

**From:** [Smallwood, Thomas](#)  
**To:** [IDEM OLO Solid Waste Permits Submittals](#)  
**Cc:** [Weinzapfel, Adam](#)  
**Subject:** Tree Report Spring of 2024 Twin Bridges RDF 32-02  
**Date:** Tuesday, July 2, 2024 11:06:51 AM  
**Attachments:** [30 May 2024 Twin Bridges - 2024 Tree Monitoring.pdf](#)

---

\*\*\*\* This is an EXTERNAL email. Exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email. \*\*\*\*

---

Mr. Weinzapfel,

Please see the Spring 2024 Tree Report for the Twin Bridges RDF attached to this email.

Please reach out with any questions that you may have.

Regards,

**Thomas Smallwood, Ph.D.**

Engineer II, 

C: +1 317-954-0909 |

E: [tsmallw5@wm.com](mailto:tsmallw5@wm.com) |

WM – Twin Bridges Landfill |  
124 East Twin Bridges Rd. |  
Danville, IN 46122 |



400 Boone Hollow Lane, Springville, IN 47462

(812) 583-0200

May 31, 2024

Mr. Tom Smallwood, P.E.  
Twin Bridges RDF  
124 East Twin Bridges Road  
Danville, Indiana 46122

Subject: Semi-annual Tree Monitoring Report  
Twin Bridges Recycling & Disposal Facility  
Danville, Hendricks County, Indiana  
IDEM Solid Waste Facility Permit FP 32-02  
DHE Project WMI.001

Dear Justin:

## ***1.0 PURPOSE***

The purpose of this report is to present the data collected during the Spring 2024 monitoring event and describe the status of the vegetation and hydrology within the tree planting plots at Twin Bridges Landfill and corrective actions taken. The following sections discuss the monitoring program, results, and recommendations for the tree planting area.

## ***2.0 MONITORING PROGRAM***

The landfill is responsible for properly installing and maintaining the tree planting project in compliance with the plan entitled “Minor Permit Modification Request to Plant Selected Trees in Vegetative Soil Layer of Final Cover” dated August 4, 2004. The solid waste permit was modified to allow for the planting of woody vegetation on a permitted solid waste facility as a pilot project. The plan consists of the planting of approximately 170 trees at a rate of 400 trees per acre density, with 15 lbs. of herbaceous under story mix broadcast or drilled into the soil over the entire planting area. Prior to planting, weeds and existing vegetation would be controlled with an appropriate herbicide and fertilizer would be added to aid the trees which would be growing in poor soils.

The monitoring event consists of vegetation and soil assessments to determine the development of the tree planting effort according to performance standards set in the

approved permit. Vegetation monitoring will be conducted twice per year during the growing season in Spring and Fall, over a minimum five year period. In addition to monitoring the vegetation during the monitoring events, wildlife usage will be noted and recommendations made for improvement. If deficiencies are noted, corrective actions will be recommended to ensure compliance with the permit. The vegetation monitoring is the main evaluation of the status of the project. The locations of the monitoring plots are presented in Figure 1.

### 3.0 VEGETATION MONITORING

Woody stem counts were counted within each 50' X 50' plot to assess survival of the tree species. Sampling of the herbaceous understory planting consisted of monitoring percent cover of native understory in each plot to assess the percent cover of the herbaceous species. The Spring, 2024 monitoring event was conducted on May 29, 2024. A listing of the species survival is discussed below.

The eight plots were planted in Spring, 2009 with an appropriate understory of seed oats and native grasses. Trees were planted on approximately five-foot centers.

To address the previously high mortality rate of the trees, WMI instituted corrective actions on the plots. On October 3, 2013, 19 3-gallon containerized trees were planted in Plot #8, which had been cleared due to a previous erosion problem and left barren. Prior to the tree planting, the plot was sprayed with appropriate herbicide, seeded with native understory grasses and fenced off to deter deer predation. After the planting, fertilizer was added to the trees and soap was hung from the branches as an experiment for additional deer deterrent. Trees came in 3-gallon containers with their own soil. Other backfilled soil was the typical fill material existing on the landfill that all other trees were installed in. The exact species of trees include:

<b>3-Gallon Containerized Trees Planted in Plot 8 in October, 2013</b>	
Gymnocladus dioicus	Kentucky Coffee Tree
Cornus amomum	Silky Dogwood
Diospyrus virginiana	Persimmon
Betula nigra (2)	River Birch
Platanus occidentalis	Sycamore
Quercus macrocarpa	Bur Oak
Quercus imbricaria	Shingle Oak
Quercus rubra	Red Oak
Quercus muehlenbergii	Chinquapin Oak

Quercus lyrata	Overcup Oak
Quercus velutina	Black Oak
Quercus shumardii	Shumard Oak
Liriodendron tulipifera	Tulip Poplar
Viburnum lentago	Nannyberry
Liquidambar styraciflua	Sweetgum
Aesculus glabra	Ohio Buckeye
Taxodium distichum	Bald Cypress
Rhus typhina	Staghorn Sumac

Of the remaining seven plots, several of the trees had survived into their ninth year, though mortality was high. DHE estimates approximately 40% survival since the initial planting. No significant additional tree mortality was observed since the Spring 2020 monitoring event, likely due to an average year of precipitation. The prior years' mortality observed was due to a variety of factors, including poor soil conditions and heavy deer browse during the summer. In Fall, 2019, several containerized trees were added to the #5 plot in an effort to boost diversity and increase surviving trees and shrubs.

#### **4.0 WILDLIFE OBSERVATIONS**

Main observations of wildlife are limited to deer, birds, and various insects. Bluebirds, Field Sparrows, Turkey Vultures and Meadowlarks were observed utilizing trees in the plots. Numerous dragonflies and honeybees were also present. In time, the mature trees will attract other species that prefer the woody cover to the rest of the landfill grasses.

*Mr. Tom Smallwood, P.E.  
Waste Management of Indiana  
Twin Bridges Landfill – Tree Monitoring  
May 31, 2024  
Page 4 of 4*

## **5.0 RECOMMENDATIONS**

Approximately 40% of the trees were present into their eleventh year after planting and a healthy understory was in place. The remaining trees and shrubs appeared stressed or dead and showed evidence of deer browsing and drought toll.

Adequate markers showing the edges of the plots should be erected so that mowers and landfill traffic can avoid the plots.

No further corrective actions are recommended at this time.

If you have any questions regarding this monitoring report or the recommendations made within, please contact us at (317) 446-1567.

Sincerely,

DHE, INC.



Gregory J. Gerke, PWS, CESSWI  
Senior Ecologist

Attachments



Photo #1: View of Plot #1 (looking east).



Photo #2: View of Plot #2 (looking east).



Photo #3: View of Plot #3 (looking east).



Photo #4: View of Plot #4 (looking east).



Photo #5: View of Plot #5 (looking east).



Photo #6: View of Plot #6 (looking east)





Photo #7: View of Plot #7 (looking east)



Photo #8: View of Plot #8 (looking east).



Photo #9: View of wildlife usage within tree plots.



Photo #10: View of tree plots from western portion of landfill (looking northeast).



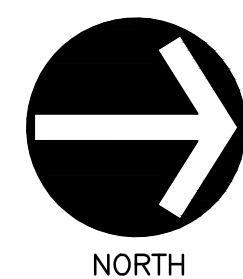
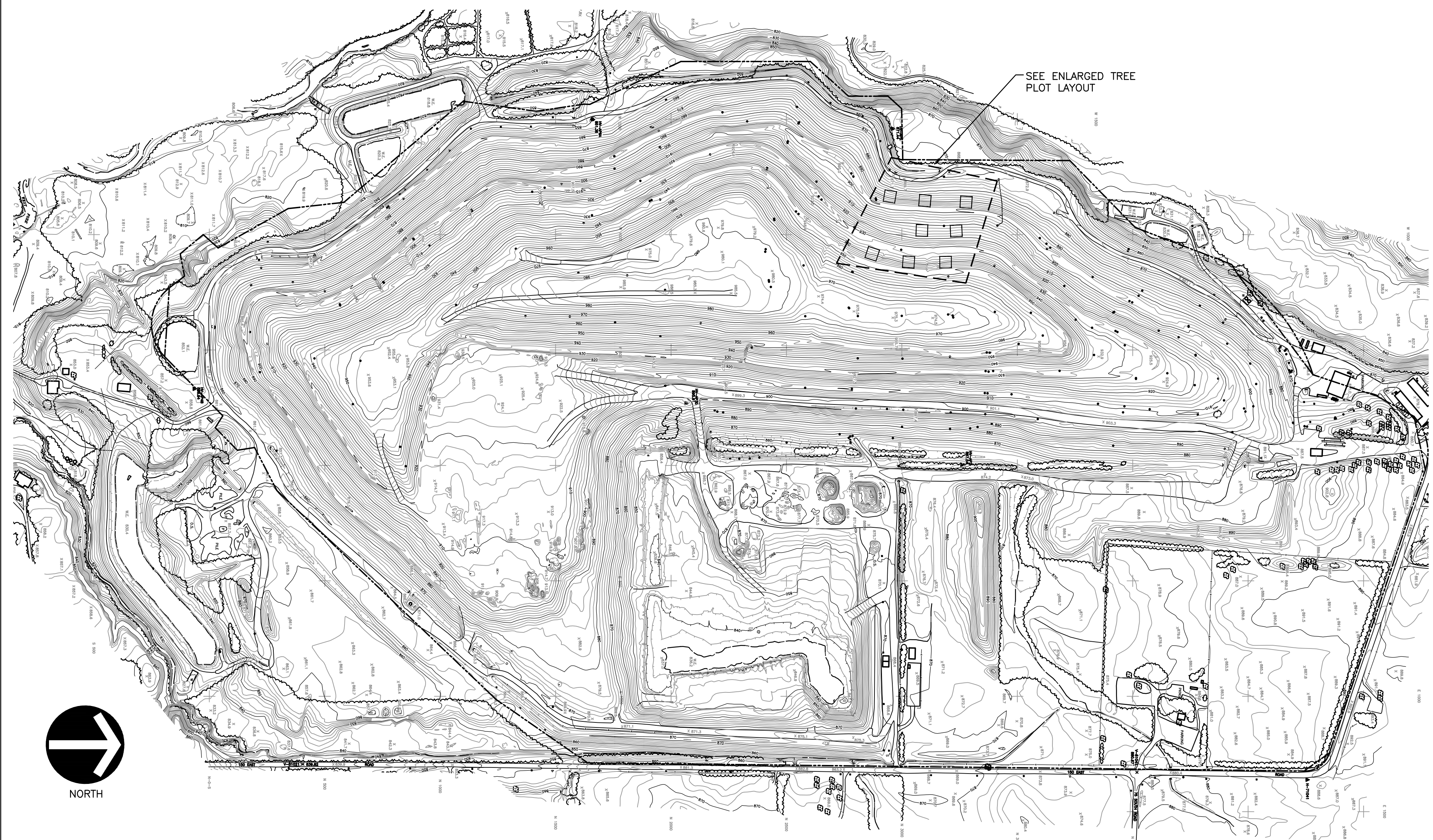
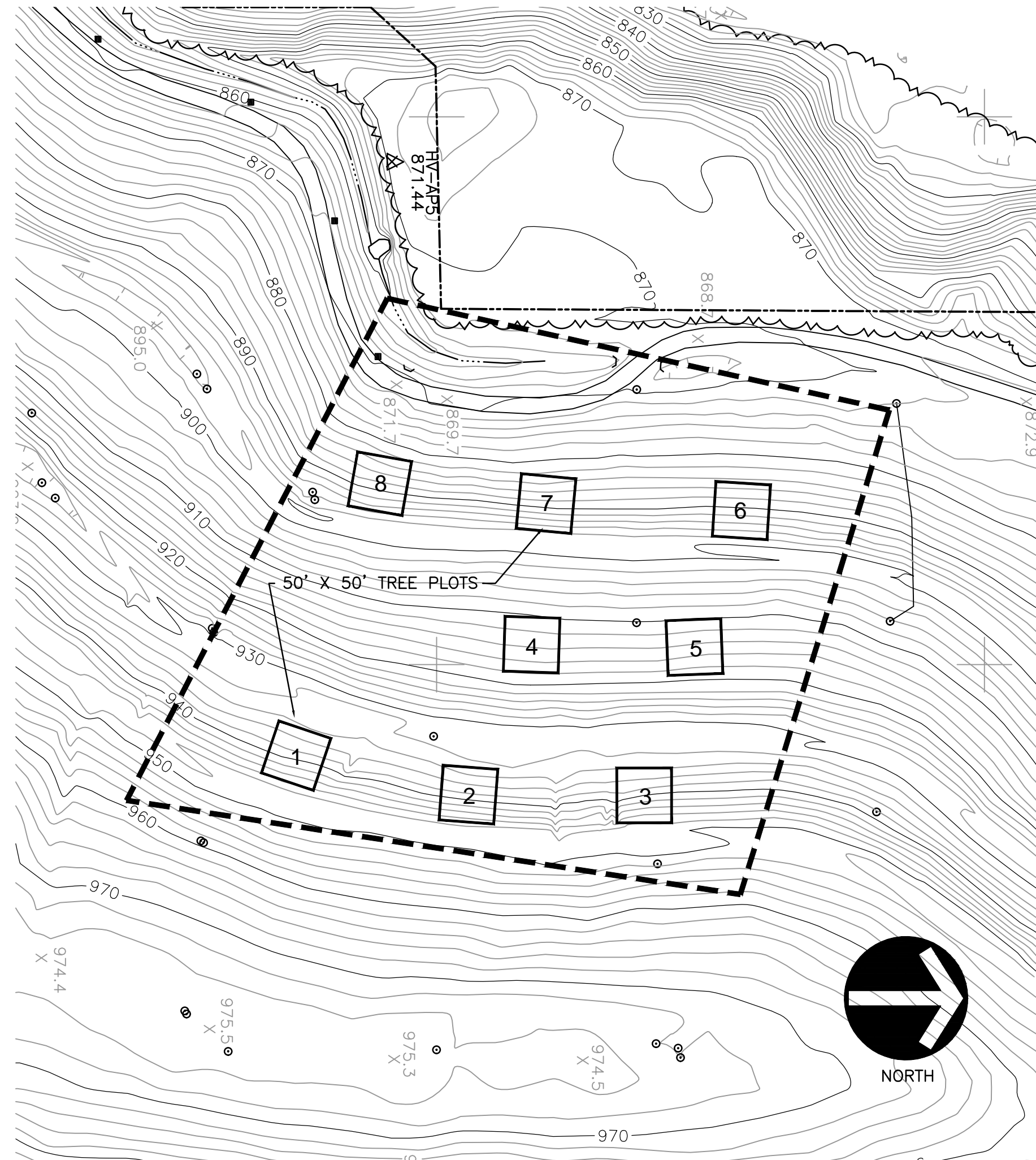
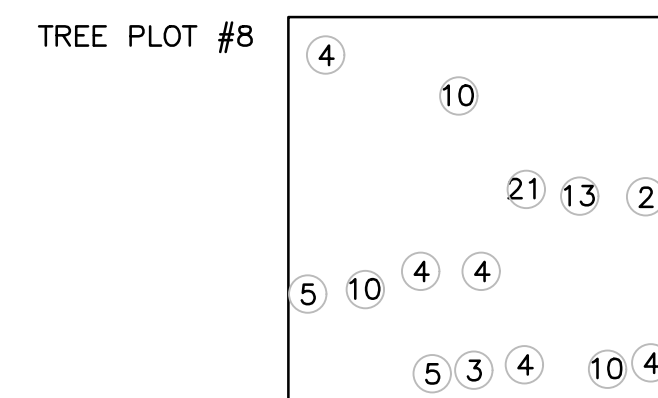
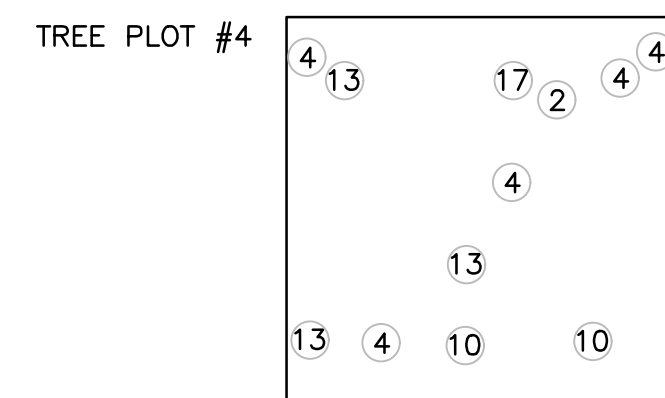
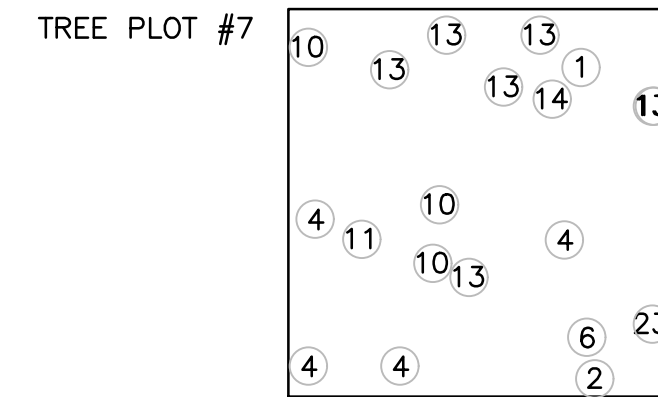
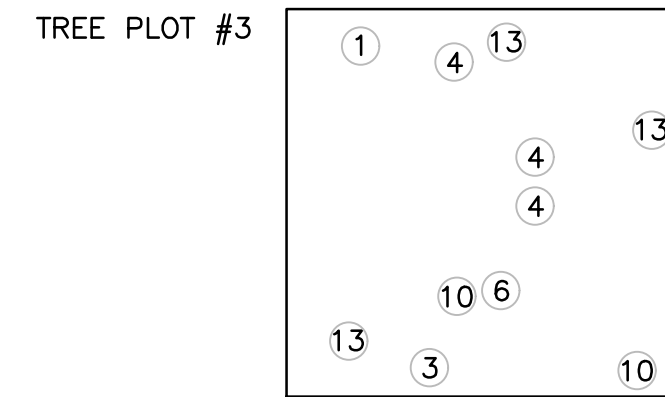
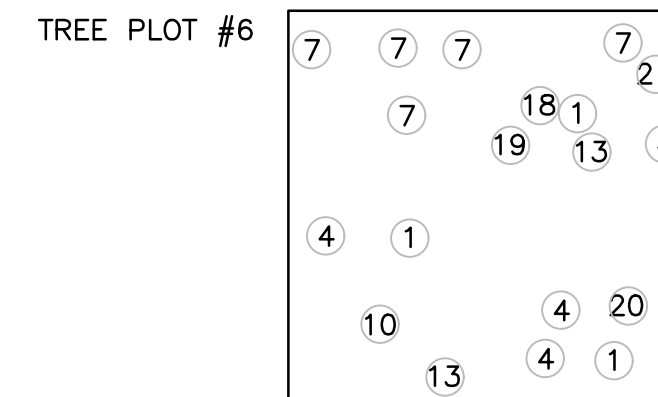
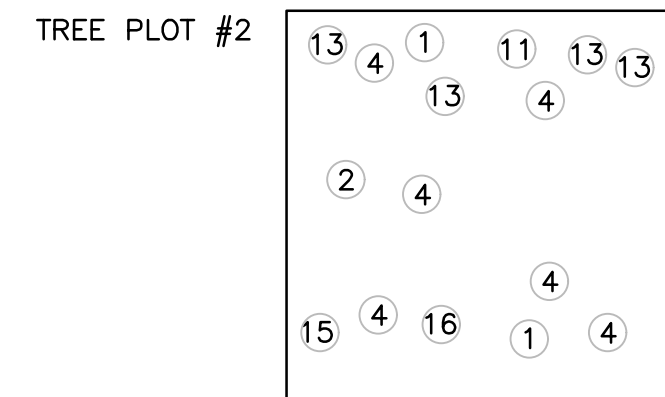
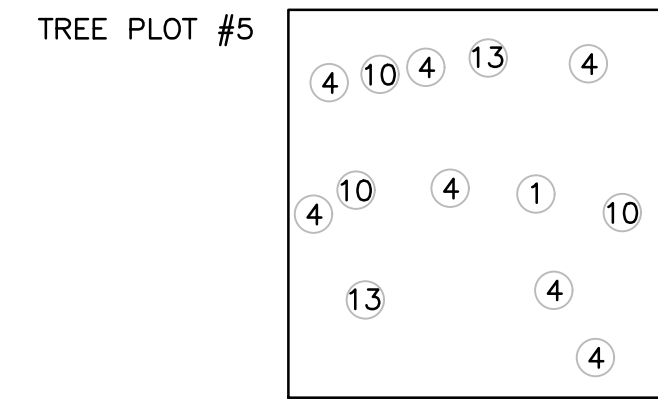
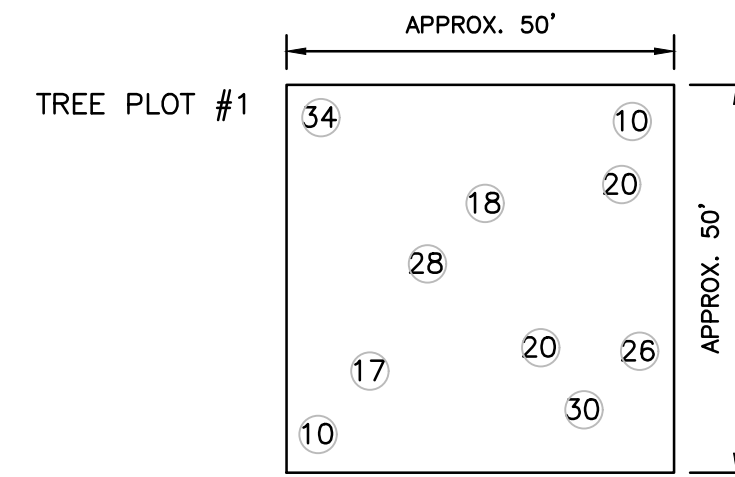
Photo #12: View of soil profile prior to planting.



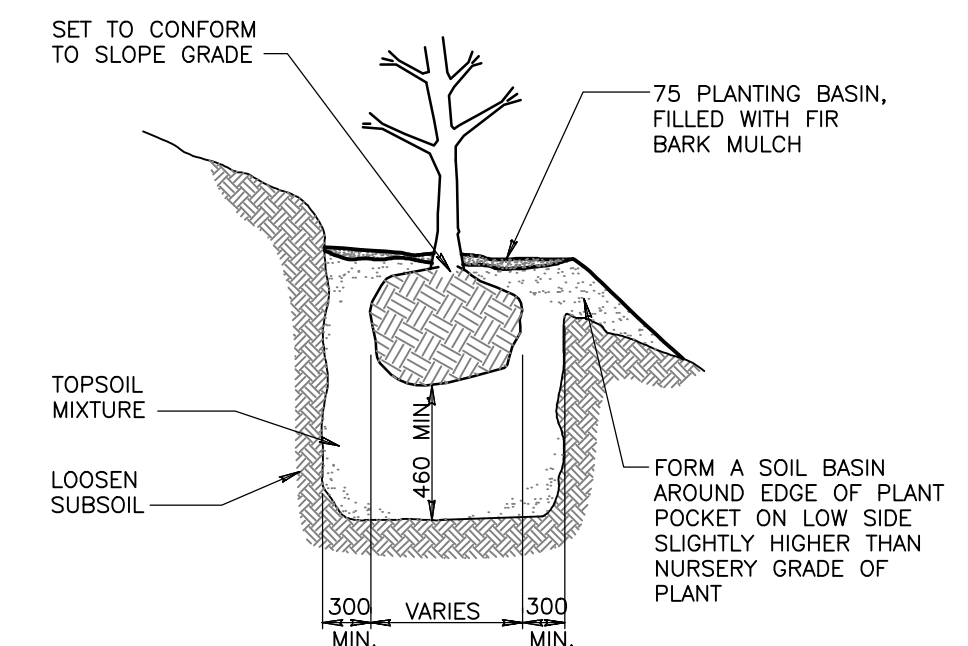
Photo #13: View of an aerial photograph showing tree plots on side of landfill.

**TREE PLOT LAYOUTS: (REFER TO PLANT SCHEDULE FOR REF. #)**

3 = REF. # REFERS TO TYPE OF TREE PLANTED AND APPROXIMATE LOCATION TREE WAS PLANTED WITHIN TREE PLOT

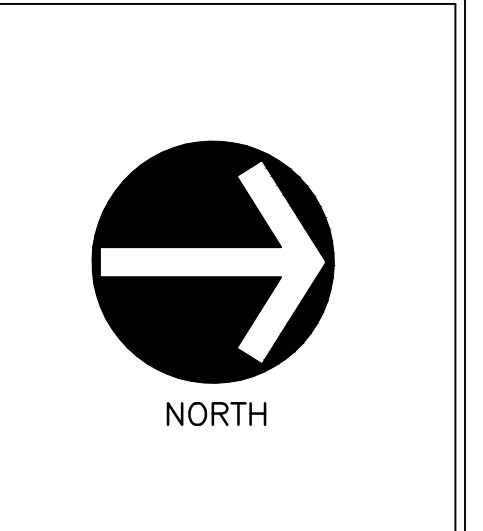


TREE PLOT MONITORING												
REF. #	BOTANICAL NAME	COMMON NAME	PLANTED 5/11	MONITORED 5/17/12	PLANTED 10/3/13	MONITORED 9/19/14	MONITORED 5/15/15	MONITORED 5/19/16	MONITORED 8/8/16	MONITORED 4/28/17	MONITORED 9/28/17	MONITORED 5/25/18
1	Viburnum prunifolium	Black Haw	8	1	5	17	13	13	13	13	13	8
2	Crataegus phaenopyrum	Washington Hawthorn	7	3	4	4	4	4	4	4	4	4
3	Diospyros kaki	Persimmon	2	1	4	4	3	4	4	4	3	3
4	Juniperus virginiana	Eastern Red Cedar	26	6	15	33	33	33	33	33	33	33
5	Gymnocladus dioica	Kentucky Coffee Tree	7	3	2	5	5	6	6	6	6	2
6	Nyssa sylvatica	Black Gum	1	1	4	11	6	6	4	4	2	2
7	Acer rubrum	Red Maple	25	6	11	25	20	20	12	12	8	6
8	Acer saccharinum	Silver Maple	2	1	2	0	0	0	0	0	0	0
9	Quercus muehlenbergii	Chinquapin Oak	6	0	2	3	2	3	3	3	1	0
10	Betula nigra	River Birch	14	6	10	21	18	19	16	15	14	15
11	Celtis occidentalis	Hackberry	18	7	0	4	2	2	2	2	2	2
12	Corylus americana	Hazelnut	14	2	10	0	0	0	0	0	0	0
13	Amelanchier canadensis	Serviceberry	17	5	14	28	25	25	21	21	21	21
14	Pinus strobus	White Pine	17	0	0	1	0	0	0	0	0	0
15	Prunus americana	American Plum	-	-	-	1	1	1	1	1	1	1
16	Cercis canadensis	Eastern Redbud	-	-	-	3	1	1	1	1	1	1
17	Platanus occidentalis	American Sycamore	-	-	-	2	1	2	1	1	1	1
18	Quercus macrocarpa	Burr Oak	-	-	-	2	1	2	2	2	2	3
19	Cornus amomum	Silky Dogwood	-	-	-	1	1	2	2	2	1	2
20	Ulmus americana	American Elm	-	-	-	1	1	2	2	2	2	2
21	Fraxinus pennsylvanica	Green Ash	-	-	-	4	1	1	1	1	1	1
22	Morus rubra	Red Mulberry	-	-	-	1	0	0	0	0	0	0
23	Acer negundo	Box Elder	-	-	-	2	2	2	1	1	1	1
24	Viburnum lentago	Nanny Berry	-	-	-	-	-	1	1	1	0	0
25	Liquidambar styraciflua	Sweetgum	-	-	-	-	-	1	1	0	0	0
26	Prunus serotina	Black Cherry	-	-	-	-	-	1	1	1	1	1
27	Quercus lyrata	Overcup Oak	-	-	-	-	-	1	0	0	0	0
28	Aesculus glabra	Ohio Buckeye	-	-	-	-	-	1	1	1	1	1
29	Quercus velutina	Black Oak	-	-	-	-	-	1	1	1	1	1
30	Quercus shumardi	Shumard Oak	-	-	-	-	-	1	1	1	1	2
31	Taxodium distichum	Bald Cypress	-	-	-	-	-	1	0	0	0	0
32	Rhus typhina	Staghorn Sumac	-	-	-	-	-	1	1	1	1	1
33	Quercus rubra	Red Oak	-	-	-	-	-	1	1	0	0	0
34	Liriodendron tulipifera	Tulip Poplar	-	-	-	-	-	1	1	1	1	1
35	Quercus imbricaria	Shingle Oak	-	-	-	-	-	1	0	0	0	0
Total			164	42	83	173	140	160	138	135	123	110



PLANTING ON A SLOPE  
N.T.S.

WASTE MANAGEMENT - TWIN BRIDGES RDF  
123 TWIN BRIDGES ROAD  
DANVILLE, INDIANA 46122



DWN BY: GJG  
CHKD. BY: GJG  
SCALE: NTS  
DATE: 05/30/24

PILOT TREE MONITORING  
TWIN BRIDGES LANDFILL  
DANVILLE, INDIANA 46122

PLANTING PROJECT EXHIBIT

PROJECT NUMBER  
WMI.003

DRAWING NUMBER  
EX1

SHEET 1 OF 1