilized until a permanent seeding can be applied.

### Non-Sediment Pollution Control

Although sediment is the pollutant of greatest concern on most construction sites, there are other sources of pollution. Most of these BMPs are easy to implement with a little bit of planning and go a long way toward keeping your site clean and organized. Please be sure to inform all contractors how these BMPs affect their operations on the site, particularly those that will be working near a stream.

---

## Inspection Sheet

**INSPECTIONS MUST BE CONDUCTED ONCE EVERY 7 DAYS AND WITHIN 24 HOURS OF A 0.5" OR GREATER RAINFALL. ALL SEDIMENT CONTROLS MUST BE INSTALLED PRIOR TO GRADING AND WITHIN 7 DAYS OF FIRST GRUBBING**

### GENERAL INSPECTION INFORMATION

Construction Site Inspection Date: \_\_\_\_\_ Inspector Name: \_\_\_\_\_

Inspector Title: \_\_\_\_\_ Qualifications/Certifications: \_\_\_\_\_

#### Storm Events of the Last 7 Days

Storm Event Date	Storm Event Time	Storm Event Duration	Total Rainfall Amount (inches)	Discharge Occur? (Y/N)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

#### Weather Information at the Time of Inspection

Temperature \_\_\_\_\_ Climate (Sunny, Cloudy, Rain)? \_\_\_\_\_ Is Storm Water Being Discharged? \_\_\_\_\_

#### Sketch or Small Site Map

Along with a narrative inspection log, Ohio EPA recommends the inspector use a sketch or a reduced photocopy of the site plan showing the location of storm water outfalls and storm drain inlets as well as the location and types of control measures. Problems observed at these locations, or at other locations on the construction site, should be highlighted and any corrective measures undertaken should be drawn in and noted in detail on the front side of the sketch. This method will also be helpful as the permittee is required to update the SWP3 to reflect current site conditions.

### CONSTRUCTION ENTRANCES

#### Key things to look for ...

	Yes	No
1. Has the drive been constructed by placing geotextile fabric under the stone?	<input type="checkbox"/>	<input type="checkbox"/>
2. Is the stone 2-inch diameter?	<input type="checkbox"/>	<input type="checkbox"/>
3. Has the stone been placed to a depth of 6 inches, with a width of 10 feet and a length of at least 50 feet (30 feet for entrances onto individual sublots)?	<input type="checkbox"/>	<input type="checkbox"/>
4. If the drive is placed on a slope, has a diversion berm been constructed across the drive to divert runoff away from the street or water resource?	<input type="checkbox"/>	<input type="checkbox"/>
5. If drive is placed across a ditch, was a culvert pipe used to allow runoff to flow across the drive?	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

## SEDIMENT PONDS

### Key things to look for ...

	Yes	No
1. Are concentrated flows of runoff directed to a sediment pond?	<input type="checkbox"/>	<input type="checkbox"/>
2. Is sheet-flow runoff from drainage areas that exceed the design capacity of silt fence (generally 0.25 acre or larger) directed to a sediment pond?	<input type="checkbox"/>	<input type="checkbox"/>
3. Is runoff being collected and directed to the sediment pond via the storm sewer system or via a network of diversion berms and channels?	<input type="checkbox"/>	<input type="checkbox"/>
4. Is the sediment pond dewatering zone appropriately sized (67 cubic yards per acre of total drainage area)?	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the sediment pond sediment settling zone appropriately sized (34 cubic yards per acre of disturbed area)?	<input type="checkbox"/>	<input type="checkbox"/>
6. Is the sediment basin designed to be dewatered at the surface through the use of a skimmer or another similar surface water dewatering device?	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the sediment basin designed so that the dewatering zone will drain in no less time than 48 hours?	<input type="checkbox"/>	<input type="checkbox"/>
8. Have the embankments of the sediment pond and the areas that lie downstream of the pond been stabilized?	<input type="checkbox"/>	<input type="checkbox"/>
9. For sediment basins that dewater 100% between storms, is the riser pipe wrapped with chicken wire and double wrapped with geotextile fabric?	<input type="checkbox"/>	<input type="checkbox"/>
10. Does the riser have 1-inch diameter holes spaced 4 inches apart, both horizontally and vertically?	<input type="checkbox"/>	<input type="checkbox"/>
11. For sediment basins, which dewater 60% between storms, is the diameter of the dewatering hole per plan (see Chapter 6 of <i>Rainwater</i> manual)?	<input type="checkbox"/>	<input type="checkbox"/>
12. For sediment traps, is there geotextile under the stone spillway and is the spillway saddle-shaped?	<input type="checkbox"/>	<input type="checkbox"/>
13. For sediment traps, which dewater 100% between storms, is the dewatering pipe end-capped, no larger than 6 inches in diameter, perforated and double-wrapped in geotextile?	<input type="checkbox"/>	<input type="checkbox"/>
14. Is the length-to-width ratio between inlet(s) and outlet at least 2:1? <b>NOTE:</b> If not, a baffle should be added to lengthen the distance.	<input type="checkbox"/>	<input type="checkbox"/>
15. Is the depth from the bottom of the basin to the top of the primary spillway no more than 3 to 5 feet?	<input type="checkbox"/>	<input type="checkbox"/>
16. For a modified storm water pond being used as a sediment pond, is the connection between the riser pipe and the permanent outlet water-tight?	<input type="checkbox"/>	<input type="checkbox"/>
17. Was the basin installed prior to grading the site?	<input type="checkbox"/>	<input type="checkbox"/>
18. Is it time to clean-out the sediment pond to restore its original capacity? Generally, sediment should be removed from the sediment settling zone once it's half-full. Stabilize the dredged sediments with seed and mulch.	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

---



---



---



---



## SILT FENCE

### Key things to look for ...

	Yes	No
1. Is the fence at least 4" to 6" into the ground?	<input type="checkbox"/>	<input type="checkbox"/>
2. Is the trench backfilled to prevent runoff from cutting underneath the fence?	<input type="checkbox"/>	<input type="checkbox"/>
3. Is the fence pulled tight so it won't sag when water builds up behind it?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are the ends brought upslope of the rest of the fence so as to prevent runoff from going around the ends?	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the fence placed on a level contour? If not, the fence will only act as a diversion.	<input type="checkbox"/>	<input type="checkbox"/>
6. Have all the gaps and tears in the fence been eliminated.	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the fence controlling an appropriate drainage area? Refer to Chapter 6 of <b>Rainwater</b> manual.	<input type="checkbox"/>	<input type="checkbox"/>
<b>RULE OF THUMB:</b> Design capacity for 100 linear feet of silt fence is 0.5 acres for slopes < 2%, 0.25 acres for slopes 2% to 20%, & 0.125 acres for slopes 20% or more. Generally, no more than 0.25 acres should lie behind 100 feet of fence at 2% to 10% slope, i.e., the distance between the fence and the top of the slope behind it should be no more than 125 feet. The allowable distance increases on flatter slopes and decreases for steeper slopes.		

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

## INLET PROTECTION

### Key things to look for ...

	Yes	No
1. Does water pond around the inlet when it rains?	<input type="checkbox"/>	<input type="checkbox"/>
2. Has the fabric been replaced when it develops tears or sags?	<input type="checkbox"/>	<input type="checkbox"/>
3. For curb inlet protection, does the fabric cover the entire grate, including the curb window?	<input type="checkbox"/>	<input type="checkbox"/>
4. For yard inlet protection, does the structure encircle the entire grate?	<input type="checkbox"/>	<input type="checkbox"/>
5. Is the fabric properly entrenched or anchored so that water passes through it and not under it?	<input type="checkbox"/>	<input type="checkbox"/>
6. For yard inlet protection, is the fabric properly supported to withstand the weight of water and prevent sagging? The fabric should be supported by a wood frame with cross braces, or straw bales.	<input type="checkbox"/>	<input type="checkbox"/>
7. Is sediment that has accumulated around the inlet removed on a regular basis?	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

## TEMPORARY STABILIZATION

### Key things to look for ...

	Yes	No
1. Are there any areas of the site that are disturbed, but will likely lie dormant for over 14 days?	<input type="checkbox"/>	<input type="checkbox"/>
2. Have all dormant, disturbed areas been temporarily stabilized in their entirety?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have disturbed areas outside the silt fence been seeded or mulched?	<input type="checkbox"/>	<input type="checkbox"/>
4. Have soil stockpiles that will sit for over 14 days been stabilized?	<input type="checkbox"/>	<input type="checkbox"/>
5. Has seed and mulch been applied at the proper rate? In general, seed is applied at 3 to 5 lbs per 1000 sq ft and straw mulch is applied at 2-3 bales per 1000 sq ft.	<input type="checkbox"/>	<input type="checkbox"/>
6. Has seed or mulch blown away? If so, repair.	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

---

---

## PERMANENT STABILIZATION

### Key things to look for ...

	Yes	No
1. Are any areas at final grade?	<input type="checkbox"/>	<input type="checkbox"/>
2. Has the soil been properly prepared to accept permanent seeding?	<input type="checkbox"/>	<input type="checkbox"/>
3. Has seed and mulch been applied at the appropriate rate (see Chapter 7 of the <i>Rainwater</i> manual)?	<input type="checkbox"/>	<input type="checkbox"/>
4. If rainfall has been inadequate, are seeded areas being watered?	<input type="checkbox"/>	<input type="checkbox"/>
5. For drainage ditches where flow velocity exceeds 3.5 ft/s from a 10-year, 24-hour storm has matting been applied to the ditch bottom?	<input type="checkbox"/>	<input type="checkbox"/>
6. If the flow velocity exceeds 5.0 ft/s, has the ditch bottom been stabilized with rock rip-rap? <b>NOTE:</b> Rock check dams may be needed to slow the flow of runoff.	<input type="checkbox"/>	<input type="checkbox"/>
7. Has rock rip-rap been placed under all storm water outfall pipes to prevent scouring in the receiving stream or erosion of the receiving channel?	<input type="checkbox"/>	<input type="checkbox"/>
8. For sites with steep slopes or fill areas, is runoff from the top of the site conveyed to the bottom of the slope or fill area in a controlled manner so as not to cause erosion?	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

---

---

## NON-SEDIMENT POLLUTION CONTROL

### Key things to look for ...

	Yes	No
1. Has an area been designated for washing out concrete trucks? Washings must be contained on site within a bermed area until they harden. The washings should never be directed toward a watercourse, ditch or storm drain.	<input type="checkbox"/>	<input type="checkbox"/>
2. Is waste and packaging disposed of in a dumpster? Do not burn them on site.	<input type="checkbox"/>	<input type="checkbox"/>
3. Are fuel tanks and drums of toxic and hazardous materials stored within a diked area or trailer and away from any watercourse, ditch or storm drain?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are streets swept as often as necessary to keep them clean and free from sediment? NOTE: Sediment should be swept back onto the lot - not down the storm sewers.	<input type="checkbox"/>	<input type="checkbox"/>
5. Are stockpiles of soil or other materials stored away from any watercourse, ditch or storm drain?	<input type="checkbox"/>	<input type="checkbox"/>
6. Have stream crossings been constructed entirely of non-erodible material?	<input type="checkbox"/>	<input type="checkbox"/>
7. If an area of the site is being dewatered, is it being pumped from a sump pit or is the discharge directed to a sediment pond? <b>NOTE:</b> if you must lower ground water, the water may be discharged to the receiving stream as long as the water remains clean. Be sure not to co-mingle the clean ground water with sediment-laden water or to discharge it off-site by passing it over disturbed ground.	<input type="checkbox"/>	<input type="checkbox"/>

Note areas where repairs or maintenance is needed or where this practice needs to be applied:

---

---

## **Appendix H**

### **Communication documentation with the Ohio EPA**

## Gina Lee

---

**From:** Justin.Reinhart@epa.ohio.gov  
**Sent:** Friday, April 19, 2019 10:02 AM  
**To:** Gina Lee; Lynette.Hablitzel@epa.ohio.gov  
**Cc:** Paul Tokarczyk; 'Stachowiak, Dariusz'  
**Subject:** RE: Hardin County Wind Farm

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Gina,

Thanks for organizing the call yesterday. We appreciate the early consultation on your proposed project. To get a response back to you as soon as possible I consulted with our stormwater program managers this morning. We certainly recognize the unique challenges your and similar projects have with post-construction water quality controls and recommend an approach would be to a) treat stormwater from the substation area as you have indicated was planned, b) take measures to assure any runoff from the roads and turbine pads is dispersed so that it will not lead to erosion/gullyng in the adjacent fields and c) utilize the Construction General Permit language allowing for off-site mitigation for the road & turbine pads. This typically involves retrofitting water quality controls into existing, older stormwater basins. Its possible a workable, older stormwater basin could be found in Lima or Kenton. Another more unusual solution for us may be to mitigate through installation of a local agricultural conservation practice. This would probably be a ditch modification or buffer strip type practice. We can help connect you to the local folks that could possibly help locate a mitigation project.

Justin Reinhart, PE  
[Ohio EPA | Division of Surface Water](#)  
Storm Water Technical Assistance  
P.O. Box 1049, Columbus, OH 43216-1049  
614-705-1149



---

**From:** Gina Lee <GLee@barr.com>  
**Sent:** Tuesday, April 16, 2019 9:03 PM  
**To:** Hablitzel, Lynette <Lynette.Hablitzel@epa.ohio.gov>; Reinhart, Justin <Justin.Reinhart@epa.ohio.gov>  
**Cc:** Paul Tokarczyk <PTokarczyk@barr.com>; 'Stachowiak, Dariusz' <DStachowiak@invenergyllc.com>  
**Subject:** RE: Hardin County Wind Farm

No problem Lynette, I have an accent and a lot of people spell my name wrong 😊

I will send an appointment to Justin for Thursday at 2pm. Thanks for being willing to work with us on this!

Gina Lee

Environmental Scientist  
Duluth, MN office: 218.529.7105  
fax: 218.529.8202  
[GLee@barr.com](mailto:GLee@barr.com)  
[www.barr.com](http://www.barr.com)

resourceful. naturally.



If you no longer wish to receive marketing e-mails from Barr, respond to [communications@barr.com](mailto:communications@barr.com) and we will be happy to honor your request.

---

**From:** [Lynette.Hablitzel@epa.ohio.gov](mailto:Lynette.Hablitzel@epa.ohio.gov) <[Lynette.Hablitzel@epa.ohio.gov](mailto:Lynette.Hablitzel@epa.ohio.gov)>  
**Sent:** Tuesday, April 16, 2019 2:50 PM  
**To:** Gina Lee <[GLee@barr.com](mailto:GLee@barr.com)>; [Justin.Reinhart@epa.ohio.gov](mailto:Justin.Reinhart@epa.ohio.gov)  
**Cc:** Paul Tokarczyk <[PTokarczyk@barr.com](mailto:PTokarczyk@barr.com)>; 'Stachowiak, Dariusz' <[DStachowiak@invenergyllc.com](mailto:DStachowiak@invenergyllc.com)>  
**Subject:** RE: Hardin County Wind Farm

Hello, Gina. I apologize for my misspelling of your name in the previous email!

I am out of office tomorrow morning and have an external meeting in the afternoon. I am available Friday from 8 to 3. Justin is available for a call Thursday afternoon and all day Friday. Please feel free to organize a call with Justin for tomorrow or with both of us on Friday. I have copied Justin on this e-mail. His number is 614-705-1149.

Sincerely,

**Lynette M. Hablitzel, P.E.**  
Storm Water Coordinator  
Division of Surface Water  
Ohio EPA  
Northwest District Office  
347 North Dunbridge Road  
Bowling Green, Ohio 43402  
(419)373-3009  
[lynette.hablitzel@epa.ohio.gov](mailto:lynette.hablitzel@epa.ohio.gov)

---

**From:** Gina Lee <[GLee@barr.com](mailto:GLee@barr.com)>  
**Sent:** Tuesday, April 16, 2019 8:46 AM  
**To:** Hablitzel, Lynette <[Lynette.Hablitzel@epa.ohio.gov](mailto:Lynette.Hablitzel@epa.ohio.gov)>  
**Cc:** Paul Tokarczyk <[PTokarczyk@barr.com](mailto:PTokarczyk@barr.com)>; 'Stachowiak, Dariusz' <[DStachowiak@invenergyllc.com](mailto:DStachowiak@invenergyllc.com)>  
**Subject:** RE: Hardin County Wind Farm

Good morning Lynette,

I was wondering if you and Justin are available on Thursday at 2pm for a short meeting with my client and I? We would like to know what other wind farms used in the area as post-construction stormwater control (I know you said you have not worked much with wind farms but maybe Justin did?). We have looked at the Runoff Reduction Methods and unfortunately this is not applicable in our situation. We have planned for swales along the proposed roads but we do have some concerns about that.

If you have time I will follow up with an appointment.

Thank,  
Gina

Gina Lee

Environmental Scientist  
Duluth, MN office: 218.529.7105  
fax: 218.529.8202  
[GLee@barr.com](mailto:GLee@barr.com)  
[www.barr.com](http://www.barr.com)

resourceful. naturally.



If you no longer wish to receive marketing e-mails from Barr, respond to [communications@barr.com](mailto:communications@barr.com) and we will be happy to honor your request.

---

**From:** [Lynette.Hablitzel@epa.ohio.gov](mailto:Lynette.Hablitzel@epa.ohio.gov) <[Lynette.Hablitzel@epa.ohio.gov](mailto:Lynette.Hablitzel@epa.ohio.gov)>

**Sent:** Friday, April 12, 2019 2:37 PM

**To:** Gina Lee <[GLee@barr.com](mailto:GLee@barr.com)>

**Subject:** Hardin County Wind Farm

Hello, Glee,

Sorry for the delay in this email. I had a couple interruptions after we spoke and then was in Columbus yesterday for a meeting. You will find information about the Runoff Reduction Method in Ohio's Rainwater and Land Development Manual: [https://epa.ohio.gov/dsw/storm/technical\\_guidance](https://epa.ohio.gov/dsw/storm/technical_guidance), under the "New Provisional Practices" link. There is also a Runoff Reduction Spreadsheet to help designer's credit various practices towards the required treatment of the Water Quality Volume as required by the NPDES Construction General Permit: <https://www.epa.state.oh.us/dsw/storm/index#108452496-additional-information>.

If you have any questions, please let me know. You may also contact Justin Reinhart, P.E., our Technical Assistance person, for additional help.

**Lynette M. Hablitzel, P.E.**

Storm Water Coordinator

Division of Surface Water

Ohio EPA

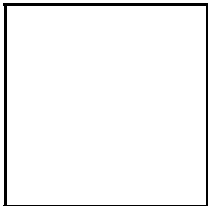
Northwest District Office

347 North Dunbridge Road

Bowling Green, Ohio 43402

(419)373-3009

[lynette.hablitzel@epa.ohio.gov](mailto:lynette.hablitzel@epa.ohio.gov)



**Did You Know:** Children of parents who talk to their teens about drugs are up to 50% less likely to use. Start the conversation: [StartTalking.Ohio.Gov](http://StartTalking.Ohio.Gov)

This email is intended for the sole use of the intended recipient and may contain privileged, sensitive or protected information. If you are not the intended recipient, be advised that the unauthorized use, disclosure, copying, distribution, or action taken in reliance on the contents of this communication is prohibited. If you have received this email in error, please notify the sender via telephone or return email and immediately delete this email.



## Gina Lee

---

**From:** Justin.Reinhart@epa.ohio.gov  
**Sent:** Monday, April 29, 2019 1:59 PM  
**To:** Gina Lee  
**Cc:** Lynette.Hablitzel@epa.ohio.gov  
**Subject:** Hardin Co. Contacts

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Gina,

Received your voicemail. I did reach out to several folks but did not hear back yet. The primary contact would likely be Hardin Soil & Water Conservation District. The contact there is Mark Lowery at (419) 673-0456.

Justin

Justin Reinhart, PE  
[Ohio EPA | Division of Surface Water](#)  
Storm Water Technical Assistance  
P.O. Box 1049, Columbus, OH 43216-1049  
614-705-1149

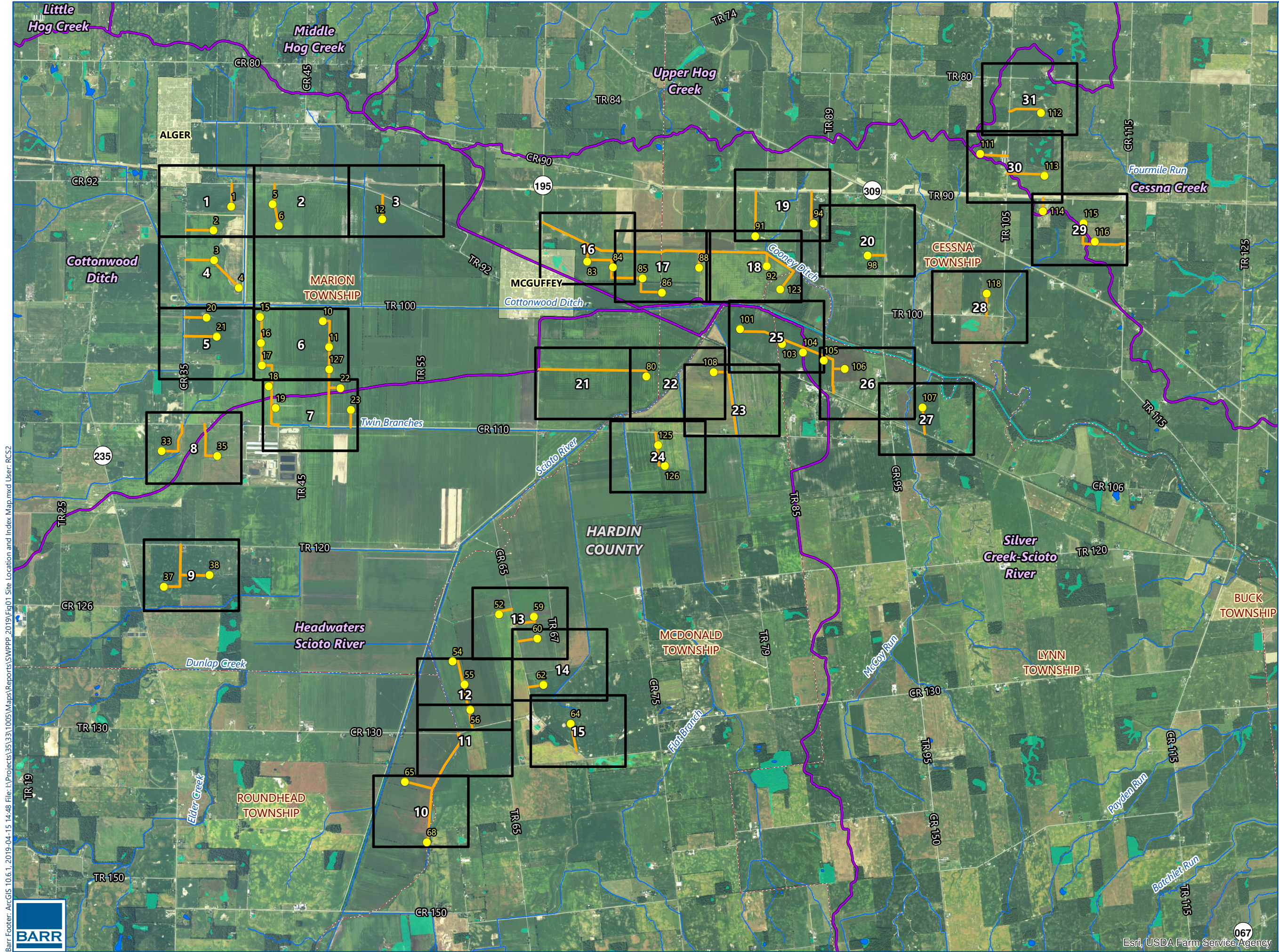


**Did You Know:** Children of parents who talk to their teens about drugs are up to 50% less likely to use. Start the conversation: [StartTalking.Ohio.Gov](http://StartTalking.Ohio.Gov)

This email is intended for the sole use of the intended recipient and may contain privileged, sensitive or protected information. If you are not the intended recipient, be advised that the unauthorized use, disclosure, copying, distribution, or action taken in reliance on the contents of this communication is prohibited. If you have received this email in error, please notify the sender via telephone or return email and immediately delete this email.

## Figures





- Turbine Location
- Access Roads
- Mapbook Index Boundaries
- NHD Flowline
- Surveyed Wetlands
- Wetlands (NWI)
- NHD Waterbody
- Watershed (NHD HUC12)
- Municipal Boundary
- Civil Township
- County Boundary

0 2,000 4,000  
Feet

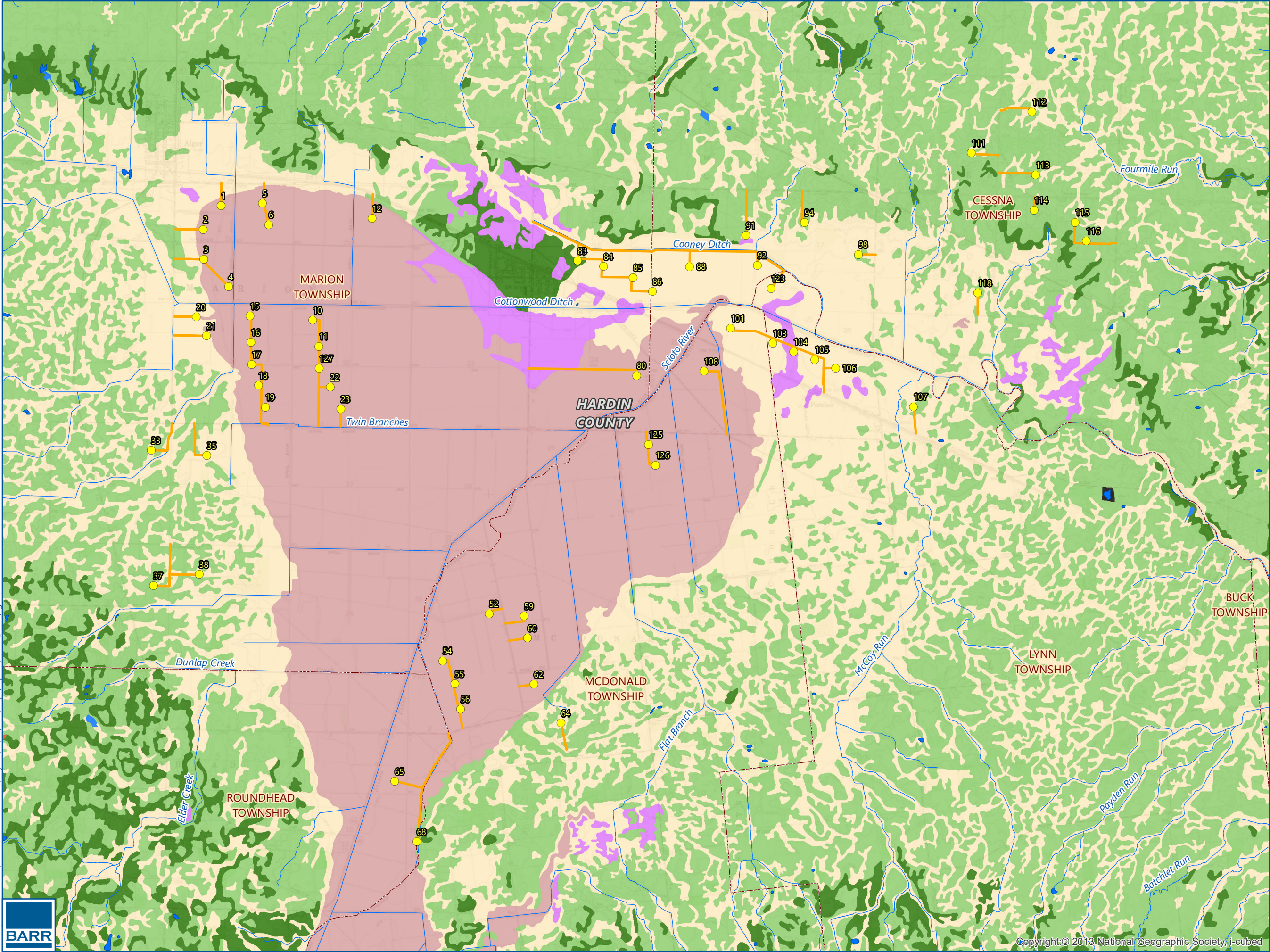
**SITE LOCATION  
AND INDEX MAP**  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

**FIGURE 1**





Barr Footer: ArcGIS 10.6.1, 2019-04-16 12:08 File: I:\Projects\33\33\1005\Maps\Reports\SWPPP 2019\Fig02 Generalized Soil Overview.mxd User: PCS2



Turbine Location

Access Roads

NHD Flowline

NHD Waterbody

Municipal Boundary

Civil Township

County Boundary

**Generalized Soil Map Unit Names**

Generalized Loam

Generalized Silt Loam

Generalized Clay Loam

Generalized Silty Clay Loam

Generalized Muck

Morley-Belmore Complex

Pits

Water

0 2,000 4,000

Feet

**GENERALIZED SOIL OVERVIEW**

Hardin County Wind Project

Invenergy LLC

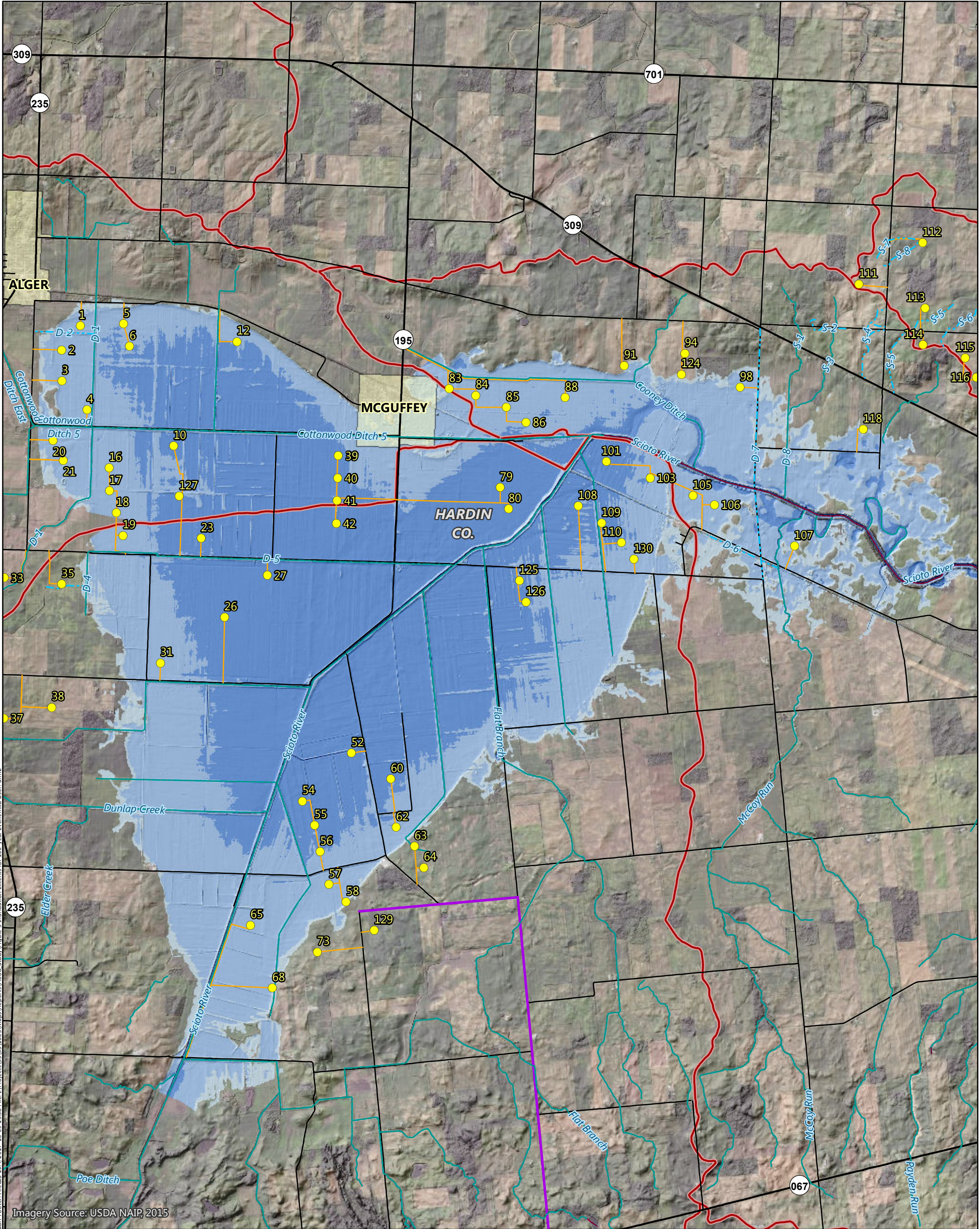
Hardin County, Ohio

FIGURE 2



Copyright:© 2013 National Geographic Society, i-cubed





Bar Footer: ArcGIS 10.4, 2017-10-09 13:58 File: I:\Projects\35\33\1005\Maps\Reports\Flood Study\Figure 3 Inundation Extents for 100-year Event.mxd User: am2

- Turbine Location (7/20/2017)
- Access Road
- Transportation Route
- Drainage Ditch
- Watershed Boundary
- Depth of Inundation for 100-yr Event
  - < 1 Ft
  - 1 - 5 Ft
  - 5 - 10 Ft
  - > 10 Ft

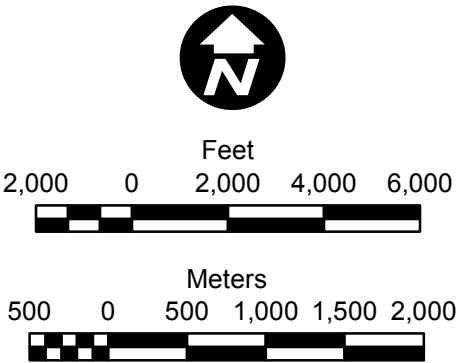


Figure 3

**INUNDATION EXTENTS  
FOR 100-YEAR EVENT**

Hardin Wind Project  
Invenergy LLC  
Hardin County, Ohio





Turbine (18' Diameter)

Underground Collection of Cables

Drainage Flow

Permanent Culvert

Temporary Culvert

Sediment Barrier

**Elevation Contour (2006)**

10 Foot Contour

2 Foot Contour

Permanent Access Road (16')

Erosion Control Matting

Turn Radius

Excavation Extent

Gravel Extent

Temporary Soil Stockpile

Construction Limits

Notes:

1. Proposed permanent access roads will be 16' wide. Additional 8' on each side will be needed for temporary work space.

2. Trenches for installation of underground collection cables will be maximum 40 feet wide. Additional 5' of temporary workspace will be needed.

3. Excavation for turbine foundation will be up to 100' x 100' x 11'. Approximately 340' x 340' of temporary work space will be needed. Following turbine installation (turbine diameter is 18'), 10' of permanent gravel will be installed around the turbine. The rest of the temporary workspace will be returned to it's pre-construction agricultural use.

N

0

50

100

Feet

TYPICAL TURBINE LAYOUT

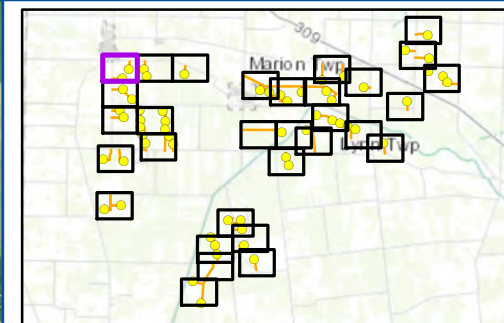
Hardin County Wind Project

Invenergy LLC

Hardin County, Ohio

FIGURE 4





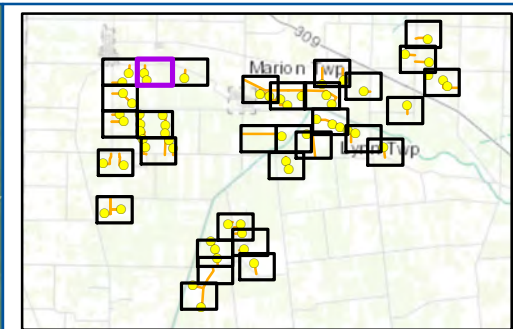
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Emergent Wetland
  - ▨ Freshwater Pond
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour
  - ▨ Municipal Boundary

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-1

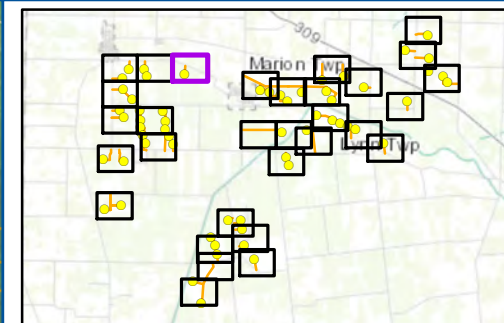




- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- - - Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- - - Construction Limits
- ~ NHD Flowline
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Pond
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

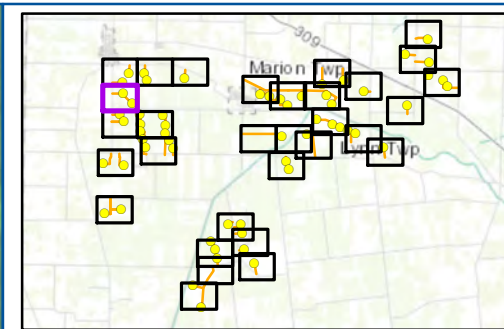
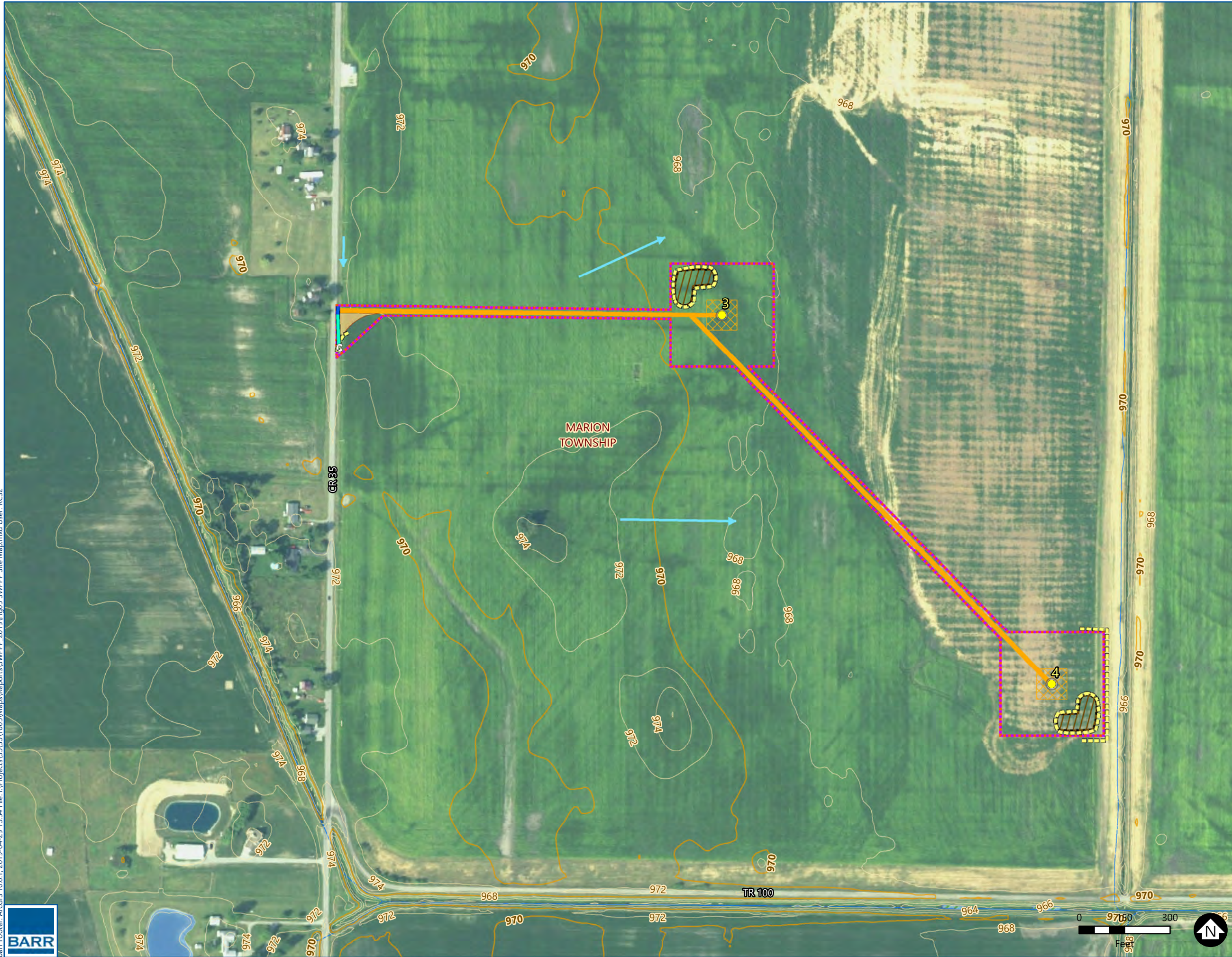
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-3



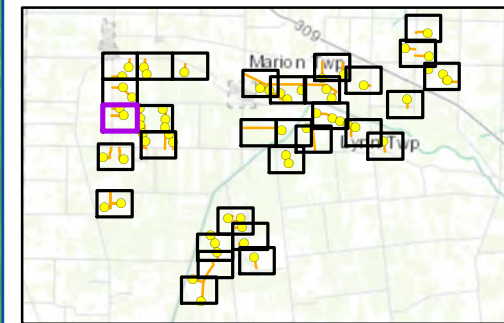
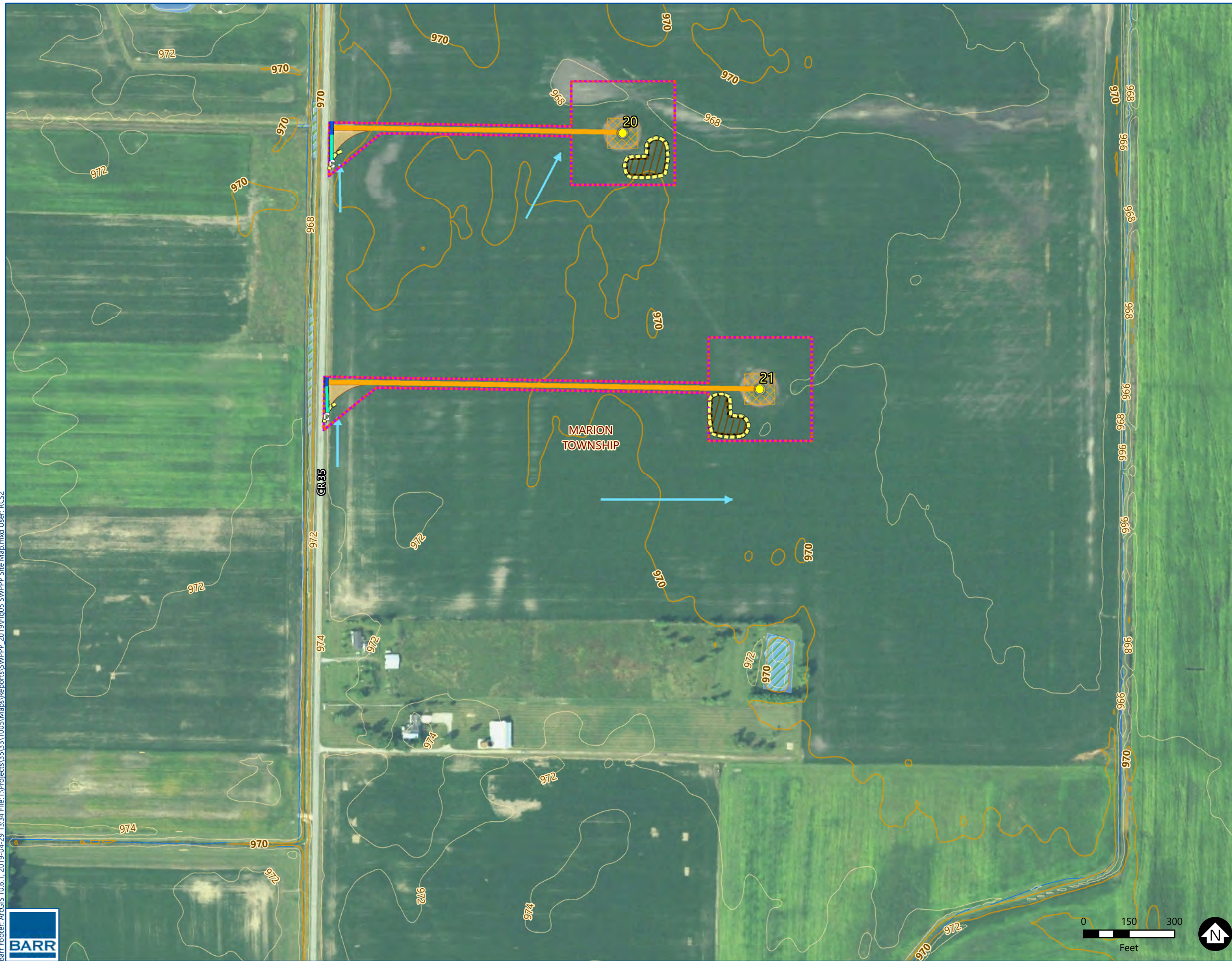




- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- Surveyed Wetlands
- Wetlands (NWI)**
- Freshwater Pond
- Elevation Contour (2006)**
- 10 Foot Contour
- 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





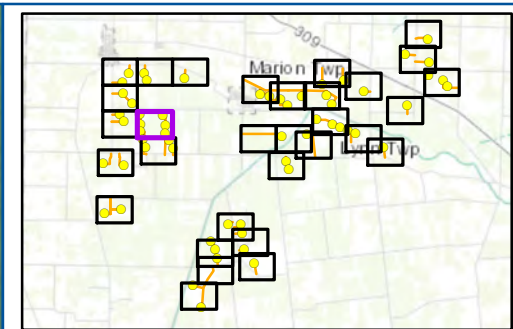
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▭ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Forested/Shrub Wetland
  - ▨ Freshwater Pond
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-5



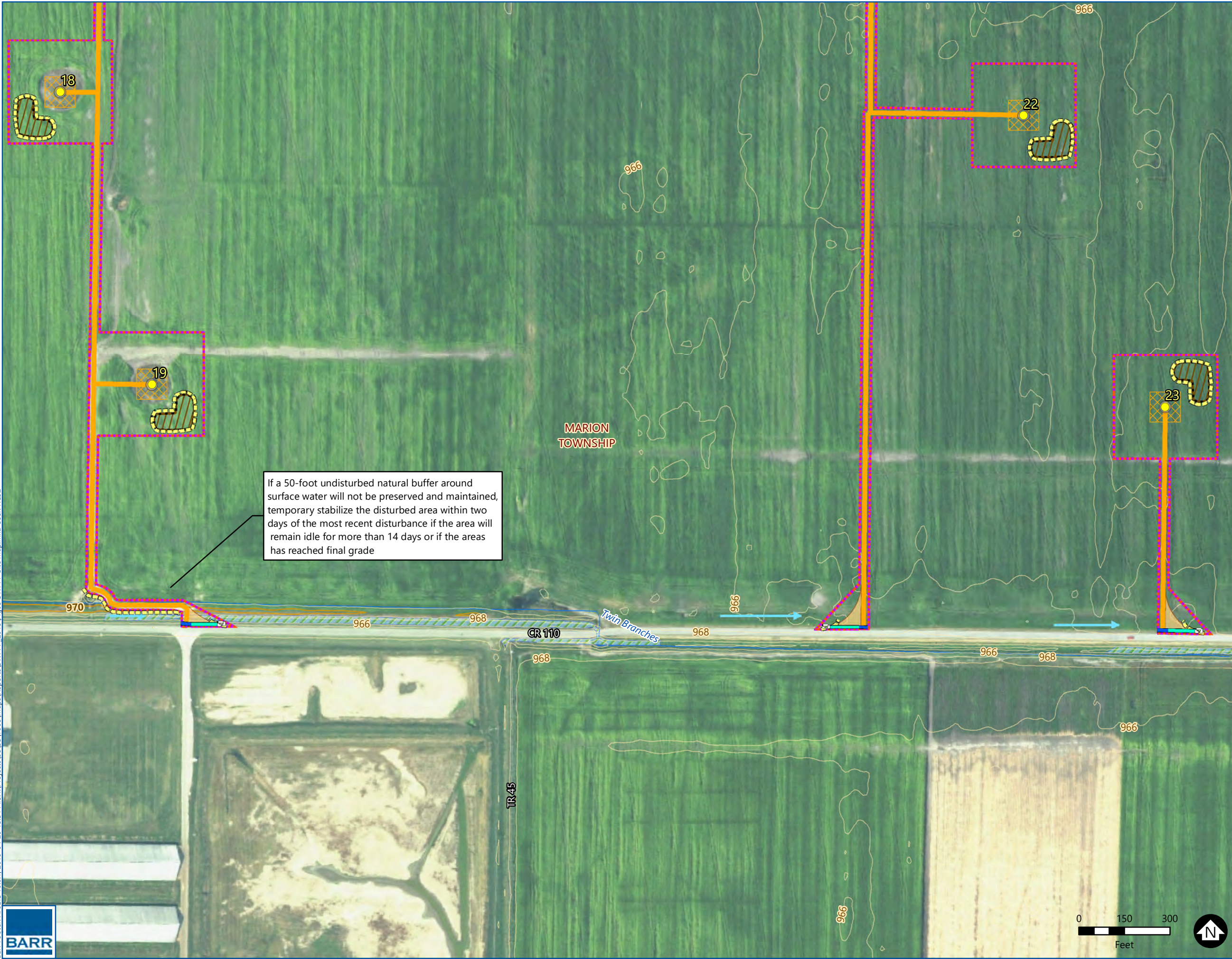


- Turbine Location
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▭ Construction Limits
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

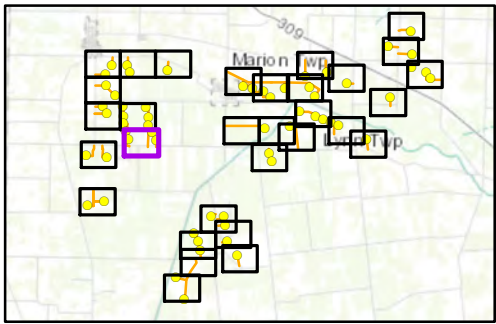
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.



Barr Footer: ArcGIS 10.6.1, 2019-04-29 13:34 File: \\Projects\\335\\331005\\Maps\\Reports\\SWPPP Site Map.mxd User: RCS2



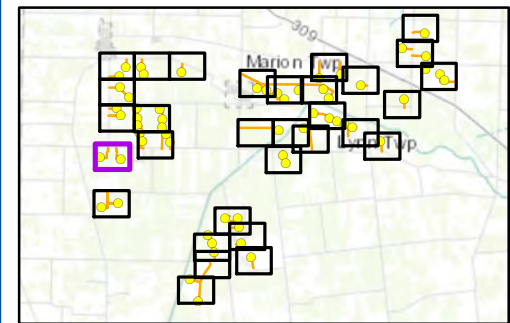
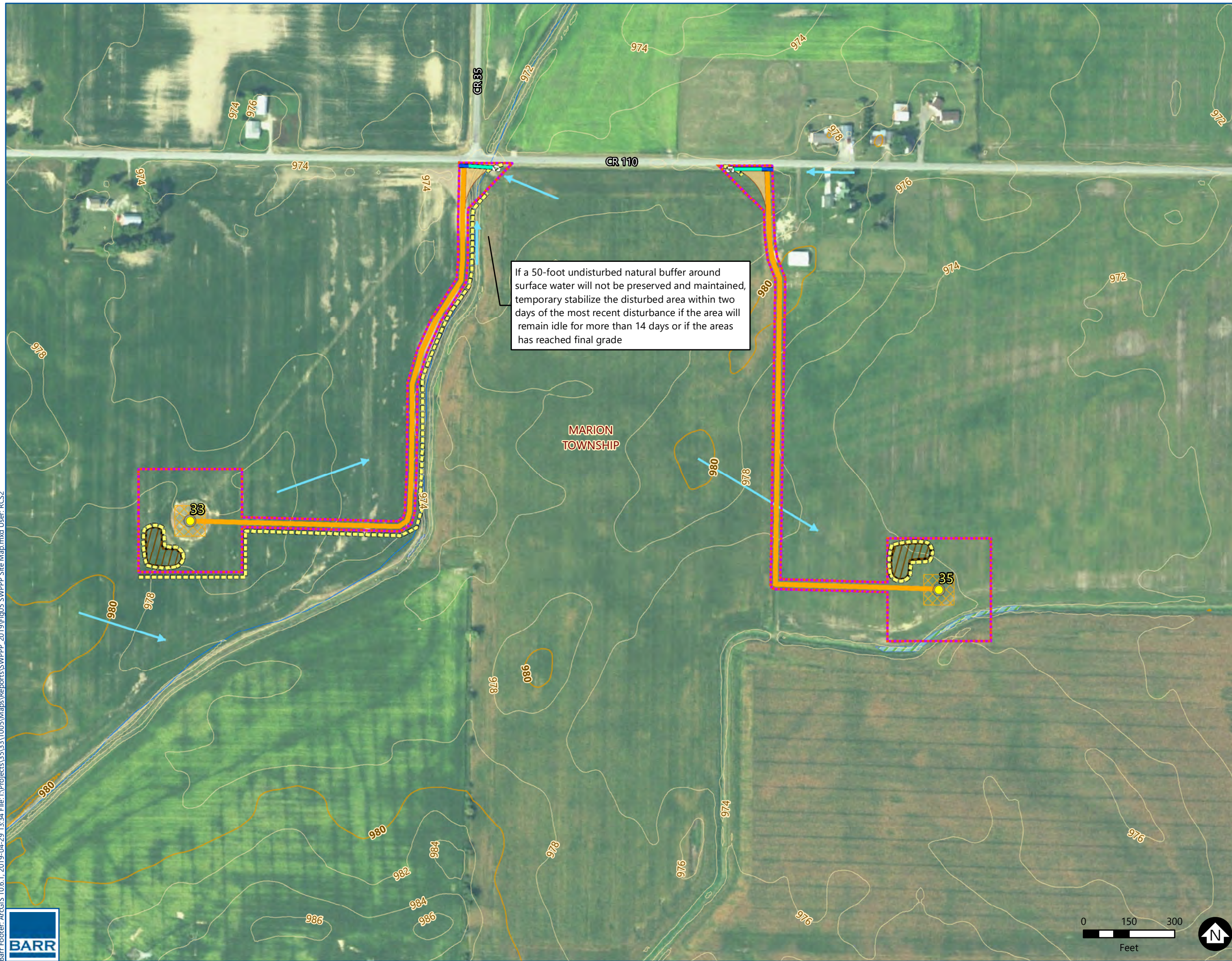
If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade



- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- Erosion Control Matting
- Turn Radius
- Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- NHD Flowline
- Surveyed Wetlands
- Elevation Contour (2006)**
- 10 Foot Contour
- 2 Foot Contour

#### Notes

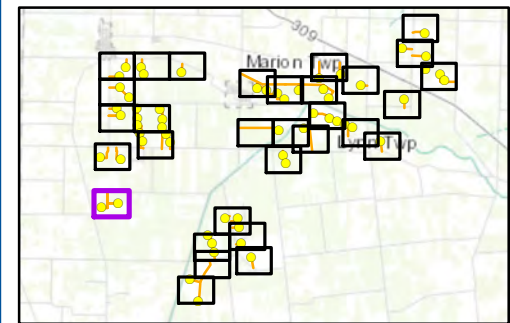
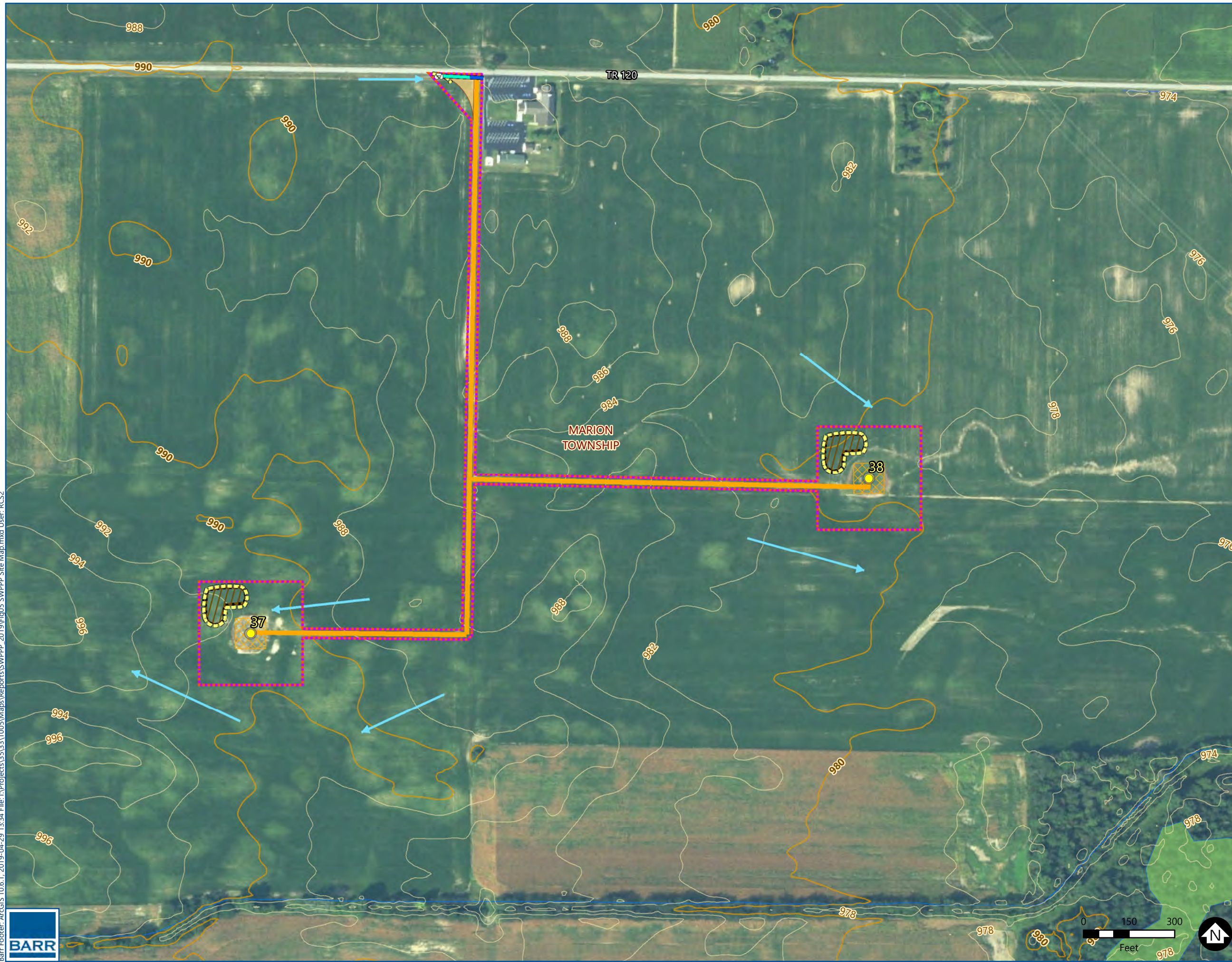
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-8



Barr Footer: ArcGIS 10.6.1, 2019-04-29 13:34 File: \\Projects\\33\\33\\1005\\Maps\\Reports\\SWPPP Site Map.mxd User: RC52



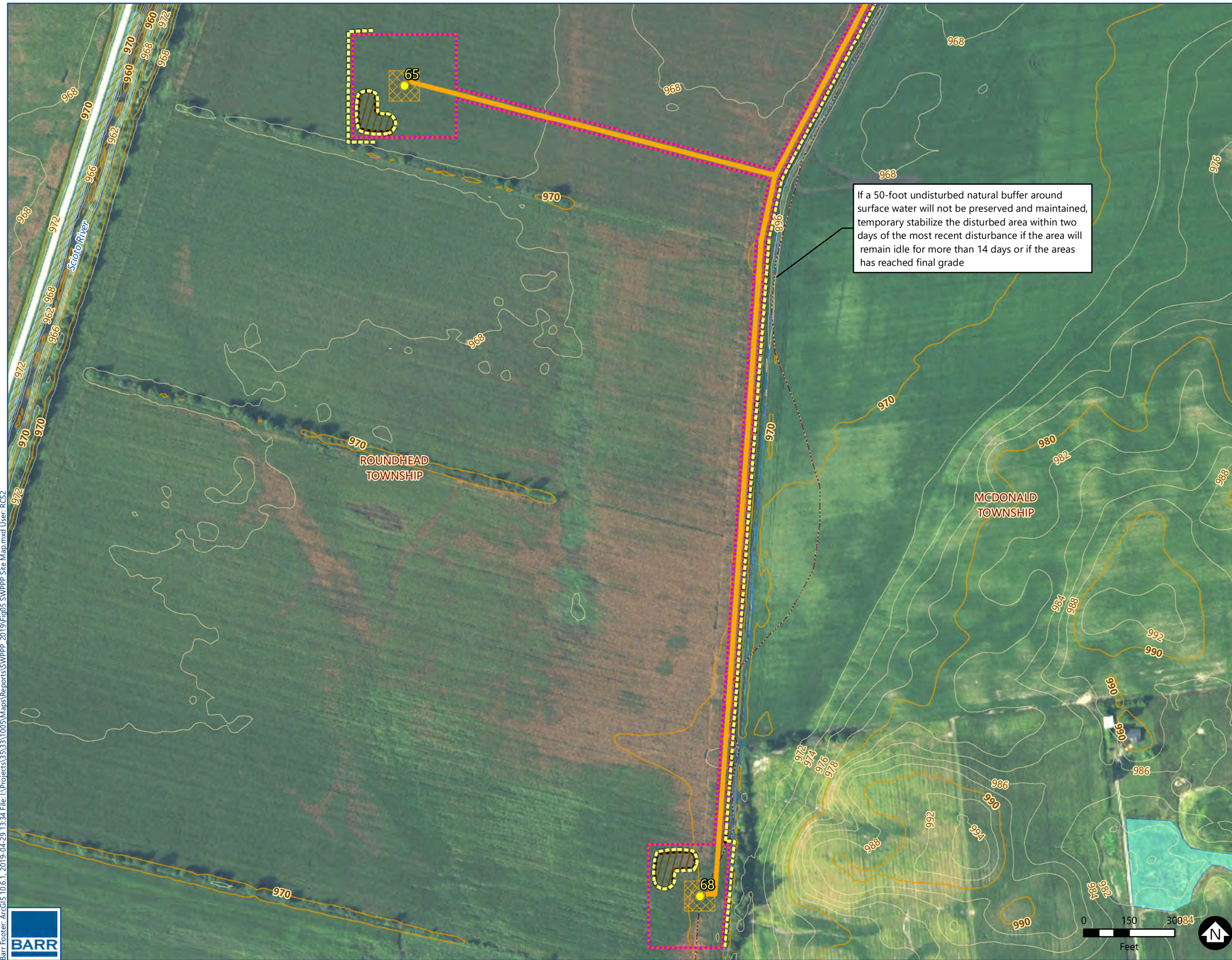
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

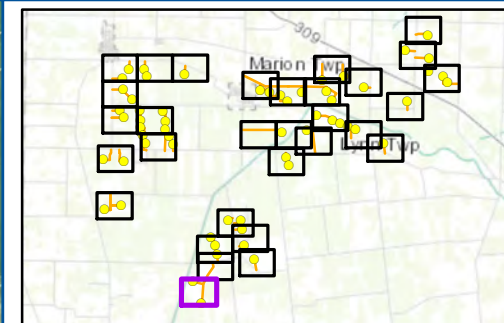
SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-9





If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade



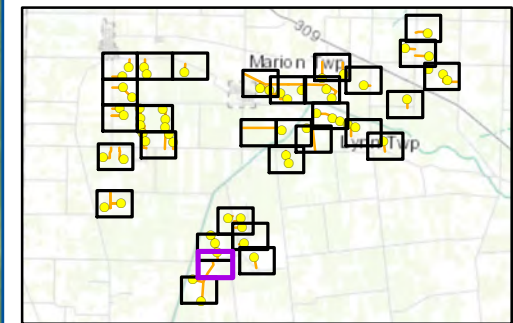
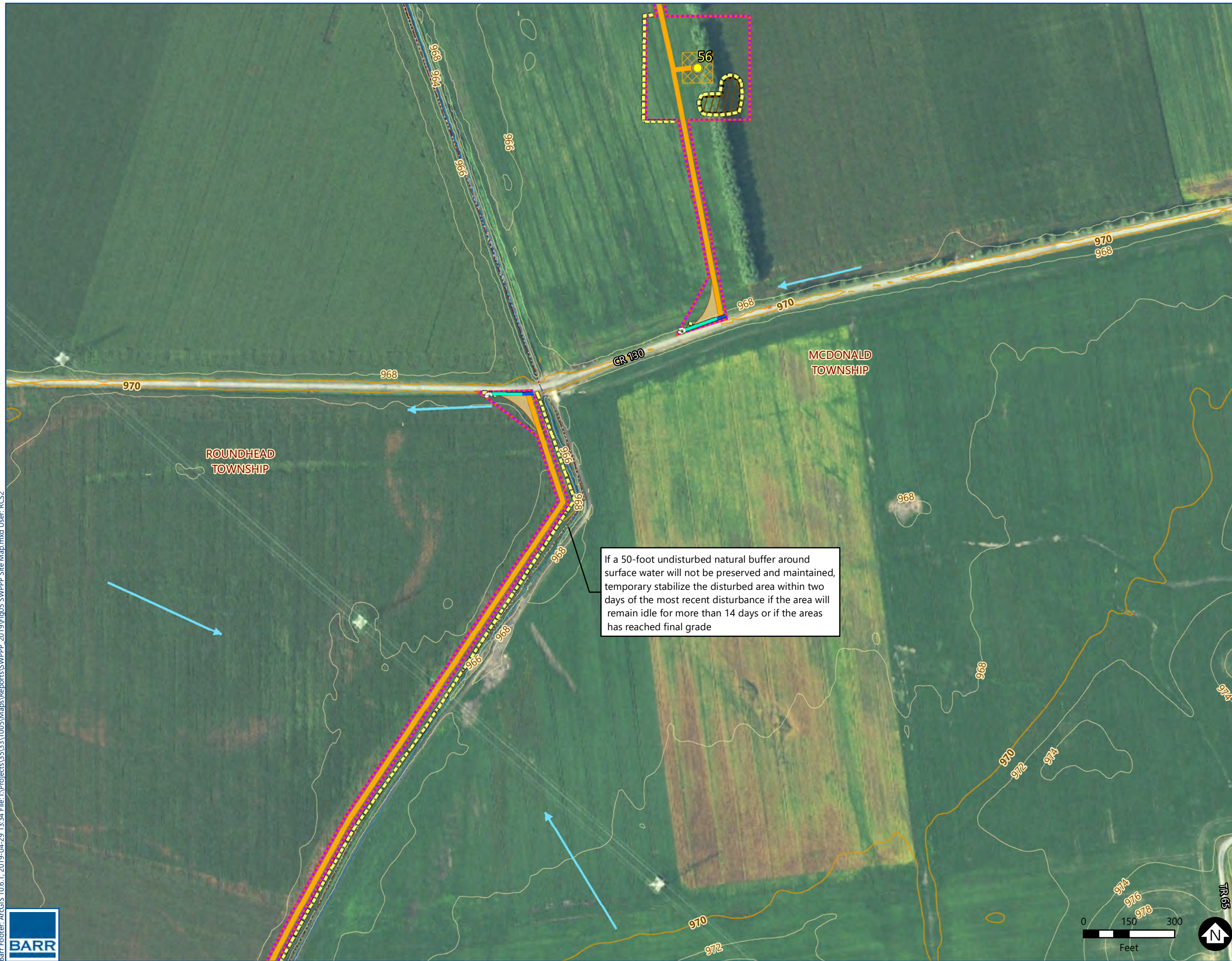
- Turbine Location
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Excavation Extent
- Gravel Extent
- ⊖ Temporary Soil Stockpile
- Construction Limits
- ~ NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
- ▨ Freshwater Emergent Wetland
- Elevation Contour (2006)**
- 10 Foot Contour
- 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-10





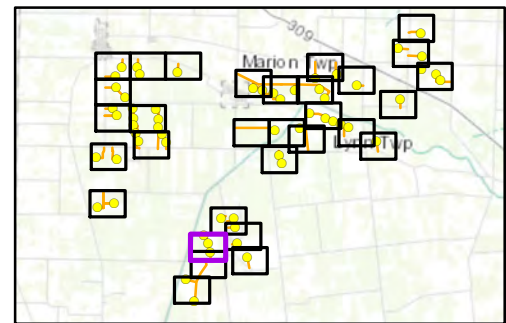
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- Erosion Control Matting
- Turn Radius
- Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- NHD Flowline
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-11

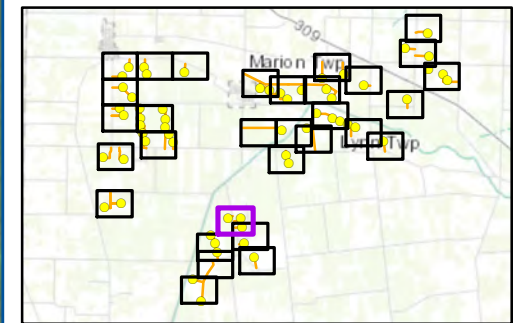




- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

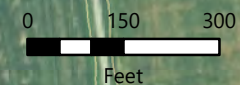
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- Erosion Control Matting
- Turn Radius
- Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- ~ Surveyed Wetlands
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

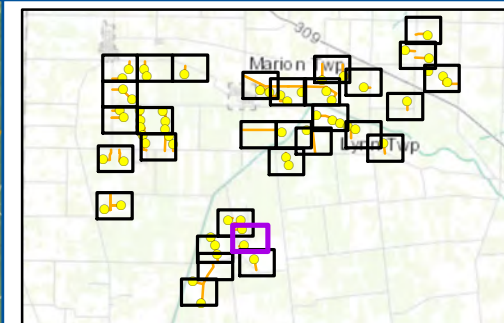
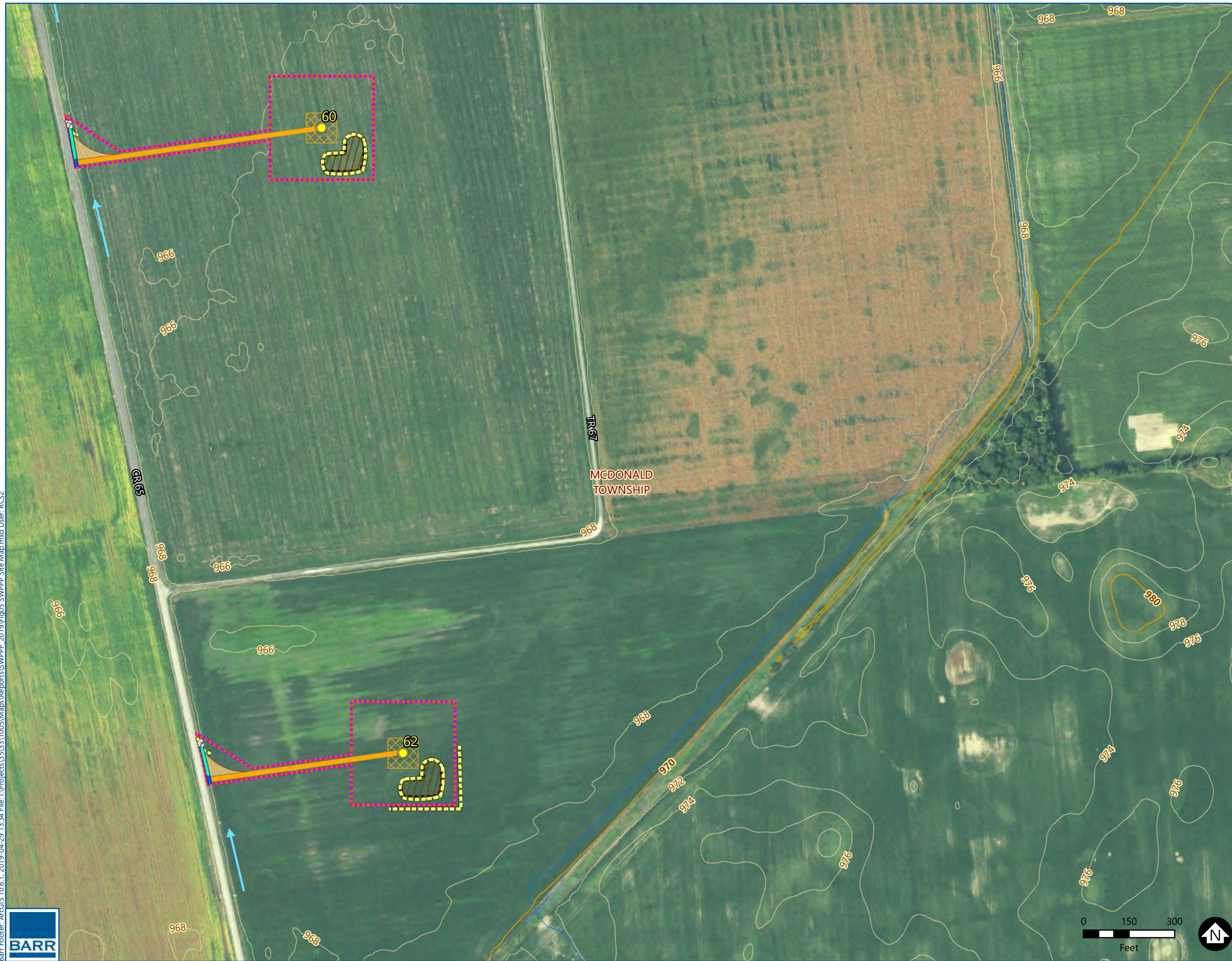
- Notes**
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.



SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

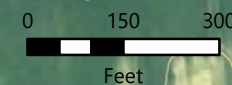
FIGURE 5-13





- Turbine Location
- Drainage Flow
- Permanent Culvert
- - - Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Elevation Contour (2006)**
- 10 Foot Contour
- 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

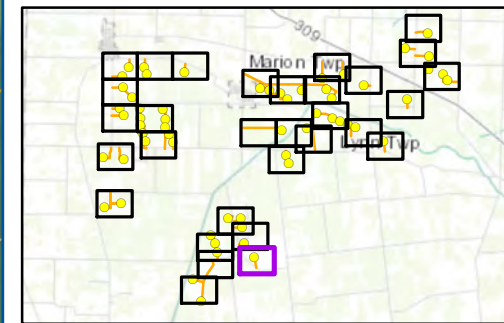


SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-14



Barr Footer: ArcGIS 10.6.1, 2019-04-29 13:34 File: \\Projects\\3533\\1005\\Maps\\Reports\\SWPPP Site Map.mxd User: RCS2



- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- - - Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- - - Construction Limits
- NHD Flowline
- Surveyed Wetlands
- Wetlands (NWI)**
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetland
  - Freshwater Pond
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

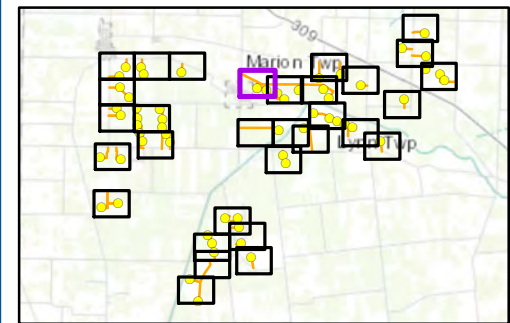
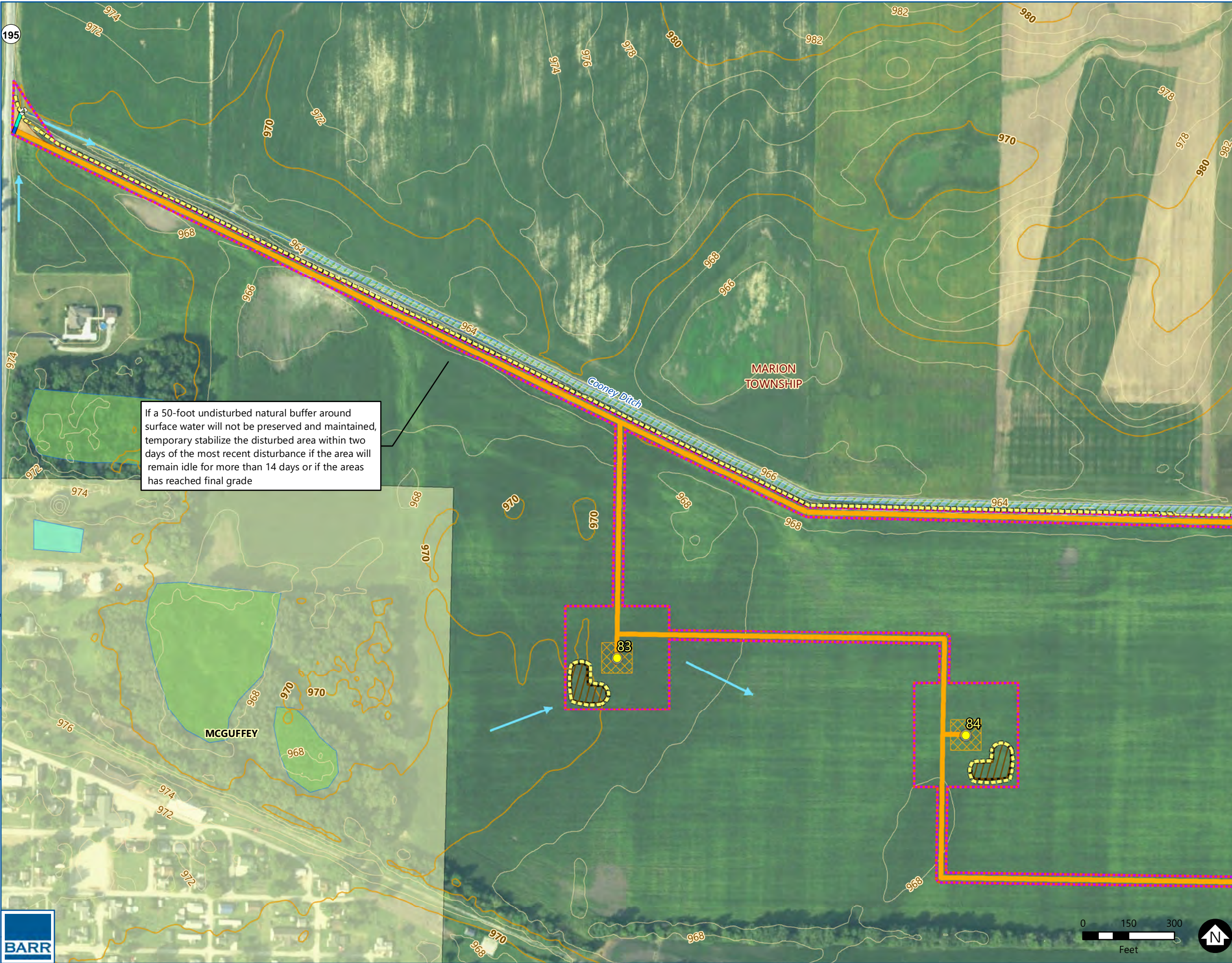
SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-15

0 150 300  
Feet

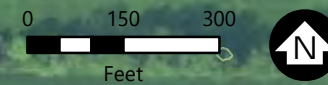






- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- NHD Flowline
- Surveyed Wetlands
- Wetlands (NWI)**
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour
  - Municipal Boundary

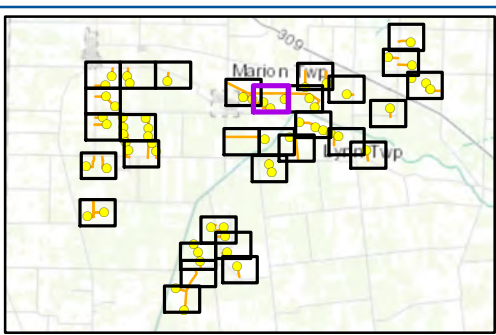
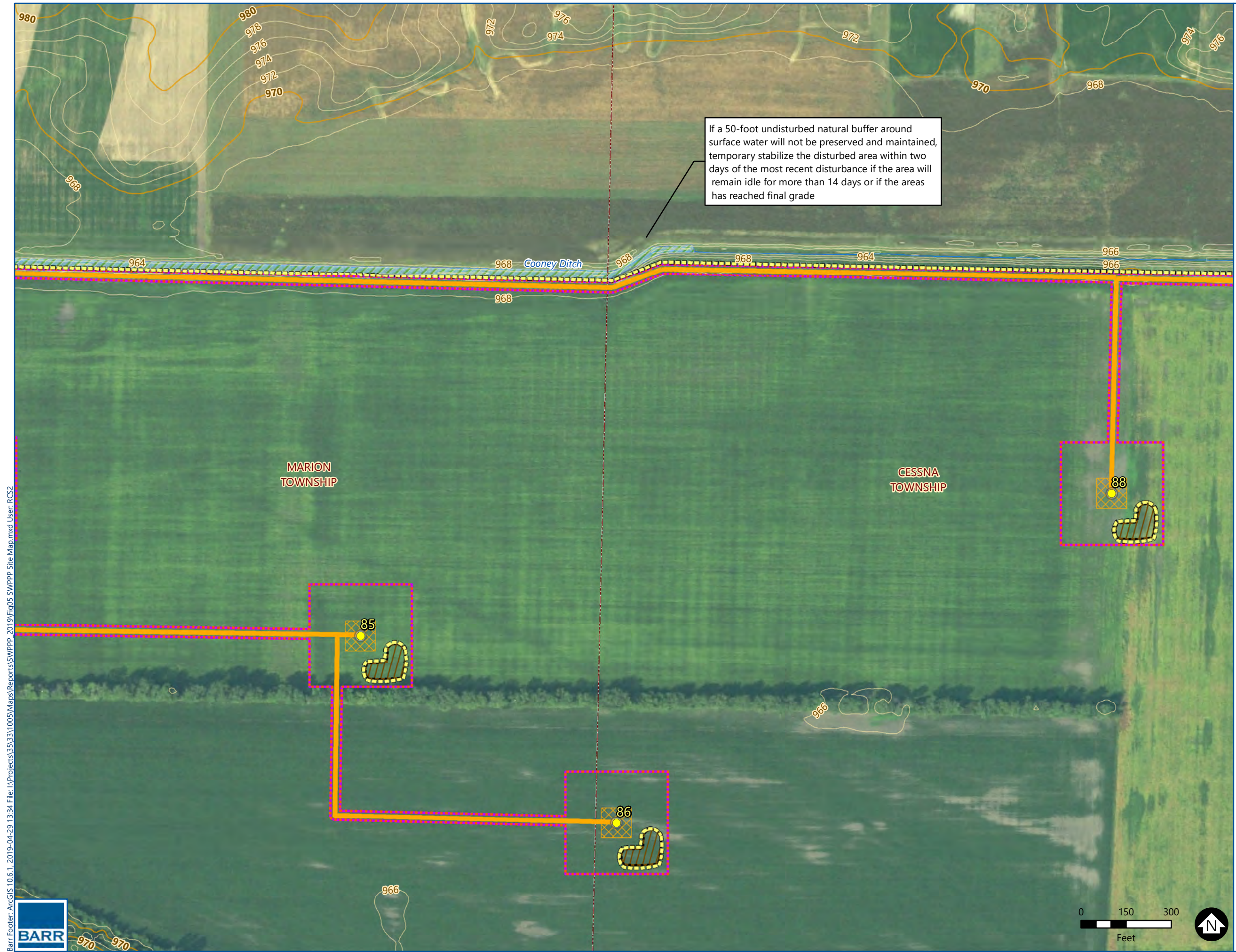
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.



SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-16





- Turbine Location
  - Sediment Barrier
  - Permanent Access Road (16')
  - ▨ Excavation Extent
  - Gravel Extent
  - ⬭ Temporary Soil Stockpile
  - ▭ Construction Limits
  - ~ NHD Flowline
  - ▨ Surveyed Wetlands
- Elevation Contour (2006)**
- 10 Foot Contour
  - 2 Foot Contour

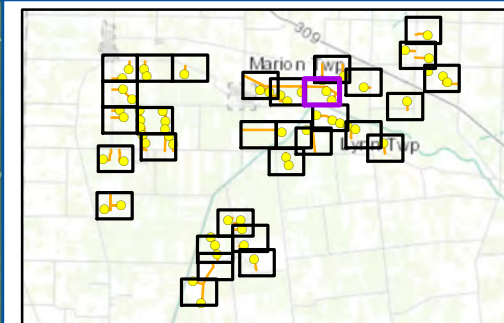
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

Barr Footer: ArcGIS 10.6.1, 2019-04-29 13:34 File: \\Projects\3533\1005\Maps\Reports\SWPPP\2019\Fig05 SWPPP Site Map.mxd User: RCS2



SWPPP SITE MAP  
 Hardin County Wind Project  
 Invenergy LLC  
 Hardin County, Ohio  
 FIGURE 5-17





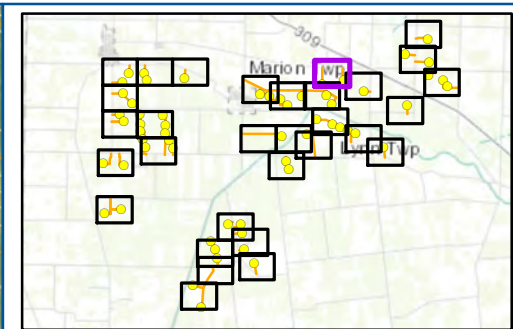
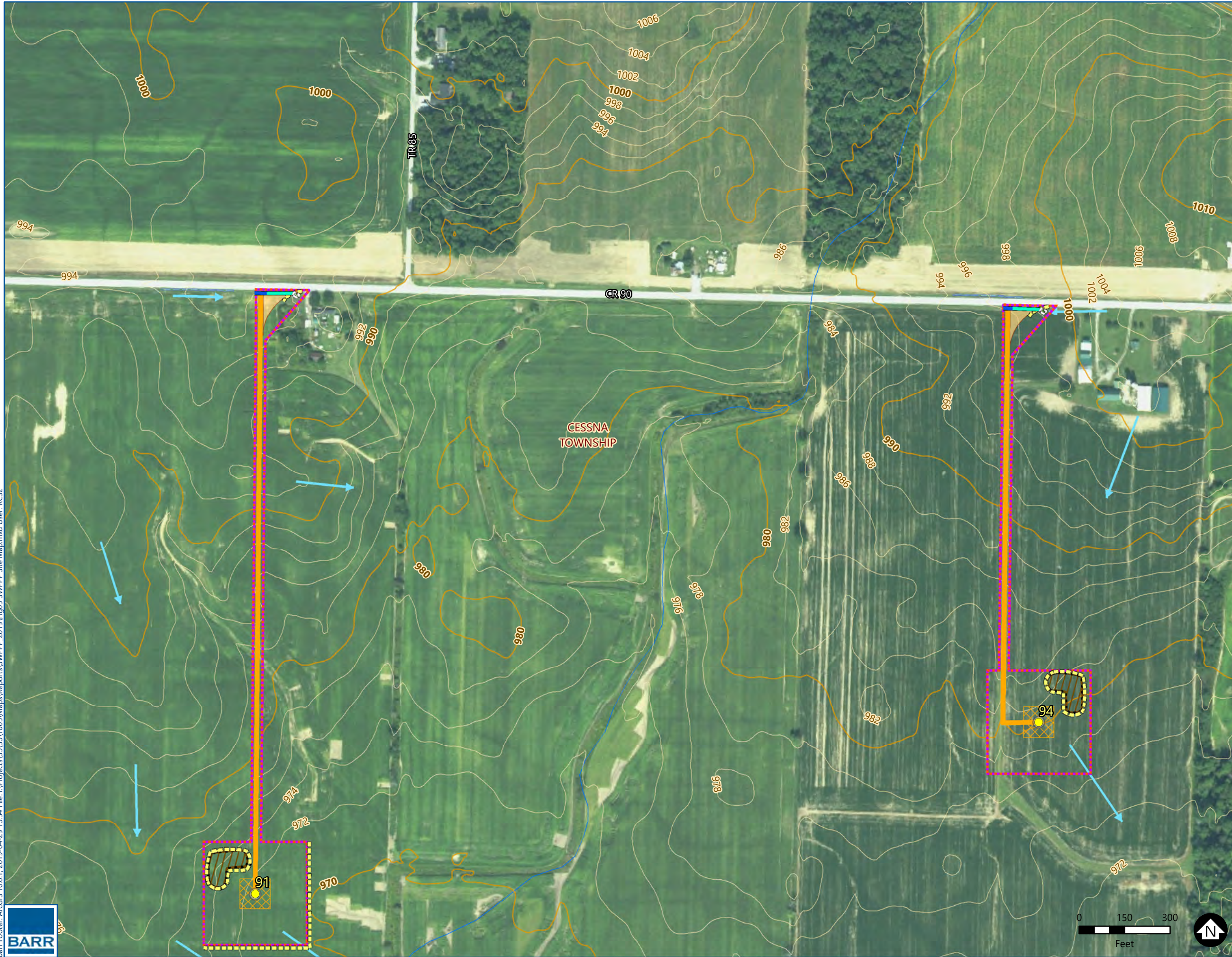
- Turbine Location
- Drainage Flow
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▭ Construction Limits
- ~ NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-18





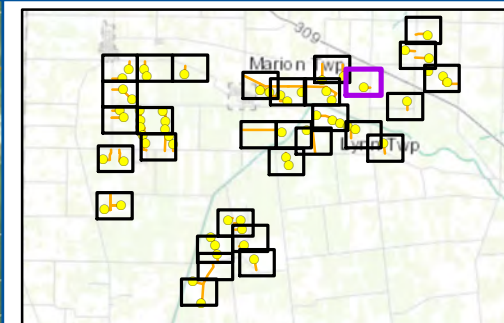
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-19





- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- Wetlands (NWI)**
  - Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

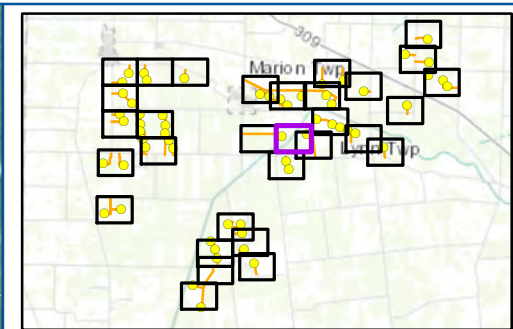
SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-20









- Turbine Location
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Excavation Extent
- Gravel Extent
- ⬭ Temporary Soil Stockpile
- Construction Limits
- ~ NHD Flowline
- ▨ Surveyed Wetlands
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.



SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-22

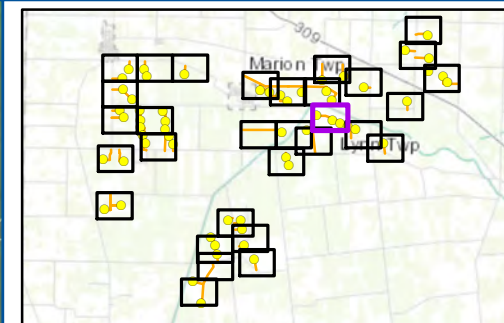












- Turbine Location
- Drainage Flow
- Sediment Barrier
- Permanent Access Road (16')
- Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- NHD Flowline
- Wetlands (NWI)**
  - Freshwater Emergent Wetland
  - Riverine
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

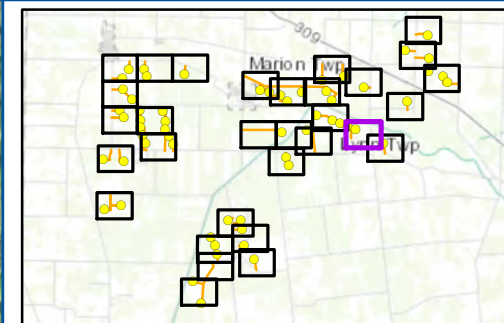
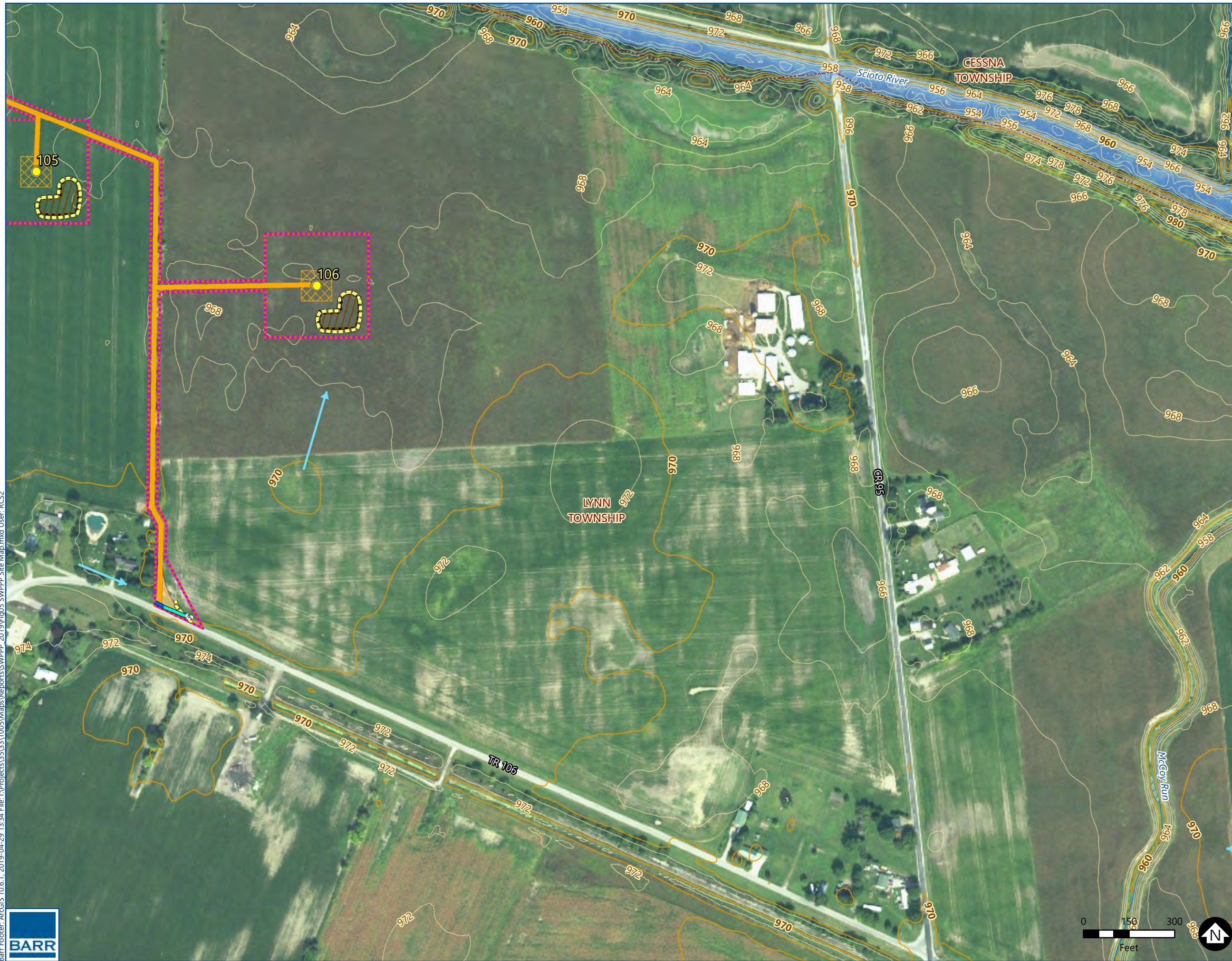
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-25

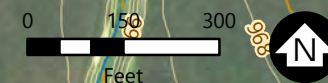






- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Riverine
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

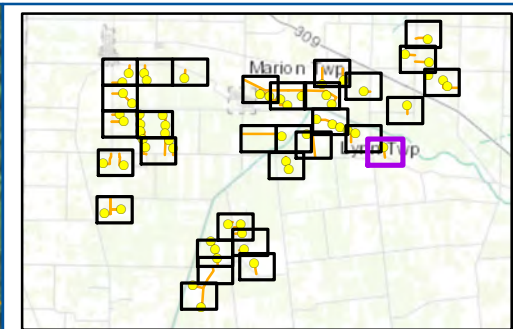
- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.



SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-26

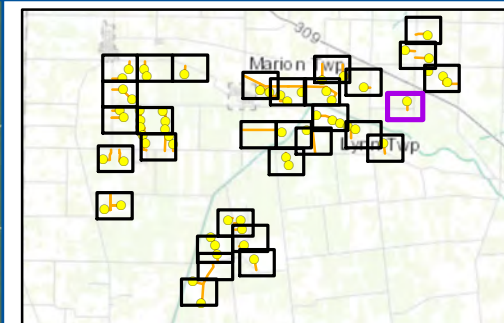
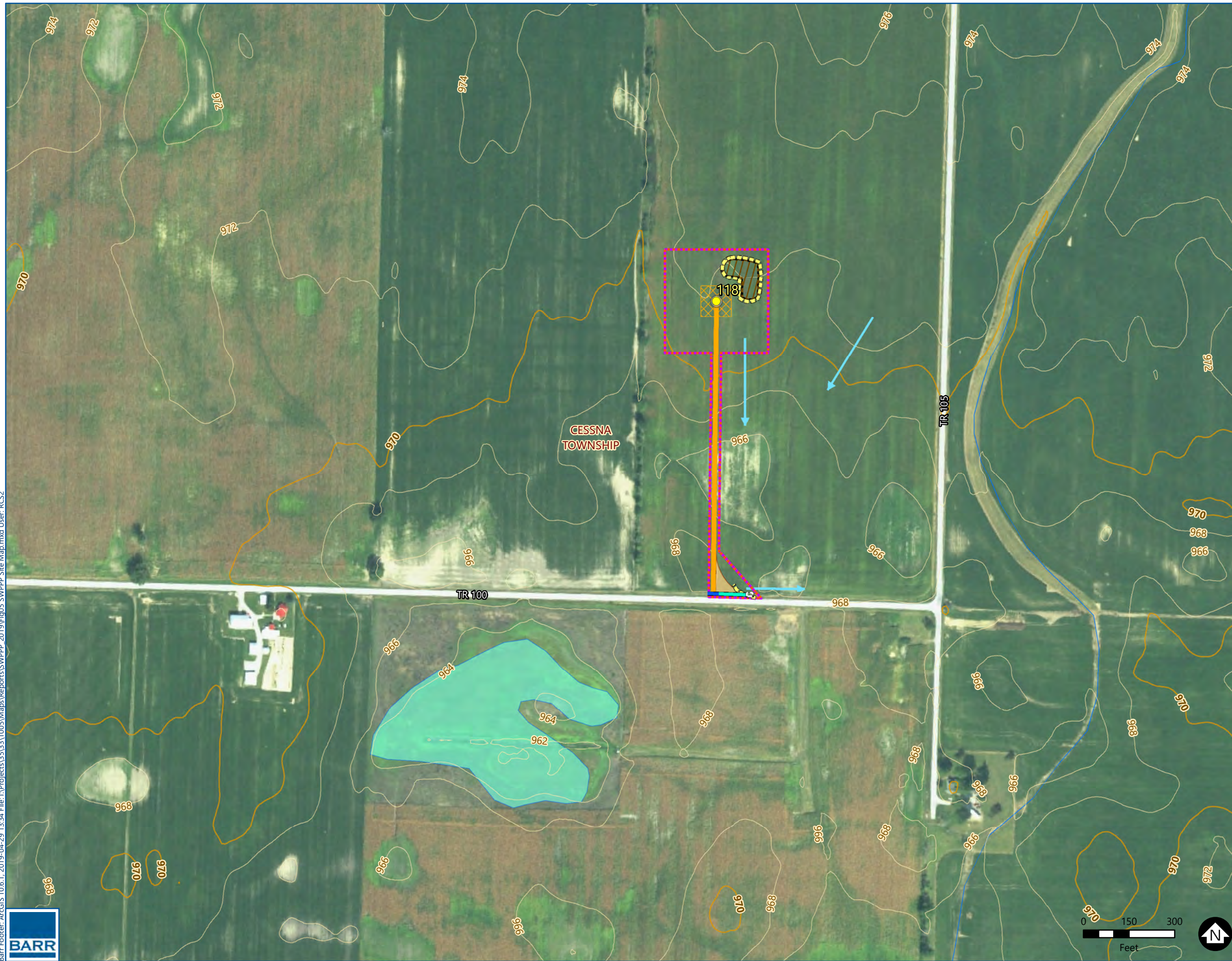




- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- ▨ Surveyed Wetlands
- Wetlands (NWI)**
  - ▨ Freshwater Emergent Wetland
  - ▨ Freshwater Forested/Shrub Wetland
  - ▨ Freshwater Pond
  - ▨ NHD Waterbody
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





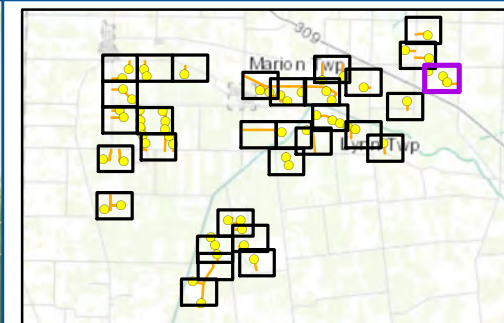
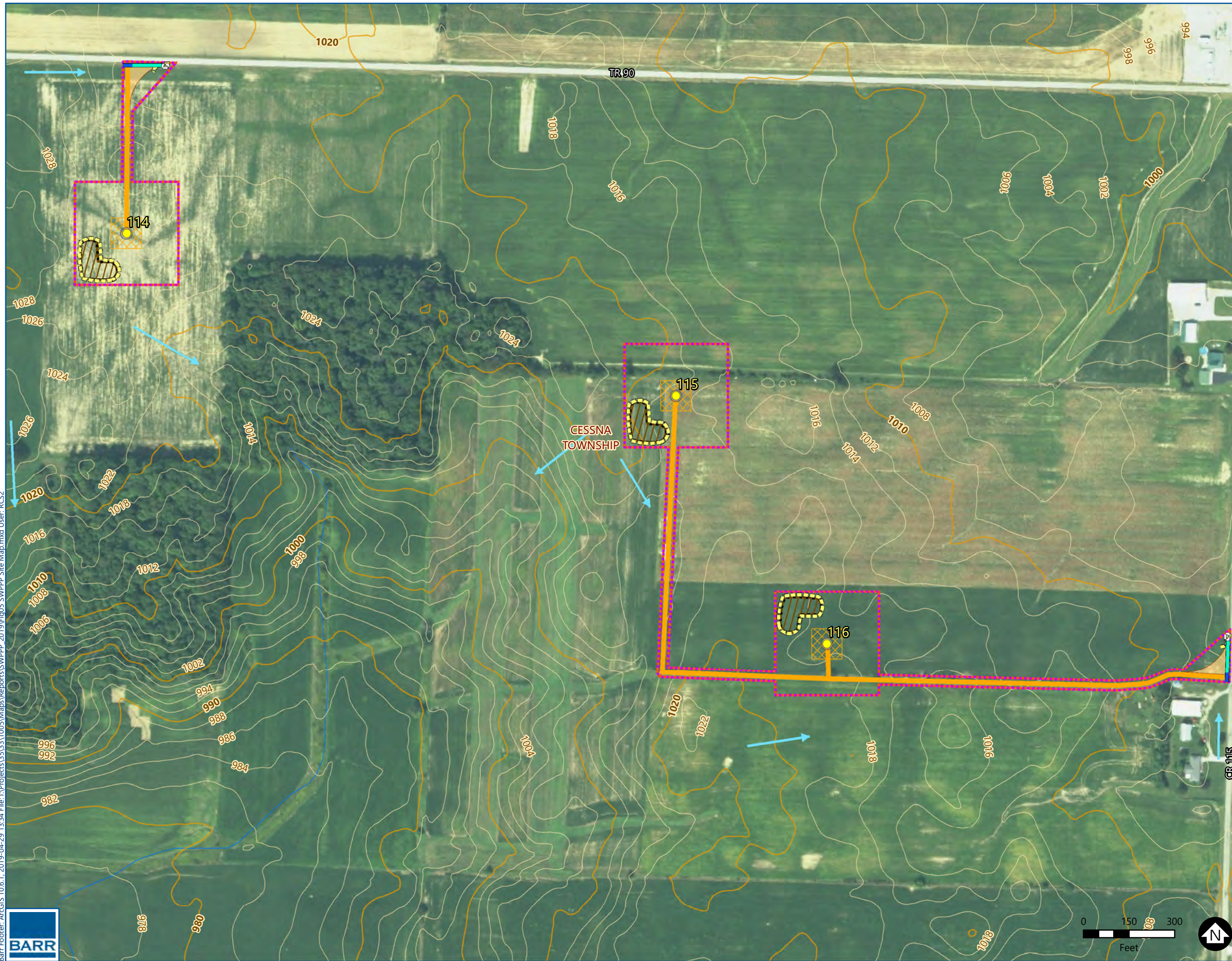
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▨ Construction Limits
- NHD Flowline
- Wetlands (NW1)**
  - Freshwater Emergent Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-28





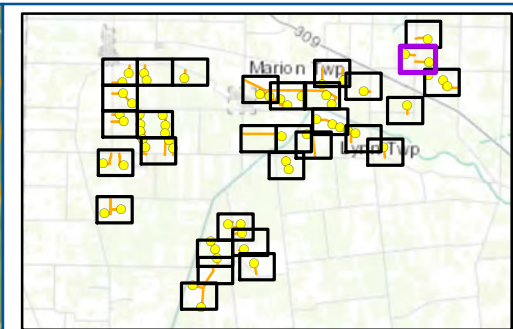
- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- ▨ Erosion Control Matting
- Turn Radius
- ▨ Excavation Extent
- Gravel Extent
- ▨ Temporary Soil Stockpile
- ▭ Construction Limits
- NHD Flowline
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-29

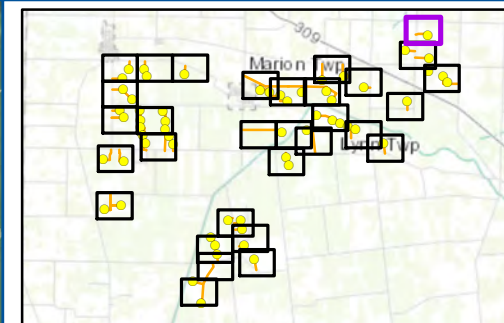
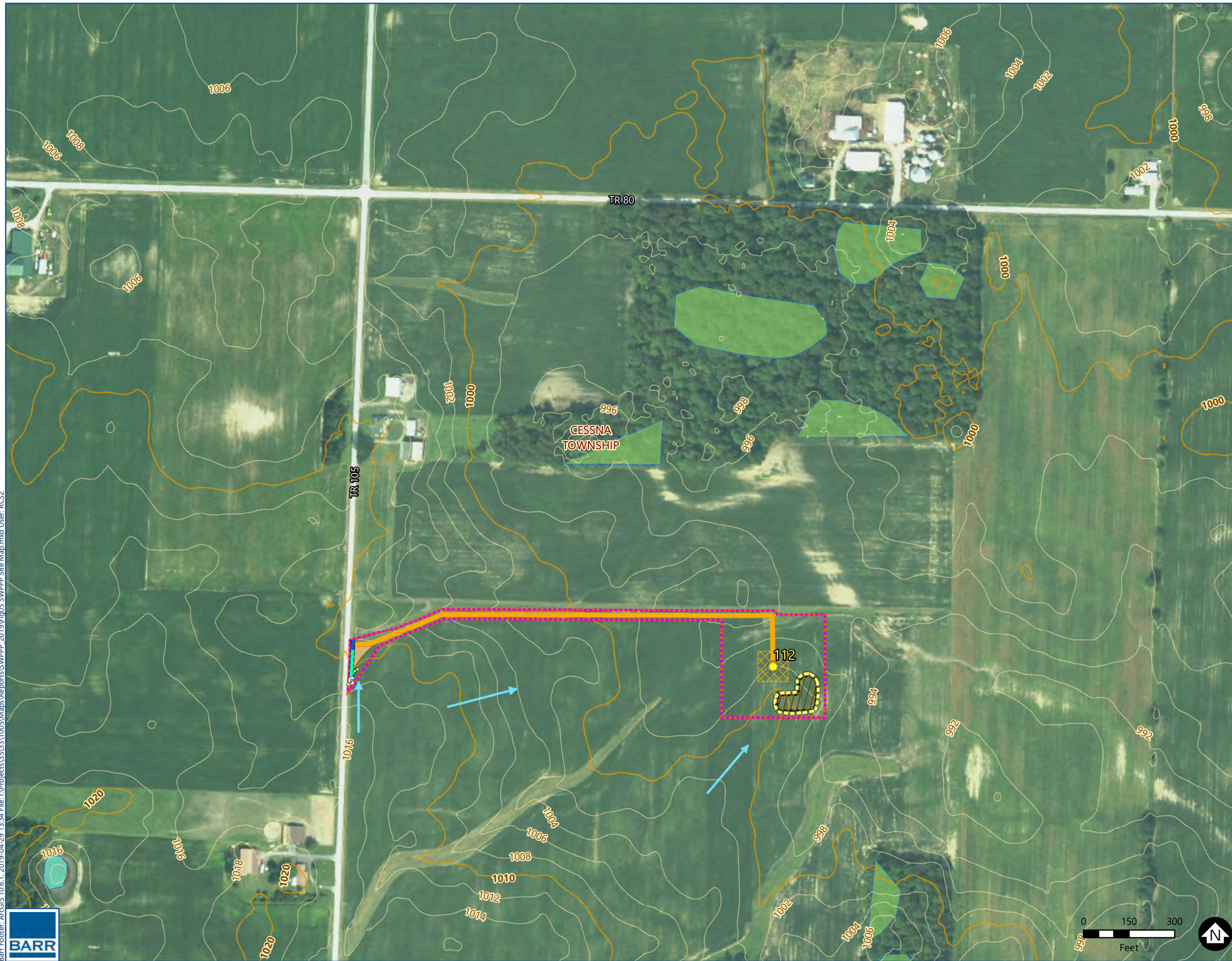




- Turbine Location
- Drainage Flow
- Permanent Culvert
- Temporary Culvert
- Sediment Barrier
- Permanent Access Road (16')
- Erosion Control Matting
- Turn Radius
- Excavation Extent
- Gravel Extent
- Temporary Soil Stockpile
- Construction Limits
- Wetlands (NW1)**
  - Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
  - 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.





- Turbine Location
  - Drainage Flow
  - Permanent Culvert
  - Temporary Culvert
  - Sediment Barrier
  - Permanent Access Road (16')
  - ▨ Erosion Control Matting
  - Turn Radius
  - ▨ Excavation Extent
  - Gravel Extent
  - ▨ Temporary Soil Stockpile
  - ▨ Construction Limits
- Wetlands (NWI)**
- ▨ Freshwater Emergent Wetland
  - ▨ Freshwater Forested/Shrub Wetland
- Elevation Contour (2006)**
- 10 Foot Contour
  - 2 Foot Contour

- Notes
1. If a disturbed area, including soil piles, will remain undisturbed for more than 14 days, install sediment barriers (silt fence or a 12-inch diameter filter sock) on all downgradient perimeters prior grading activity and within 7 days of grubbing activities.
  2. Installed sediment barriers at the access road entrance and culvert entrance as shown on Figure 3 (Typical Turbine Location Layout).
  3. Do not install silt fence in areas with concentrated flow (example: roadside ditches).
  4. Disturbed areas will be stabilized in accordance with Section 3.2.1.
  5. If a 50-foot undisturbed natural buffer around surface water will not be preserved and maintained, temporary stabilize the disturbed area within two days of the most recent disturbance if the area will remain idle for more than 14 days or if the areas has reached final grade.
  6. All disturbed swales/channels will be stabilized with seed and erosion control blankets.

SWPPP SITE MAP  
Hardin County Wind Project  
Invenergy LLC  
Hardin County, Ohio

FIGURE 5-31



**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**6/17/2019 4:17:50 PM**

**in**

**Case No(s). 09-0479-EL-BGN, 11-3446-EL-BGA, 16-2404-EL-BGA, 16-0469-EL-BGA**

Summary: Notification of Phase 3 – Compliance with Condition 54,  
Storm Water Pollution Prevention Plan electronically filed by Christine M.T. Pirik on behalf of  
Hardin Wind Energy LLC