Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

6/1/2016

Windrift Farm LLC
7184 Rosewood-Quincy Rd
DeGraff, OH 43318-9520

RE: Director's Final Findings & Orders
NPDES
Champaign County
8OU00022

Ladies and Gentlemen:

Transmitted herewith is one copy of the Director's Final Findings & Orders in the referenced matter.

Sincerely,

Kevin J. Fowler, Supervisor
Permit Processing Unit
Division of Surface Water

KJF/dks

Enclosure

CERTIFIED MAIL

cc: M. Mann, DSW
R. DeMuth, DSW
B. Schuch, DSW
L. Reeder, DSW
J. Martin, DSW
Fiscal
Compliance Section
M. McCarron, PIC
H. Griesmer, PIC
M. Burt, SWDO/DSW
B. Fischbein, Legal
P. Simcic, Legal
P. Fallah, DEFA
Journal Room
File

Ohio EPA Invoice/Receipt

Date Printed: June 01, 2016

Revenue ID: 1092176

Please include this Revenue ID with all correspondence.

Organization ID: 107337

Information: Windrift Farms
7184 Rosewood Quincey Rd.
Degraff, OH 43318-

Due Date: July 02, 2016

Amount Due: $5,000.00

Effective Date: June 01, 2016

Revenue Description: DSW- Findings and Orders-Civil Penalties (FOSW)
Program Name: Surface Water Programs
Reason: FO for Windrift Farm LLC 8OU00022

For some Revenues, Interest and/or Penalties may be charged for late payment.

Next Interest Date (if applicable):

Next Penalty Date (if applicable):

Remittance Advice **Detach Here - Please Return This Portion With Your Payment**

Organization ID: 107337

Information: Windrift Farms
7184 Rosewood Quincey Rd.
Degraff, OH 43318-

Due Date: Jul 02, 2016

Amount Due: $5,000.00

Secondary Type/Id: /

Revenue Type: FOSW

Amount Enclosed: $_____

Many Ohio EPA fee invoices are payable online. For online credit card or ACH payment, go to https://eBiz.epa.ohio.gov, login or create an account and from the "Available Services" window choose "Pay Ohio EPA Fees Online".

Please write this number on your check. Revenue ID: 1092176
Make check or money order payable to "Treasurer, State of Ohio"

Remit to: **Ohio Environmental Protection Agency - OFA**
Department L-2711
Columbus, OH 43260-2711

For Ohio EPA use only

Check ID: _____
Check Date: _____
Check Number: _____
Check Amount: $_____

107337	Windrift Farms	500000	FOSW	1092176

OHIO E.P.A.
JUN - 1 2016
ERED DIRECTOR'S JOURNAL

BEFORE THE
OHIO ENVIRONMENTAL PROTECTION AGENCY

In the Matter of:

Windrift Farm, LLC **7184 Rosewood-Quincy Rd.** **DeGraff, OH 43318-9520**	: : :	**Director's Final** **Findings and Orders**

Respondent

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: [signature] Date: 6-1-16

PREAMBLE

It is agreed by the parties hereto as follows:

I. JURISDICTION

These Director's Final Findings and Orders ("Orders") are issued to Windrift Farm, LLC ("Respondent") pursuant to the authority vested in the Director of the Ohio Environmental Protection Agency ("Ohio EPA") under Ohio Revised Code ("ORC") §§ 6111.03, 3704.03, and 3745.01.

II. PARTIES BOUND

These Orders shall apply to and be binding upon Respondent and successors in interest liable under Ohio law. No change in the composition of Respondent shall in any way alter Respondent's obligations under these Orders.

III. DEFINITIONS

Unless otherwise stated, all terms used in these Orders shall have the same meaning as defined in ORC Chapters 6111, 3704, and 3745 and the rules promulgated thereunder.

IV. FINDINGS

The Director of Ohio EPA has determined the following findings:

1. Respondent owns an approximately 174-acre property located at 12230 Putnam Road, Johnson Township, Champaign County, Ohio ("the Site").

2. On August 3, 2012, Ohio EPA, Southwest District Office, Division of Air Pollution Control conducted a complaint investigation at the Site. As a result of the investigation, the Director determined that Respondent had violated Ohio Administrative Code ("OAC") Rule 3745-19-04(B) by open burning improper waste materials for disposal purposes and by conducting open burning at a

location that was not at least 1,000 feet from any inhabited building not located on the Site.

3. On August 8, 2012, Ohio EPA, Southwest District Office, Division of Air Pollution Control issued a Notice of Violation to Respondent for the aforementioned violations of OAC Rule 3745-19-04(B).

4. On October 12, 2012, Ohio EPA received verified complaint (#12-026 VC) alleging that Respondent had filled in and relocated a portion of an unnamed tributary to Mosquito Creek, and had illegally dumped, buried, or burned solid waste at the Site.

5. The unnamed tributary flows into Kiser Lake which discharges into Mosquito Creek. The unnamed tributary, Kiser Lake and Mosquito Creek are considered "waters of the state" as defined by ORC § 6111.01.

6. Ohio EPA Division of Surface Water and the Champaign County Soil and Water Conservation District performed an investigation of the property on September 18, 2012. A subsequent investigation was performed on April 10, 2013.

7. As a result of these investigations Ohio EPA determined that approximately 428 feet of the stream had been filled, and that a new channel had been excavated approximately 90 feet to the west which conveys water to the natural stream channel downstream. The investigations also observed that the riparian vegetation had been removed, causing significant erosion and sedimentation along the stream channel.

8. These activities constitute a discharge of fill material which would require a Section 401 water quality certification from Ohio EPA and a Department of the Army Section 404 permit from the United States Army, Corps of Engineers ("USACE"). Neither the Ohio EPA nor the USACE has a record of a permit application for the activity observed on the Site.

9. Pursuant to ORC § 6111.04, no person shall place or discharge, or cause to be placed or discharged, in any waters of the state any sewage, sludge, sludge materials, industrial waste, or other wastes without a valid, unexpired permit.

10. In impacting the unnamed tributary, as described above without a 401 water quality certification or other permit or authorization from Ohio EPA, Respondent has caused pollution by discharging or placing or causing to be placed other wastes into waters of the state in violation of ORC §§ 6111.04 and 6111.07.

11. The Director has given consideration to, and based his determination on, evidence relating to the technical feasibility and economic reasonableness of complying with the following Orders and their relation to benefits to the people of the State to be derived from such compliance.

V. ORDERS

The Director hereby issues the following Orders:

1. Respondent shall preserve a total of six hundred forty two linear feet (642') of the unnamed tributary and associated riparian and upland buffer (the "Preservation Area") pursuant to the environmental covenant attached to these Orders as Appendix A. The boundaries of the Preservation Area are described in the legal description set forth in the environmental covenant.

2. Respondent shall exclude cattle from the Preservation Area by means of a permanent fence. Respondent shall construct the permanent fence no later than December 31, 2016.

3. Respondent shall restore four hundred twenty-eight linear feet (428') of the unnamed tributary in accordance with the September 10, 2014 Stream Restoration Plan ("SRP") attached to these Orders as Appendix B. For purposes of this restoration:

    a. The Director and Respondent agree that Respondent satisfactorily completed the grading, channel widening, and other earthmoving activities set forth in the SRP as of November, 2014.

    b. Respondent represents that between September, 2014 and the present:

        i. Respondent reseeded all areas disturbed by earthmoving with wild rye, little bluestem, and fescue grasses. This seeding was stabilized with netted straw matting along the banks.

        ii. Respondent planted 136 trees and shrubs in the areas of Figure 4 of the SRP shown with green and yellow shading. Approximately 50% of the plantings were of bare rootstock tree species 12-18" tall, including cottonwood, walnut and maple. Shrub species were chokeberry and buttonbush.

        iii. Respondent planted deep-rooted herbaceous vegetation, including sedges, indian wood oats, coreopsis, and trefoil, in May of 2015 to stabilize bank soils until woody vegetation is well-established. This vegetation was planted 4-8 feet apart in a staggered pattern, in accordance with ODNR guidelines.

    c. The Director finds that the vegetative planting described in (b), above, is in accordance with the SRP. This finding does not release Respondent from the obligation to achieve the Restoration Goals set forth in Order (4), below.

4. Respondent shall achieve the following Restoration Goals within five (5) years of the date of these Orders:

   a. Demonstrate that the areas of Figure 4 of the SRP shown with green and yellow shading have been populated with native trees and shrubs at a rate of 400 individuals per acre; and

   b. Demonstrate the areas within the restored stream are not showing signs of excessive bank erosion, sedimentation, headcutting, or degradation.

5. Respondent shall allow duly authorized representatives from the Ohio EPA or the Champaign County Soil and Water Conservation District access to the Site at all reasonable times to monitor the progress of the restoration and for compliance with these Orders. Ohio EPA or the Champaign County Soil and Water Conservation District shall notify Respondent at least seven (7) days prior to accessing the Site. Respondent or the Champaign County Soil and Water Conservation District may monitor the stream restoration in six month intervals for the first year of the monitoring, and thereafter yearly for the next four years.

6. Respondent shall execute the environmental covenant agreed to by the parties for the Preservation Area and file it with the Champaign County Recorder. Respondent shall submit to Ohio EPA a true copy of the conservation easement or environmental covenant as filed with the County Recorder.

7. Respondent shall pay to the Ohio EPA the amount of five thousand dollars ($5,000.00) in settlement of the Ohio EPA's claim for civil penalties, which may be assessed pursuant to ORC § 6111.09. Payment shall be made by tendering an official check made payable to "Treasurer, State of Ohio" for the total amount within thirty (30) days of the effective date of these Orders, , together with a letter identifying Respondent, to:

   Office of Fiscal Administration
   Ohio Environmental Protection Agency
   P.O. Box 1049
   Columbus, OH 43216-1049

   A photocopy of the check shall be sent to Ohio EPA, Central Office, in accordance with Section X of these Orders.

VI. TERMINATION

Respondent's obligations under these Orders shall terminate when Respondent certifies in writing and demonstrates to the satisfaction of Ohio EPA that Respondent has performed all obligations under these Orders and the Chief of Ohio EPA's Division of Surface Water acknowledges, in writing, the termination of these Orders. If Ohio EPA does not agree that all obligations have been performed, then Ohio EPA will notify

Respondent of the obligations that have not been performed, in which case Respondent shall have an opportunity to address any such deficiencies and seek termination as described above.

The certification shall contain the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate and complete."

This certification shall be submitted by Respondent to Ohio EPA and shall be signed by a responsible official of Respondent. For purposes of these Orders, a responsible official is as defined in OAC Rule 3745-33-03.

VII. OTHER CLAIMS

Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership or corporation, not a party to these Orders, for any liability arising from, or related to activities occurring at the Site.

VIII. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to these Orders shall be undertaken in accordance with the requirements of all applicable local, state, and federal laws and regulations. These Orders do not waive or compromise the applicability and enforcement of any other statutes or regulations applicable to Respondent.

IX. MODIFICATIONS

These Orders may be modified by agreement of the parties hereto. Modifications shall be in writing and shall be effective on the date entered in the journal of the Director of Ohio EPA.

X. NOTICE

All documents required to be submitted by Respondent pursuant to these Orders shall be addressed to:

Ohio Environmental Protection Agency
Division of Surface Water
401 Permitting Unit
P.O. Box 1049, Columbus, OH 43216-1049

or to such persons and addresses as may hereafter be otherwise specified in writing by Ohio EPA.

Notifications to Respondent shall be directed to the following:

Windrift Farm, LLC
7184 Rosewood-Quincy Rd.
DeGraff, OH 43318-9520

XI. RESERVATION OF RIGHTS

Ohio EPA and Respondent each reserve all rights, privileges and causes of action, except as specifically waived in Section XII of these Orders.

XII. WAIVER

In order to resolve disputed claims, without admission of fact, violation or liability, and in lieu of further enforcement action by Ohio EPA for only the violations specifically cited in these Orders, Respondent consents to the issuance of these Orders and agrees to comply with these Orders. Compliance with these Orders shall be a full accord and satisfaction for Respondent's liability for the violations specifically cited herein.

Respondent hereby waives the right to appeal the issuance, terms and conditions, and service of these Orders and Respondent hereby waives any and all rights Respondent may have to seek administrative or judicial review of these Orders either in law or equity.

Notwithstanding the preceding, Ohio EPA and Respondent agree that if these Orders are appealed by any other party to the Environmental Review Appeals Commission, or any court, Respondent retains the right to intervene and participate in such appeal.

XIII. EFFECTIVE DATE

The effective date of these Orders is the date these Orders are entered into the Ohio EPA Director's journal.

IV. SIGNATORY AUTHORITY

Each undersigned representative of a party to these Orders certifies that he or she is fully authorized to enter into these Orders and to legally bind such party to these Orders.

IT IS SO ORDERED AND AGREED:

Ohio Environmental Protection Agency

Craig W. Butler
Director

5/27/16
Date

IT IS SO AGREED:

Windrift Farm, LLC

Signature

3.22.16
Date

Dana Current, President
Printed or Typed Name and Title

Appendix A

To be recorded with Deed Records - R.C. Section 317.08

ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into pursuant to Ohio Revised Code ("R.C.") Sections 5301.80 to 5301.92 by Windrift Farm, LLC, a for-profit corporation (the "Owner" and "Holder"), having an address of 7184 Rosewood-Quincy Road, DeGraff, Ohio, and the Ohio Environmental Protection Agency ("Ohio EPA"), as a non-holder agency, for the purpose of subjecting certain property ("the Covenant Area") to the activity and use limitations set forth herein.

WHEREAS, the Owner is the owner in fee of certain real property located at 12230 Putnam Road, Johnson Township, St. Paris, Ohio ("the Property"), which contains the Covenant Area and is situated in Champaign County, Ohio, in the Mosquito Creek watershed;

WHEREAS, the Ohio EPA and Owner have agreed that Owner will protect the Covenant Area in perpetuity with an environmental covenant;

WHEREAS, the specific conservation values (hereinafter "Conservation Values") of the Covenant Area have been documented in a document entitled "Windrift Farm Stream Restoration Plan" dated September 10, 2014 (the "Mitigation Plan").

WHEREAS, Owner proposes to protect the Covenant Area and the Covenant Area's Conservation Values in perpetuity by this Environmental Covenant.

Now therefore, Owner and Ohio EPA agree to the following:

1. Environmental Covenant. This instrument is an environmental covenant developed and executed pursuant to R.C. Sections 5301.80 to 5301.92.

2. Covenant Area. The Covenant Area is located on the Property in

Champaign County, Ohio, and is more particularly described in Exhibit A attached hereto and hereby incorporated by reference herein ("the Covenant Area").

3. The Owner shall be the Holder of this Environmental Covenant.

4. Activity and Use Limitations. The Owner hereby imposes and agrees to comply with the following activity and use limitations on the Covenant Area:

Division: Any division or subdivision of the Covenant Area is prohibited;

Agricultural Activities: Cattle and any other livestock shall be excluded from the Covenant Area and are prohibited from grazing in, or accessing the stream in, the Covenant Area.

Commercial Activities: Commercial development or industrial activity on the Covenant Area is prohibited. Storage of agricultural supplies, feed, manure, fertilizer or commodities is prohibited.

Construction: The placement or construction of any man-made modifications such as buildings, structures, roads and parking lots on the Covenant Area is prohibited, other than (a) construction of fencing along the perimeter of the Covenant Area and (b) construction activities that are authorized by the Mitigation Plan approved by the Ohio EPA;

Cutting and Other Control of Vegetation: Any cutting of live trees, ground cover or vegetation, or destroying the same by means of herbicides on the Covenant Area is prohibited, other than (a) the removal or control of invasive and noxious species, (b) control activities that are authorized by the Mitigation Plan approved by the Ohio EPA, and (c) removal of trees or vegetation necessary to maintain fencing along the perimeter of the Covenant Area;

Land Surface Alteration: Any act that removes soil, sand, gravel, rock, minerals or other materials from the Covenant Area, or that would alter the topography of the Covenant Area, is prohibited;

Water Courses: Any act which involves or results in dredging, straightening, filling, channelization, impediment, diversion, or other alteration of water courses and streams and adjacent riparian buffers is prohibited except as part of activities that are authorized by the Mitigation Plan approved by the Ohio EPA.

Utilities: Underground or above-ground utilities may only be constructed if

no other alternative are available and Ohio EPA has approved the exception;

Other Activities: Each and every other activity or construction project which might endanger the natural, scenic, biological, or ecological integrity of the Covenant Area shall be prohibited.

5. Running with the Land. This Environmental Covenant shall be binding upon the Owner and all assigns and successors in interest, including any Transferee, and shall run with the land, pursuant to R.C. Section 5301.85, subject to amendment or termination as set forth herein. The term "Transferee" as used in this Environmental Covenant, shall mean any future owner of any interest in the Covenant Area or any portion thereof, including, but not limited to, any owner of a fee simple interest, mortgagee, easement holder, and/or lessee.

6. Compliance Enforcement. Compliance with this Environmental Covenant may be enforced pursuant to R.C. Section 5301.91 or other applicable law. Failure to timely enforce compliance with this Environmental Covenant or the use limitations contained herein by any party shall not bar subsequent enforcement by such party and shall not be deemed a waiver of the party's right to take action to enforce any provision of this Covenant. Nothing in this Environmental Covenant shall restrict the Director of Ohio EPA from exercising any authority under applicable law in order to protect public health or safety or the environment.

7. Rights of Access. Owner hereby grants to Ohio EPA, its agents, contractors, and employees the right of reasonable access to the Covenant Area in connection with the implementation or Enforcement of this Environmental Covenant. Ohio EPA, its agents, contractors, and employees shall notify Owner at least seven (7) days prior to accessing the Covenant Area.

8. Compliance Reporting. Owner and any Transferee shall submit to Ohio EPA, upon reasonable request by the Ohio EPA, written documentation verifying that the activity and use limitations remain in place and are being complied with.

9. Notice upon Conveyance. Each instrument hereafter conveying any interest in the Covenant Area or any portion of the Covenant Area shall contain a notice of the activity and use limitations set forth in this Environmental Covenant, and provide the recorded location of this Environmental Covenant. The notice shall be substantially in the following form:

THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT, DATED_____, 201_, RECORDED IN THE DEED OR OFFICIAL RECORDS OF THE CHAMPAIGN COUNTY

RECORDER ON _____, 201_, IN [DOCUMENT ____, *or* BOOK___, PAGE ____,]. THE ENVIRONMENTAL COVENANT CONTAINS THE FOLLOWING ACTIVITY AND USE LIMITATIONS:

[In the notice, restate restrictions from Paragraph 4 of this Covenant]

Owner shall notify Ohio EPA within ten (10) days after each conveyance of an interest in any portion of the Covenant Area. Owner's notice shall include the name, address and telephone number of the Transferee.

10. Representations and Warranties. Owner hereby represents and warrants to Ohio EPA, to the best of Owner's actual knowledge, that:

a. Owner is the sole owner of the Covenant Area;

b. Owner holds fee simple title to the Covenant Area and that the Covenant Area not subject to any utility, road or other easement;

c. Owner has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all obligations hereunder; and

d. that this Environmental Covenant will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which Owner is a party or by which Owner may be bound or affected.

11. Amendment or Termination. This Environmental Covenant may be amended or terminated only by written consent of the Owner (or a Transferee) and the Director of Ohio EPA, pursuant to R.C. §§ 5301.89 or 5301.90 and other applicable law. "Amendment" means any changes to the Environmental Covenant, including the activity and use limitations set forth herein, or the elimination of one or more activity and use limitations when there is at least one limitation remaining. "Termination" means the elimination of all activity and use limitations set forth herein and all other obligations under this Environmental Covenant.

Within thirty (30) days of signature by all requisite parties of any instrument constituting an amendment or termination of this Environmental Covenant, the Owner or Transferee shall file such instrument for recording with the Champaign County Recorder's Office, and shall provide a true copy of the recorded instrument to Ohio EPA.

12. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

13. Governing Law. This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Ohio.

14. Recordation. Within thirty (30) days after the date of the final required signature upon this Environmental Covenant, the Owner shall file this Environmental Covenant for recording, in the same manner as a deed to the property, with the Champaign County Recorder's Office.

15. Effective Date. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded as a deed record for the Covenant Area with the Champaign County Recorder.

16. Distribution of Environmental Covenant. The Owner shall distribute a file- and date-stamped copy of the recorded Environmental Covenant to: Ohio EPA and Johnson Township [see ORC Section 5301.83].

17. Notice. Unless otherwise notified in writing by or on behalf of the current owner or Ohio EPA, any document or communication required by this Environmental Covenant shall be submitted to:

Ohio EPA
Division of Surface Water
Mitigation Compliance
P.O. Box 1049
Columbus, Ohio 43216-1049

The undersigned representatives of the Owner represent and certify that they are authorized to execute this Environmental Covenant.

IT IS SO AGREED:

Windrift Farm, LLC

By: Dana Current
Title: President
Date: March 22, 2016

State of Ohio)
) ss:
County of Champaign)

Before me, a notary public, in and for said county and state, personally appeared Dana Current, a duly authorized representative of Windrift Farm, LLC, who acknowledged to me that she did execute the foregoing instrument on behalf of Windrift Farm, LLC.

IN TESTIMONY WHEREOF, I have subscribed my name and affixed my official seal this 22nd day of March, 2016,

Notary Public

CHRISTOPHER A. WALKER, Attorney at Law
Notary Public, State of Ohio
My Commission has no expiration date
Section 147.03 O. R. C.

OHIO ENVIRONMENTAL PROTECTION AGENCY

By: Director

Date: 5/27/16

State of Ohio)
) ss:
County of Franklin)

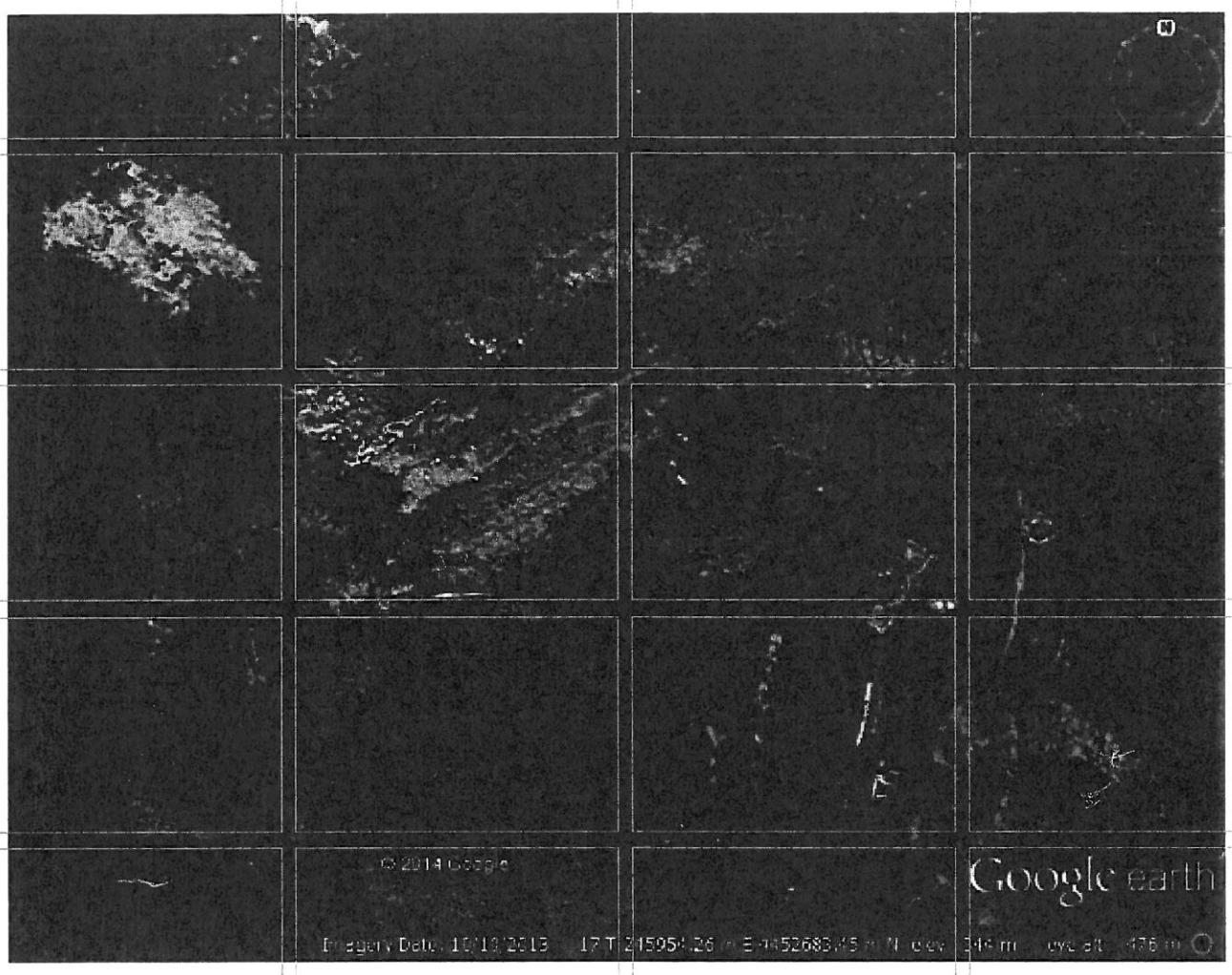
Before me, a notary public, in and for said county and state, personally appeared the Director of Ohio EPA, who acknowledged to me that he did execute the foregoing instrument on behalf of Ohio EPA. CRAIG W. BUTLER,

IN TESTIMONY WHEREOF, I have subscribed my name and affixed my official seal this 27th day of MAY, 2016.

Notary Public

CHARMA DIANE CASTEEL
NOTARY PUBLIC
STATE OF OHIO
MY COMMISSION EXPIRES
May 10, 2019

Appendix B



Prepared For:

Windrift Farms LLC.
12230 Putnam Road
St. Paris, Ohio

Windrift Farm
Stream Restoration Plan

10 September 2014

Environmental Resources Management
15833 Bellepoint Road
Suite 100
Marysville, OH 43040

www.erm.com

The world's leading sustainability consultancy

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DRAFT

Prepared for:

Windrift Farms LLC
12230 Putnam Road
St. Paris, Ohio

Windrift Farms LLC
Stream Restoration Plan

10 September 2014

James M. Teitt
Managing Partner,
Strategic Development, IAP

Environmental Resources Management
15833 Bellepoint Road
Suite 100

Marysville, OH 43040
740.666.2907 (p)
740.666.1025 (f)

http://www.erm.com

1.0 *INTRODUCTION*

This report describes proposed stream restoration plans for an unnamed tributary to Mosquito Creek that abuts the Windrift Farms, LLC property off Putnam Road in Champaign County, Ohio. The genesis of this proposal stems from discussions with Mr. Chad Current, agent for Windrift Farms and his counsel, and discussions with representatives from Ohio Environmental Protection Agency (OEPA) and the Champaign County Soil and Water Management District.

Description of Area

The referenced unnamed tributary is an intermittent stream within a steep-banked ravine abutting the Windrift Farm property that receives the bulk of its surface flows from drainage ditches collecting agriculture field runoff within its watershed just to the west of Windrift Farms. The ravine is narrow and steep-banked for the first third of its length as it enters Windrift Farms, and opens up to broaden to about three times its average width about one-third its length before narrowing again to a culvert crossing under Putnam Road. The upper third of the ravine is heavily wooded (Figure 1) along the upper banks, the midstream extent relatively clear of all but a few trees along the upper banks of the ravine (Figure 2 A-C), and the ravine is moderately to heavily wooded along the upper banks for the lower one-third of its length before passing under Putnam Road.

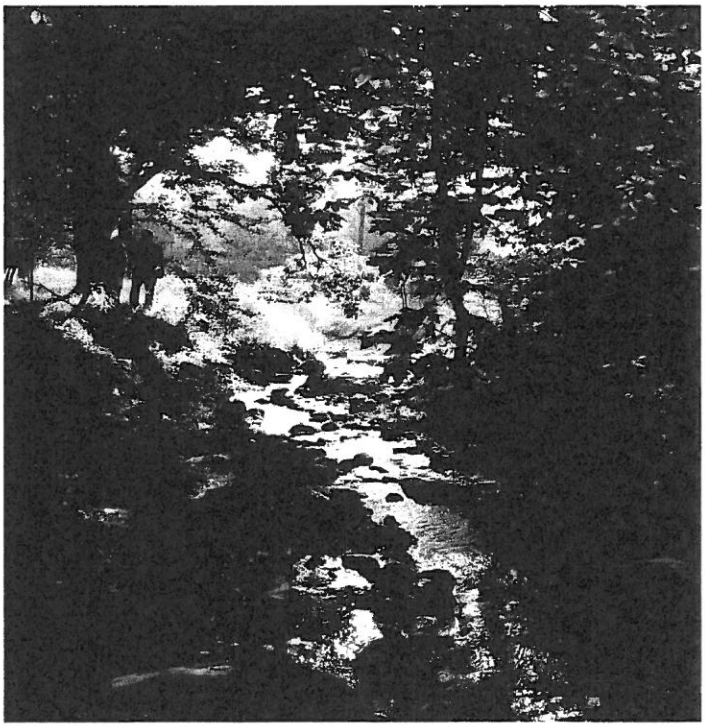
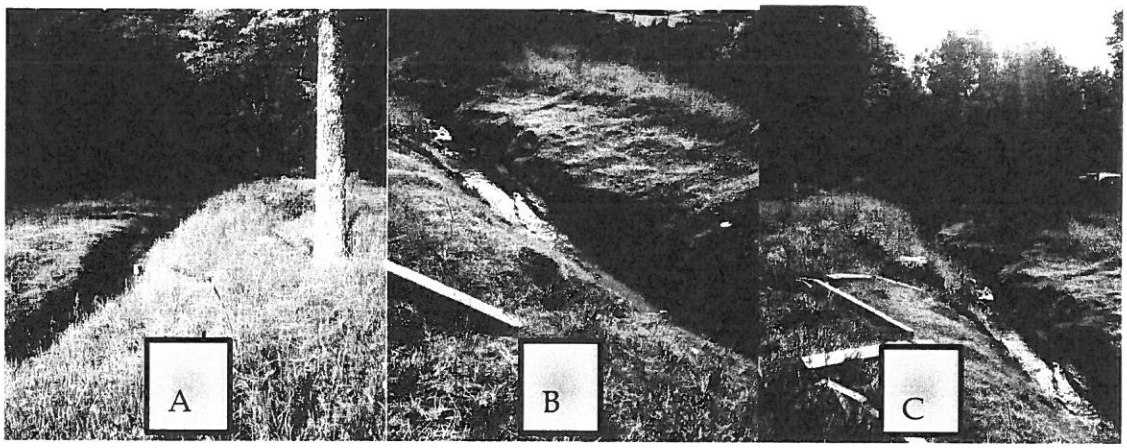


Figure 1. Stream Channel upstream of the targeted restoration reach, looking downstream (June, 2014).

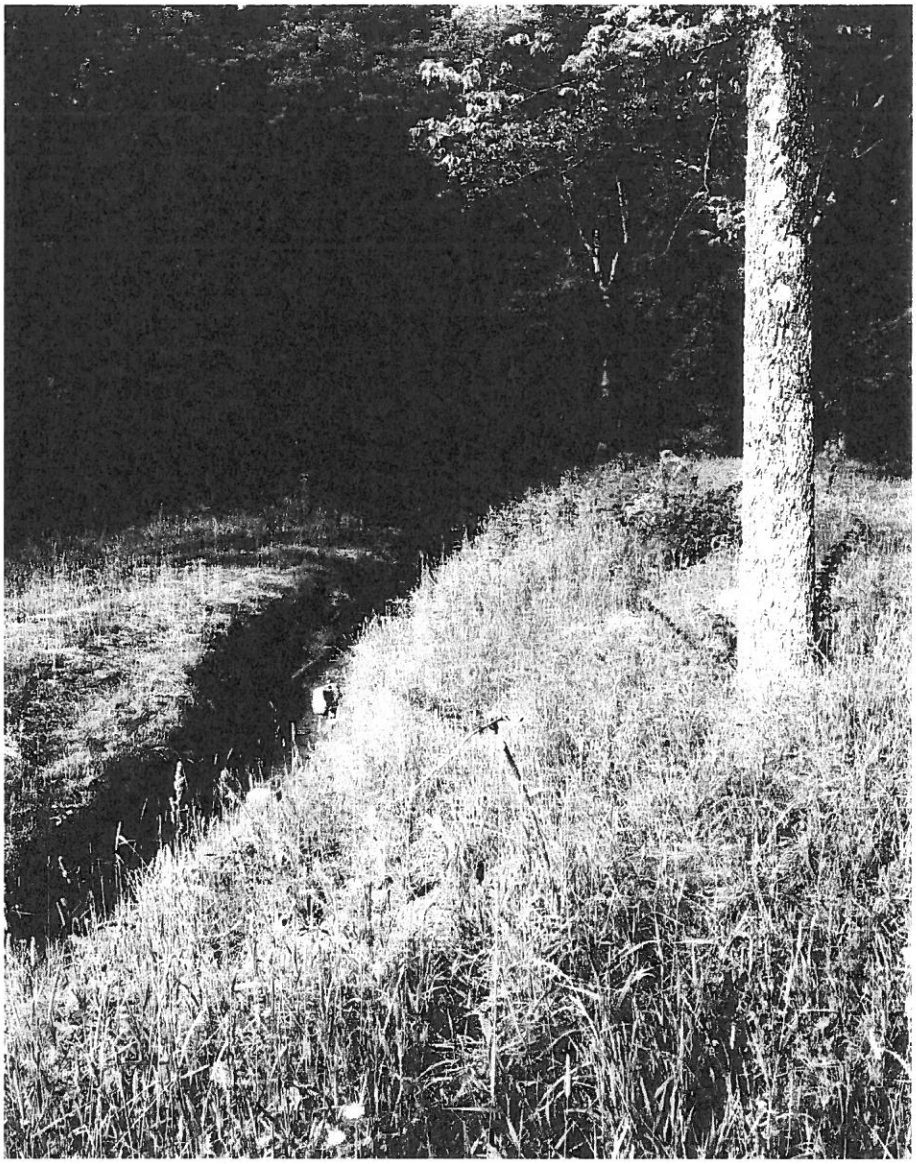
Figure 2. Channel at midstream (area targeted for restoration) looking upstream (A), at midstream (B) & looking downstream (C). (June, 2014)



Stream flows vary seasonally over the annual hydrograph, with peak surface flows during periods of abundant rainfall in early spring. The stream channel is nearly dry in most areas throughout the summer, with some indication of limited seeps and inter-gravel flow through the channel bottom in deeper locations. The upstream channel (Figure 1) water depth averages from 0.2 to 0.3-ft., and ranges from 1.5-ft. to 2.5-ft. in width. Further downstream in the targeted restoration section, stream channel width averages 2.5-ft., and ranges from approximately 1.3 to 3-ft. in width, and about 0.3 to 0.6-ft. in depth. The stream bed gradient steepens from west to east in the midstream channel, beginning where the ravine widens falling nearly 4.5-ft. to lower end.

As the ravine opens up near the head of the midstream portion of the stream channel the width varies across the base of the ravine from about 20-ft. to about 60-ft. between the steeper upper banks. The north bank abutting Windrift Farm is a natural, steep sloped, and stable confining bank that contains all flows that may have occurred in the stream. For the current location of the midstream stream channel, this bank now is the limiting factor in determining floodplain width along the north side of the ravine (Figure 3.)

Figure 3. Midstream channel north confining bank. (June 2014)



The reconstructed south channel bank currently contains 100% of any flows that would occur in the midstream channel over the entire seasonal hydrograph, and therefore restricts floodplain width currently to a maximum of about 4- to 6-ft. for high flow events.

2.0 *PROPOSED RESTORATION PLAN*

This stream restoration plan focuses on the midstream section of the stream channel (Figure 4) and includes:

- Widening the midstream channel bed to allow for a more natural, wider water course within the channel to occur over a range of flow;
- Reducing the slope of the south bank to decrease the potential for erosion and to create a wider floodplain;
- Planting shrubs and trees to stabilize the reengineered south bank; and
- Stabilizing with tree plantings the upper banks on the north and south side of the midstream channel floodplain.

The figures below depict the proposed measures discussed above.

2.1 *CHANNEL WIDTH AND BANK STABILIZATION*

Both the north and south banks of the stream channel - including the midstream section depicted in Figure 4, confine - and therefore define the limits of - the floodplain at their current dimensions.

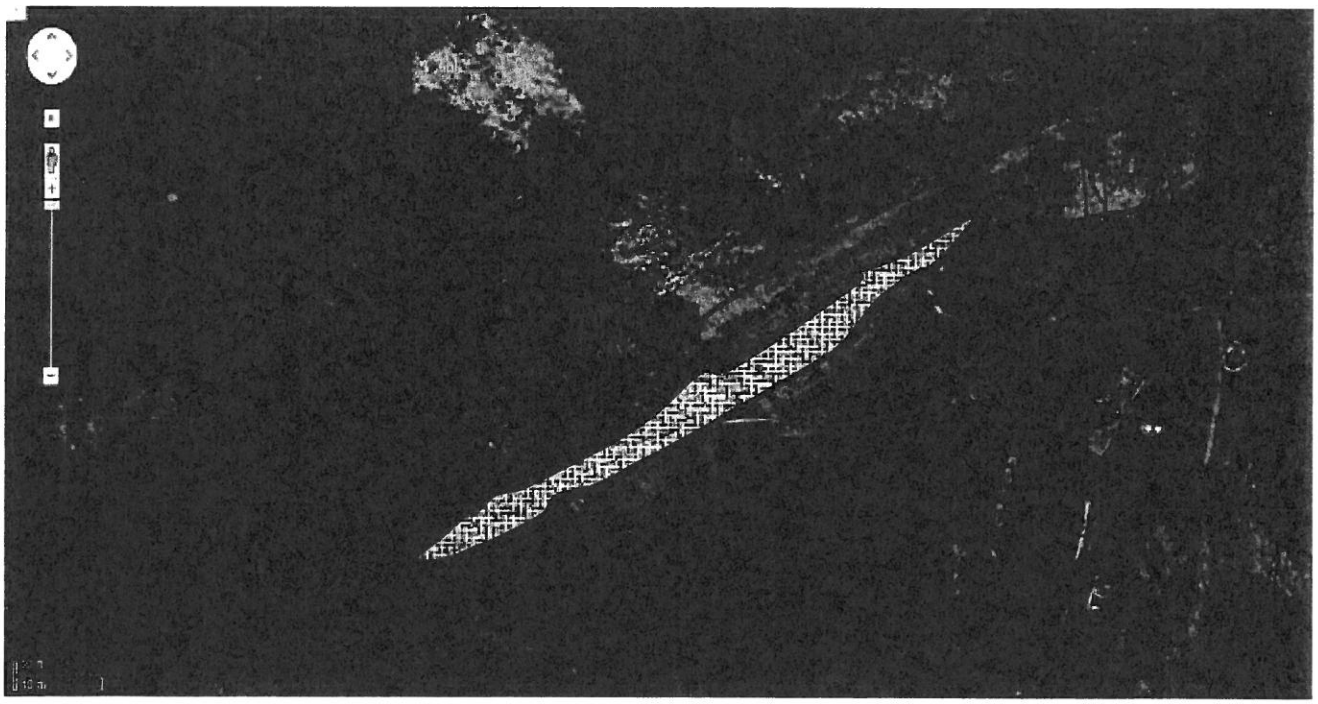


Figure 4. Midstream area targeted for restoration (Photo from Google Earth, October 2013).

The shaded green area in Figure 4 would include having the stream channel widened, the south bank regraded at 1.5:1 to 2:1 slopes, and the green shaded area stabilized with native shrub and trees. The shaded patterned yellow area would be planted with trees; the yellow shading depicts areas of natural revegetation.

The floodplain width of the upper third of the ravine averages approximately 5 ft. at it source, and widens to about 8 ft. before entering the midstream channel section of the ravine. Widening of the stream channel and reducing the slope of the south bank in the midstream section will broaden the floodplain within this stretch where the ravine naturally widens, creating a more natural floodplain condition. The floodplain in the midstream section will vary in width as depicted in Table 1 and Figures 5 through 7. The upper edge of the south bank slope will be established in consultation with Dale Goddard of the Champaign Soil and Water Conservation District, consistent with the recommended slope angles depicted below.

Table 1. Projected Midstream reconstruction details.

Midstream	Current Stream Channel	Additional Stream Channel	Slope	Slope Cut Width	Total Channel & Bank Width	Width including Upper Riparian Area	Floodplain Vegetation
Upper (avr. 1.5-ft. bank ht.)	2.5-ft.	3-ft.	2:1	3-ft.	8.5-ft.	30-ft.	Shrubs and Trees
Midsection (av. 3-ft. bank ht.)	2.5-ft.	3-ft.	2:1	6-ft.	11.5-ft.	40-ft.	Shrubs & Trees
Lower (avr. 4-ft. bank ht.)	2.5-ft.	3-ft.	1.5:1	8-ft.	12-ft.	40-ft.	Bank-toe vegetative matting, Shrubs & Trees

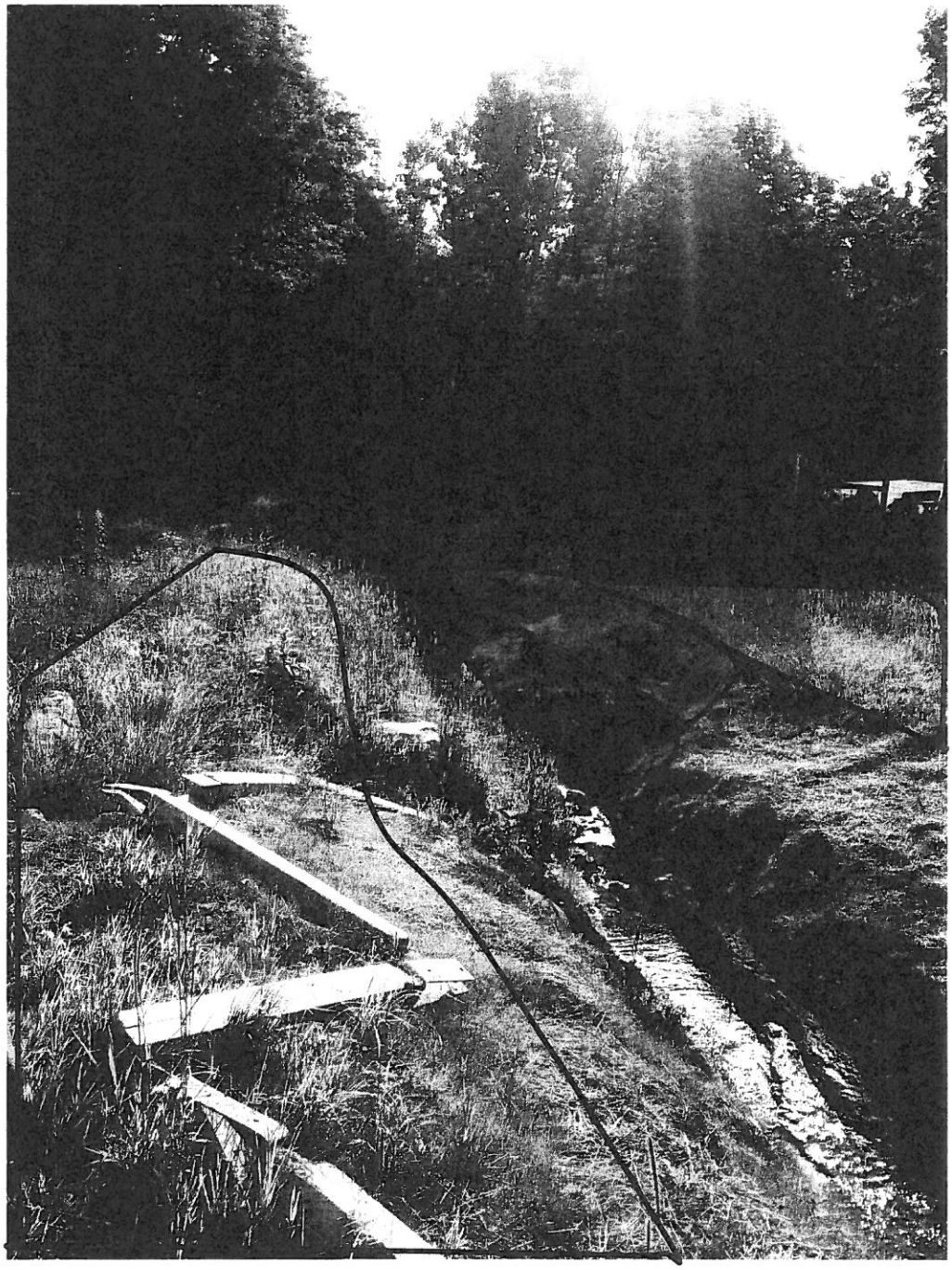
The north bank confines the floodplain of the midstream channel section to the north, and appears to be fairly stable and well vegetated with grasses along its slope. The upland riparian area along the north bank from the top of the bank along the upper-, mid- and lower- midstream channel section averages about 15-ft. in width to the existing barbed wire fence line and has stabilized naturally. To ensure that it remains stable over time, we propose tree plantings along the upper bank within the existing fence line of the property (Figure 3).

The plan to widen the channel bed, grade the slope on the south bank of the new channel and vegetate the south bank slope would restore some ecological values in the

main channel and produce a floodplain and upper riparian area of variable width moving from the upper end of the midstream section to its confluence with the previous channel. This planned approach would offer hydrological benefits to reduce future scouring.

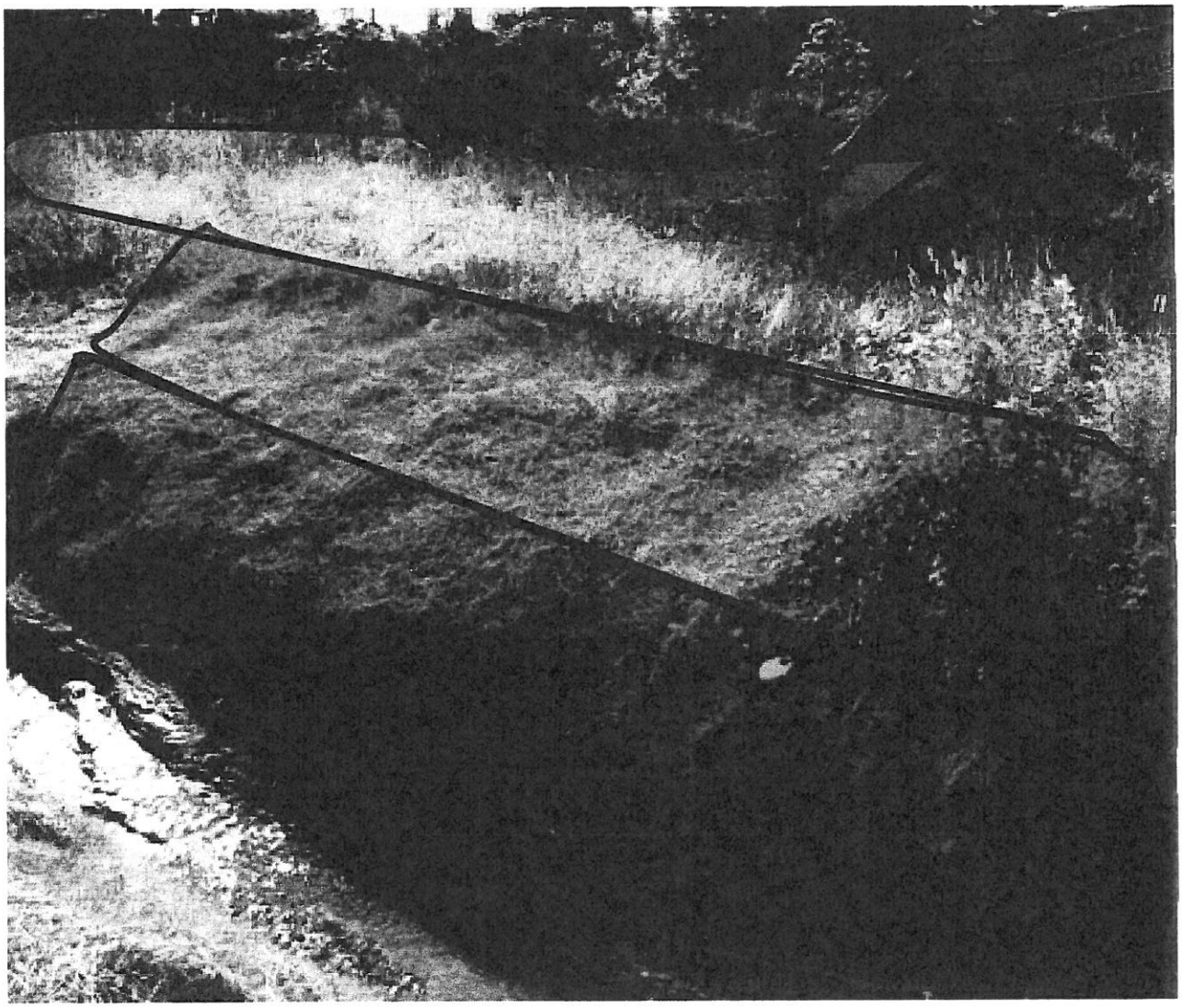
The proposed upper, mid and lower-midstream channel work is further depicted in Figures 5 through 7.

Figure 5. Lower Midstream channel south bank plan.



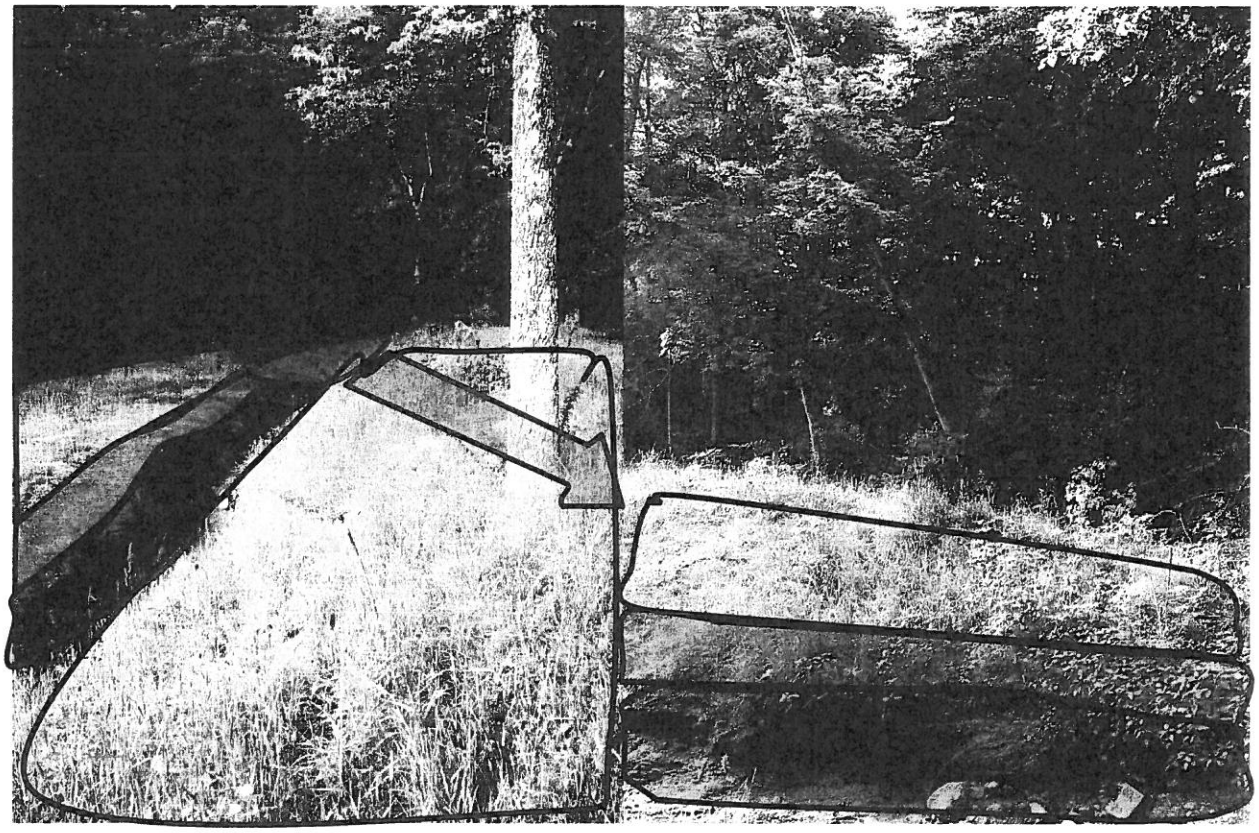
The red shaded area would be cut laterally an additional 3-ft. to within 0.3 to 0.5-ft. of the existing stream channel; the green shaded area would be cut from the new channel edge to the top of bank at a 1.5:1 slope. Yellow shaded areas depict proposed tree planting. We propose using field stone collected onsite and from nearby farm ground to decrease the gradient and to add channel complexity to the lower portion of the midstream section where needed. Fill downstream would not reduce significantly the amount of additional cutting needed to widen the channel but it would reduce some of the energy in the lower section by reducing velocity in the peak flow hydrograph and allow for a more stable stream channel and floodplain downstream.

Figure 6. Midsection - Midstream channel south bank plan.



The red shaded area in Figure 6 would be cut laterally an additional 3-ft. to within 0.3 to 0.5-ft. of the existing stream channel; the green shaded area would be cut from the new channel edge to the top of bank at a 2:1 slope. Yellow shaded areas depict proposed tree plantings for stabilization.

Figure 7. Upper - Midstream channel south bank plan.



The red shaded area in Figure 7 would be cut laterally an additional 3-ft. to within 0.3 to 0.5-ft. of the existing stream channel, yielding a new channel width in this upper end of approximately 5.5-ft.. The green shaded area would be cut from the new channel edge to the top of bank at a 2:1 slope, effectively creating a floodplain width approaching 8.5-ft on the upstream-most section to 12-ft on the downstream extent of this midstream stretch. Yellow shaded areas depict proposed tree plantings for stabilization. (The blue highlight on left is depicted at scale on right).

The riparian areas to the south of areas outlined in yellow shading in Figures 5 through 7 contain several mounds of fill, several of which have naturally vegetated.

Less than 1/4 acre of riparian area along the midstream portion of the new channel will require vegetation (area depicted in textured or patterned yellow shading on Figure 4). The natural stream bank displays a mixture of forbs and grasses, shrubs and trees, with the near-stream component largely forbs and grasses (Figure 8). We propose to plant the newly disturbed area with a mix of shrubs and trees common to this area.

Figure 8. Natural vegetation in undisturbed areas along Windrift Farm ravine.

Natural vegetation and plants native to the ravine have already recolonized portions of the previously disturbed banks depicted in Figure 4. Native trees along both banks in this area, upstream and down, also are reproducing locally, and should continue to vegetate and therefore naturally stabilize this area over time.