PLUM CREEK WETLAND MITIGATION SITE

Brunswick County, NC
Lumber River Basin
Cataloging Unit: 03040207
EEP Project Number D06040-A

Prepared for:

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, North Carolina 27699-1652

Plum Creek Wetland Mitigation Plan and As-Built Baseline Report

FINAL

Submitted
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Prepared for:

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FIGURES

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1. Executive Summary/Project Abstract

The Louis Berger Group, Inc. (Berger) is proposing to restore approximately 77 acres of nonriverine wetland (1:1 restoration ratio) and to enhance approximately six acres of wetland (2:1 enhancement ratio) in order to provide 80 nonriverine wetland mitigation units within the 89 acre Plum Creek Wetland Mitigation Site. The Site is located in Brunswick County in the Lumber River Basin, USGS Hydrologic Unit 03040207. The project is being implemented through the North Carolina Ecosystem Enhancement Program's (NCEEP) Full Delivery Process.

The goals of the Plum Creek Wetland Mitigation Site are to re-establish wetland functions at the Site by restoring wetland hydrology, plant community composition and structure, and wildlife habitat. The project will increase surface water residence time which will improve groundwater recharge and floodwater storage. In order to achieve these goals, Berger has plugged three central ditches located within the Site, drum chopped the existing vegetation to remove the loblolly pine, broken up straight planting beds, and replanted the Site with woody wetland plant species native to the area.

Berger will monitor the Site's wetland hydrology and vegetation for a period of five years. For the first three years of monitoring, vegetative success will be achieved if sample plots demonstrate that 320 native woody plant species per acre have survived. In Year 4, the native woody plant species per acre success density will be 288 per acre. In Year 5, 260 native woody plant species per acre is the success criteria. Hydrology will be considered successful by two possible metrics, per the USACE wetland delineation manual. One criteria provides for hydrologic success if the soil is ponded, flooded, or saturated within 12 inches of the soil surface continuously for at least 12.5 percent of the growing season, assuming normal precipitation. The second alternative measurement of success would be to attain ponded, flooded, or saturated conditions within 12 inches of the soil surface continuously between 5 and 12.5 percent of the growing season, provided the hydric soil and hydrophytic vegetation wetland criteria are also met.

After the five year monitoring period and after the success criteria have been met, Site management will be transferred to The Nature Conservancy. The Site is in a conservation easement held by the North Carolina Department of Environment and Natural Resources (NCDENR) and protected from development activities.

2. Project Background, Goals, Objectives, and Attributes

2.1. Location and Setting

The Louis Berger Group, Inc. (Berger) is restoring the Plum Creek Wetland Mitigation Site (Site) in Brunswick County, North Carolina to provide the North Carolina Ecosystem Enhancement Program (NCEEP) with approximately 80 non-riverine wetland mitigation units needed to compensate for projects occurring within the Lumber River Basin. The Plum Creek Wetland Mitigation Site an 89-acre site located in the Carolina Flatwoods ecoregion of the Middle Atlantic Coastal Plain (Griffith *et al*., 2002). The Site occurs in the Lumber River Basin: USGS Hydrologic Unit 03040207 and North Carolina Division of Water Quality (NCDWQ) subbasin 03-07-59 (Figure 1). As shown the USGS 7.5 minute quadrangle of Bolivia, the Site is topographically flat with elevations of approximately 50 feet above mean sea level. Boggy Branch, which drains to the Lockwoods Folly River, flows along the eastern side of the Site. Land use immediately surrounding the Site is mostly silviculture with timber stands of varying ages in rotation. The Green Swamp Game Land is located to the northwest of the Site. A swine operation is located to the southeast of the Site.

2.2. Project Goals

Wetlands provide many benefits and are a natural solution for improving water quality. One important function wetlands provide within the greater watershed is connecting area hydrologic flows through moderating groundwater, surface water and floodwaters. The goals of the proposed Plum Creek Wetland Mitigation Project are to re-establish wetland functions at the Site by restoring wetland hydrology, plant community composition and structure, and wildlife habitat. The project will increase surface water residence time which will improve groundwater recharge. Much of the water budget is influenced by precipitation, as surface flow enters the site from adjoining parcels. A longer residence time will lead to improved biochemical treatment resulting in improved water quality. Restoration of native wetland vegetative community will enhance floral and faunal habitat diversity benefiting both terrestrial and aquatic wildlife. Overall the wetland restoration goals of the Plum Creek Wetland Mitigation Site include the re-establishment of the following wetland functions:

- Groundwater recharge,
- Organic matter decomposition, and
- Suitable wildlife and aquatic habitats.

Figure 1

2.3. Project Objectives

To achieve the wetland mitigation goals, Berger anticipates restoring a minimum of 77 acres of drained wetlands and enhancing six acres of existing, modified wetlands. Four of the remaining six acres located to the east of Boggy Branch will remain as upland (See Figure 1). The remaining two acres are part of linear strips that parallel the west ditch and Boggy Branch. The drainage effect of the channels is expected to limit the re-establishment of wetland hydrology in these areas and will remain as upland buffer. These two acres are designated as Planting Zone 2, further discussed in Section 4.2 and shown on Figure 3.

The original wetland was ditched, drained, and bedded to support loblolly pine production. The Site is bounded by deep drainage ditches to the west and south, and two ditches cross the width of the tract. Boggy Branch flows along the east side of the Site and is a tributary to Lockwoods Folly River. The west ditch drains to Clark Branch, another tributary to Lockwoods Folly River. The southern ditch connects the west ditch with Boggy Branch.

In order to achieve project goals, the following objectives were implemented:

- The lateral ditches and southern ditch were plugged. The west ditch and Boggy Branch were left intact to prevent hydrologic trespass on adjoining properties (Figure 2).
- Existing vegetation was sheared, drum chopped, and left on Site to promote organic matter decomposition. There was no re-grading of the Site.
- Habitat benefits on Site will be achieved for both terrestrial and aquatic species by increasing micro-habitat diversity and vegetation diversity.

Restoring this wetland will immediately benefit the wildlife of the region by expanding wetland habitats for a variety of species including larger keystone species that require large corridors such as black bear (*Ursus americanus*). Managed by The Nature Conservancy, the Green Swamp Nature Preserve is located 0.5 miles to the north of the Site. The Plum Creek Wetland Mitigation Site will connect and expand habitat within the area. Similarly, the restored wetland may provide habitat for some threatened and endangered species listed for Brunswick County such as the wood stork (*Mycteria Americana)*, rough-leafed loosestrife (*Lysimachia asperulifolia*), and Cooley's meadowrue (*Thalictrum cooleyi*). Wildlife habitat will also be improved by the creation of small vernal pools within the wetland matrix. These features will provide fish free environments for amphibian reproduction, openings for wildlife foraging, and improve overall habitat diversity within the Site.

2.4. Project Structure, Restoration Type, and Approach

2.4.1. Project Structure

Approximately 83 acres of wet pine flatwoods have been restored and enhanced on the Plum Creek Wetland Mitigation Site. The existing three lateral ditches on Site were plugged at seven locations (Figure 2) to restore hydrology to the site. The

western ditch running parallel to the property boundary was left intact to prevent hydrologic trespass to the adjoining properties. The planting plan has incorporated the use of native species. Woody seedlings were planted in a naturalized pattern to avoid creating rows and monotypic stands.

2.4.2. Restoration Type and Approach

The Plum Creek Wetland Mitigation Site has been a loblolly pine plantation for several generations of timber. The land was last timbered and replanted approximately 10 to 15 years ago. The Site is situated in a drained coastal plain pocosin (Beaverdam Bay) in the headwater region of Boggy Branch, which drains to Lockwoods Folly River. The site was drained by four separate trapezoidal ditches approximately 6-8 feet wide and 4-6 feet deep.

The wetland restoration concept for Plum Creek was to restore the pre-existing hydrology to the drained hydric soils. Groundwater monitoring gauges were installed and will be monitoring monthly during the growing season. Restoring wetland hydrology will be accomplished through plugging the existing ditch network. Soil to construct ditch plugs was excavated from the Site and the borrow pits were graded to form small, shallow vernal pools. Existing vegetation was removed by shearing and drum chopping. Species were planted to target a pond pine woodland community.

Figure 2

2.5. Project History, Contacts, and Attribute Data

2.5.1. Project History

The Plum Creek Site was identified by Berger biologists as a potential restoration site. A Technical Proposal was submitted to NCEEP in March 2006. The existing conditions survey was performed and a Categorical Exclusion (CE) was submitted in February 2007. The CE was approved by the NCEEP in March 2007. The land was purchased from Plum Creek Timberlands in October 2007. In February 2007, nine groundwater monitoring gauges were installed at the site to monitor pre-construction groundwater levels. Also during this time, existing conditions were noted such as existing wetlands, plant communities, and soil characterizations. In July 2008, the Restoration Plan was submitted to NCEEP and approved in July 2008. Vegetation was also cleared in July 2008. Construction occurred in October 2008 and the Site was planted in December 2008.

Table 1: Project Components
Plum Creek Wetland Restoration
EEP Project Number: D06040-A

Project Component or Reach ID	Total Acres*	Type	Restoration Level and Ratio	Comment
Planting Zone 1	77	Non-riverine/ Non-riparian	Restoration 1:1	Pond Pine Woodland Community
Existing Wetland WA	6	Non-riverine/ Non-riparian	Enhancement 2:1	Pond Pine Woodland Community

* The remaining acreage is either unsuitable for mitigation or will remain as upland.

Table 2: Project Activity and Reporting History
Plum Creek Wetland Restoration
EEP Project Number: D06040-A

Activity or Report	Data Collection Complete	Completion or Delivery
Technical Proposal	January 2006	March 2006
Categorical Exclusion	January 2007	February 2007
Restoration Plan	April 2008	July 2008
Existing Vegetation Removal	N/A	July 2008
Construction	N/A	October 2008
Planting	N/A	December 2008
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	January 2009	April 2009
Year 1 Monitoring	--	Fall 2009
Year 2 Monitoring	--	Fall 2010
Year 3 Monitoring	--	Fall 2011
Year 4 Monitoring	--	Fall 2012
Year 5 Monitoring	--	Fall 2013

2.5.2. Project Contacts

Table 3: Project Contact Table Plum Creek Wetland Restoration EEP Project Number: D06040-A	
Designer Primary project design POC	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605 Michael O'Rourke (919-866-4421)
Construction Contractor Construction contractor POC	River Works, Inc 4117 Pleasant Garden Road Greensboro, NC 27406 Bill Wright (336-279-1002)
Planting Contractor Planting contractor POC	Superior Forestry Services, Inc. 36462 Highway 27 Tilley, AR 72679 John Foley (870-496-2442)
Nursery Stock Suppliers	Division of Forest Resources – Claridge Nursery (919-731-7988) Coastal Plain Nursery (252-482-5707)
Monitoring Performers	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605
Stream Monitoring POC	N/A
Vegetation Monitoring POC	Ray Bode, PWS (919-866-4420) Tina Sekula, PWS (919-866-4439)
Wetland Monitoring POC	Ray Bode, PWS (919-866-4420) Tina Sekula, PWS (919-866-4439)

2.5.3. Attribute Data

Table 4: Project Attribute Table Plum Creek Wetland Restoration EEP Project Number: D06040-A	
Project County	Brunswick County
Physiographic Region	Coastal Plain
Ecoregion	Carolina Flatwoods
Project River Basin	Lumber River Basin
USGS HUC for Project (14 digit)	03040207
NCDWQ Sub-basin for Project	03-07-59
Within extent of EEP Watershed Plan?	Yes, Lockwood Folly River Local Watershed Plan
WRC Class (Warm, Cool, Cold)	The entire Lumber Basin is designated as warmwater.
Percent of project easement fenced or demarcated?	East, west, and south boundaries are bordered by ditches.
Beaver activity observed during design phase?	No

Table 4: Project Attribute Table Plum Creek Wetland Restoration EEP Project Number: D06040-A	
Restoration Component Attribute Table	
	Plum Creek Tract
Drainage area	110 acres
Stream Order	Boggy Branch – 1st order
Restored length	N/A
Perennial or Intermittent	Boggy Branch - Perennial
Watershed type (Rural, Urban, Developing, etc.)	Undeveloped
Watershed LULC Distribution	100% Loblolly Pine Plantation
Watershed Impervious Cover (%)	0%
NCDWQ AU/Index Number	Boggy Branch - 15-25-1-2-1
NCDWQ Classification	C; Sw
303d listed?	No
Upstream of a 303d listed segment?	Yes
Reasons for 303d listing or stressor	N/A
Total acreage of easement	89 acres
Total vegetated acreage within the easement	89 acres
Total planted acreage as part of the restoration	85 acres
Rosgen Classification of pre-existing	N/A
Rosgen Classification of as-built	N/A
Valley type	N/A
Valley slope	N/A
Valley side slope range (e.g. 2-3%)	N/A
Valley toe slope range (e.g. 2-3%)	N/A
Cowardin classification	PFO
Trout waters designation	N/A
Species of concern, endangered, etc? (Y/N)	No
Dominant soil series and characteristics	Torhunta Mucky Fine Sandy Loam
Series	Torhunta (To)
Depth	48 inches
Clay %	Up to 18%
K	10.04 in/month
T	Unknown

3. Success Criteria

3.1. Morphologic Parameters and Channel Stability

This is no stream restoration component to this project; therefore, morphologic parameters and channel stability success criteria do not apply.

3.2. Vegetation

Monitoring will be performed for a minimum of five years or until success criteria are met as defined in the US Army Corps of Engineers (USACE) Stream Mitigation Guidelines (2003). Data will be collected each year of the monitoring program for five years at the same time of year. Success criteria for the plantings will vary depending upon the monitoring year. For the first three years of monitoring, success will be achieved if sample plots demonstrate that 320 native woody stems per acre have survived. In Year 4, the success criteria become 288 native woody stems per acre. In Year 5, the success criteria are 260 native woody stems per acre.

If the Site does not achieve a woody stem density of 260 stems per acre by the end of the five year monitoring period, then the monitoring period will be extended additional years until it can be documented that the remaining forested areas achieve the target density.

3.2.1. Hydrology

3.2.1.1. Streams

There is no stream restoration component to this project, therefore, stream hydrologic success criteria does not apply.

3.2.1.2. Wetlands

Hydrology will be monitored in accordance with the USACE guideline: USACE (1987) *Corps of Engineers Wetlands Delineation Manual*, through the use of monitoring wells during each growing season for the first five years of the vegetative monitoring, or until success criteria have been met. Fifteen monitoring wells have been installed at the Plum Creek Site. Each monitoring well will measure the depth to the shallow groundwater table.

Hydrology will be considered successful by two possible metrics, per the USACE wetland delineation manual mentioned above. One criteria provides for hydrologic success if the soil is ponded, flooded, or saturated within 12 inches of the soil surface continuously for at least 12.5 percent of the growing season, assuming normal precipitation. The second alternative measurement of success would be to attain ponded, flooded, or saturated conditions within 12 inches of the soil surface continuously between 5 and 12.5 percent of the growing season, provided the hydric soil and hydrophytic vegetation wetland criteria are also met. In Brunswick County, the growing season is typically 249 days, assuming a temperature of above 28 degrees F and a frequency of 5 of 10 years (NRCS, 2009). The growing season in Brunswick County typically occurs between approximately March 15 to November 18 in a given calendar year. As a result, 5 to 12.5 percent of the growing season is 12 to 31 days.

If there are no normal precipitation years during the first five years of monitoring, to meet success criteria, Berger will continue to monitor hydrology at the Site until the Site shows that it has been inundated or saturated as described above during a normal precipitation year.

In the event there are years of normal precipitation during the monitoring period, and the data for that year do not show that the Site has been inundated or saturated within the upper 12 inches of the soil for at least 5 to 12.5 percent of the growing season, the USACE may require remedial action. Berger will perform such required remedial action, and continue to monitor hydrology at the Site until is has been inundated or saturated as described above, during a normal precipitation year.

4. Monitoring Plan Guidelines

4.1. Hydrology

4.1.1. Wetland

The groundwater hydrology of the Plum Creek Site will be monitored during the growing season in accordance with USACE guidelines through the use of shallow monitoring wells with automatic data loggers. Groundwater data will be collected from 15 monitoring wells. Nine wells were established throughout the site to accurately obtain a representative view of the groundwater hydrology. Six additional wells were installed in the western central portion of the site, perpendicular the western border ditch (Figure 2). The purpose of these wells is to show the drawn down effect of the ditch on the wetland.

The data collected will be analyzed and evaluated against the performance criteria to determine whether or not wetland hydrology was established. The performance criteria defined for the Plum Creek Site requires that continuous soil saturation occur within the first 12 inches below ground surface for at least 5 to 12.5 percent of the growing season, which translates to 12 to 31 days under normal weather conditions in Brunswick County. The locations of these monitoring wells are depicted on Figure 2.

4.1.2. Stream

There is no stream restoration component to this project.

4.2. Vegetation

The location and quantity of vegetation sampling plots were established through guidance from the NCDWQ. The sampling plots were installed in a representative pattern throughout the site following construction. Vegetative data will be collected in accordance with the methods described in the CVS-EEP protocol (Lee *et al*., 2008).

Vegetative data will be sampled every monitoring year for five years. Survival criteria of planted woody stems will be 320 stems per acre in Year 3, 288 stems per acre in Year 4, and 260 stems per acre at the completion of the project monitoring period at Year 5.

Nine vegetation plots were established on Site. All plots are 10 meters by 10 meters in size. Plots were established at each monitoring well location (See Figure 2). Each plot is identified by its corresponding well as shown on Figure 2. The plots were established throughout the Site in order to gain a representative view of the overall

success of the plant community. All plots are located within Zone 1 (Pond Pine Woodlawn Community). Planting zones are presented on Figure 3. Vegetation plots were not established in Zones 2 or 3. Zone 2 is anticipated to remain an upland plant community. No credit will be given for this area; therefore, it is unnecessary to monitor. Zone 3 represents the vernal pools, which were not planted with any woody vegetation.

Zone 1 was planted with the following species: pond pine (*Pinus serotina*), loblolly bay (*Gordonia lasianthus*), and Atlantic white cedar (*Chamaecyparis thyoides*). Approximately 14,500 pond pines were planted in Zone 1 with a spacing of 16 feet on center. Approximately 8,500 loblolly bays were planted with a spacing of 23 feet on center. Approximately 2,500 cedar trees were planted with a spacing of 38 feet on center. Zone 2 was planted with the following species: loblolly bay, laurel oak (*Quercus laurifolia*), swamp chestnut oak (*Quercus michauxii*), and yellow poplar (*Liriodendron tulipifera*). Approximately 300 loblolly bays were planted with a spacing 21 feet on center. Approximately 700 laurel oaks, swamp chestnut oaks, and yellow populars (each) were planted with a spacing of 11 feet on center. Zone 3 was planted with an herbaceous cover consisting of red top (*Agrostis alba*), annual rye (*Lolium multiflorum*), switchgrass (*Panicum virgatum*).

The CVS-EEP Level 1 will be used for assessing vegetative success. Level 1 is the inventory of planted stems. The primary purpose being to determine whether prescribed plants are installed, species are distributed, individuals are spaced, and to estimate the average number of stems per acre. The baseline data containing planted trees for restoration projects containing forested community types is typically collected using protocol Level 1 because natural stems are not established immediately after construction.

Although Berger is only required to perform a Level 1 assessment under the existing contract, Berger may perform a Level 2 assessment to more accurately present the vegetative success if the planted woody stems do not meet their success criteria on a particular plot. A Level 2 assessment includes an inventory of planted and natural stems and is applicable to all woody stems (planted and natural in separate categories) in the plot to assure an accurate assessment of woody-plant restoration on the site. Use of Level 2 is encouraged for projects containing forested community types that will rely on natural woody stems for development and success.

The Site was planted December 22 and 23, 2008. As-built vegetation data was collected on January 7 and 8, 2009. Data from the as-built vegetation sampling can be found in Appendix A.

Figure 3

Figure 4

4.2.1. Digital Photos

Eight fixed photo stations were established throughout the Site. These locations are presented in Figure 2. In addition to fixed photo stations, a photo of each vegetation plot will be taken. Vegetation plot photos will always be taken standing at the southwest corner looking diagonal to the northeast corner. All photos will be taken during the monitoring periods.

Photographs were taken at the fixed photo stations and at all the vegetation plots during the as-built survey. These photos can be found in Appendix B.

4.2.2. Other Parameters

A stream gauge was installed in Boggy Branch, within the property boundaries, for informational purposes only. The stream gauge will keep records of the level of water in Boggy Branch. No success criteria are attached to the gauge.

4.2.3. The Watershed

The watershed is currently impacted by silviculture. The Plum Creek Site was timbered in the past. Adjoining parcels are also used for timber purposes. The mitigated Plum Creek Site is protected within a conservation easement and site management will be passed along to The Nature Conservancy after the five year success criteria has been met. Because the Site is placed in a conservation easement, it is protected from development activities.

5. Maintenance and Contingency Plans

As stated previously in Section 3.2, vegetation success will be achieved if sample plots demonstrate that 320 native woody species per acre have survived by Year 3. In Year 4, the native woody species per acre success density will be 288 per acre. In Year 5, 260 native woody species per acre is the success criteria. If the Site does not achieve a woody stem density of 260 stems per acre by the end of the five year monitoring period, then the monitoring period will be extended additional years until it can be documented that the remaining forested areas achieve the target density.

In addition, should Berger scientists observe populations of invasive species during monitoring efforts, species specific control measures and techniques will be enacted that may include both mechanical and chemical treatments. Herbicides utilized will be EPA certified for use in aquatic systems. If necessary to manage invasive species, Berger staff experienced in invasive species control will oversee all efforts to eradicate target species while minimizing non-target impacts. Also, only properly licensed pesticide applicators will be employed to ensure proper handling, storage, and application methods are followed for all herbicides.

Hydrology will be considered successful by two possible metrics, per the USACE wetland delineation. One criteria provides for hydrologic success if the soil is ponded, flooded, or saturated within 12 inches of the soil surface continuously for at least 12.5 percent of the growing season, assuming normal precipitation. The second

alternative measurement of success would be to attain ponded, flooded, or saturated conditions within 12 inches of the soil surface continuously between 5 and 12.5 percent of the growing season, provided the hydric soil and hydrophytic vegetation wetland criteria are also met.

In the event there are years of normal precipitation during the monitoring period, and the data for that year do not show that the Site has been inundated or saturated within the upper 12 inches of the soil for at least 5 to 12.5 percent of the growing season, the USACE may require remedial action. Berger will perform such required remedial action, and continue to monitor hydrology at the Site until both sites have been inundated or saturated as described above, during a normal precipitation year.

6. References

US Army Corps of Engineers, 2003. Stream Mitigation Guidelines. Prepared by: USACE, NCDWQ, USEPA, NCWRC.

Environmental Laboratory, 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R.,MacPherson, T.F. 2002. Ecoregions of North Carolina (map scale 1:1,500,000). U.S. EPA. Corvallis, OR.

Natural Resources Conservation Service. Climate Information – Wetlands Retrieval for North Carolina. Brunswick County. Available URL: http://www.wcc.nrcs.usda.gov/cgibin/getwetco.pl?state=nc. Accessed: January 15, 2009.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 Available URL: http://cvs.bio.unc.edu/methods.htm.

APPENDIX A
VEGETATION DATA

Appendix A: Vegetation Plot Attribute Data Plum Creek Wetland Restoration EEP Project Number: D06040-A					
Plot ID	**Community Type**	**Planting Zone ID**	**Associated Gauge(s)**	**Method**	**CVS Level**
1	Pond Pine Woodland	Zone 1	1	CVS	1
2	Pond Pine Woodland	Zone 1	2	CVS	1
3	Pond Pine Woodland	Zone 1	3	CVS	1
4	Pond Pine Woodland	Zone 1	4	CVS	1
5	Pond Pine Woodland	Zone 1	5	CVS	1
6	Pond Pine Woodland	Zone 1	6	CVS	1
7	Pond Pine Woodland	Zone 1	7	CVS	1
8	Pond Pine Woodland	Zone 1	8	CVS	1
9	Pond Pine Woodland	Zone 1	9	CVS	1

Appendix A: Vegetation Stem Density Per Plot Plum Creek Wetland Restoration EEP Project Number: D06040-A									
Planted Species	**Vegetation Plots**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Pinus serotina	8	6	6	7	4	9	8	9	5
Gordonia lasianthus	1	4	3	2	4		1	1	4
Chamaecyparis thyoides			1	1	4				2
Quercus laurifolia	1					1			
Total Stems	10	10	10	10	12	10	9	10	11
Density Per Acre	405	405	405	405	486	405	364	405	445

Plot 92549-01-1

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.066338 Datum: NAD83/WGS84

Longitude or UTM-E: -78.232747 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	THIS YEAR'S DATA Height (cm)	THIS YEAR'S DATA DBH (cm)	THIS YEAR'S DATA Re-sprout	THIS YEAR'S DATA Vigor*	THIS YEAR'S DATA Damage*	THIS YEAR'S DATA Notes
12	Pinus serotina	d	Tu	3.0	2.5	5	25.0								
13	Pinus serotina	g	Tu	6.0	2.5	3	26.0								
14	Pinus serotina	j	Tu	9.5	2.5	2	25.0								
15	Pinus serotina	h	Tu	7.0	6.0	4	33.0								
16	Pinus serotina	e	Tu	3.0	6.0	3	32.0								
17	Quercus laurifolia	a	Tu	0.5	5.5	3	34.0								
18	Pinus serotina	b	Tu	1.0	10.0	2	27.0								
19	Gordonia lasianthus	i	Tu	7.3	1.0	3	17.0								
20	Pinus serotina	f	Tu	3.0	8.5	3	31.5								
21	Pinus serotina	c	Tu	2.0	4.0	4	33.0								

 # stems: *10*

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

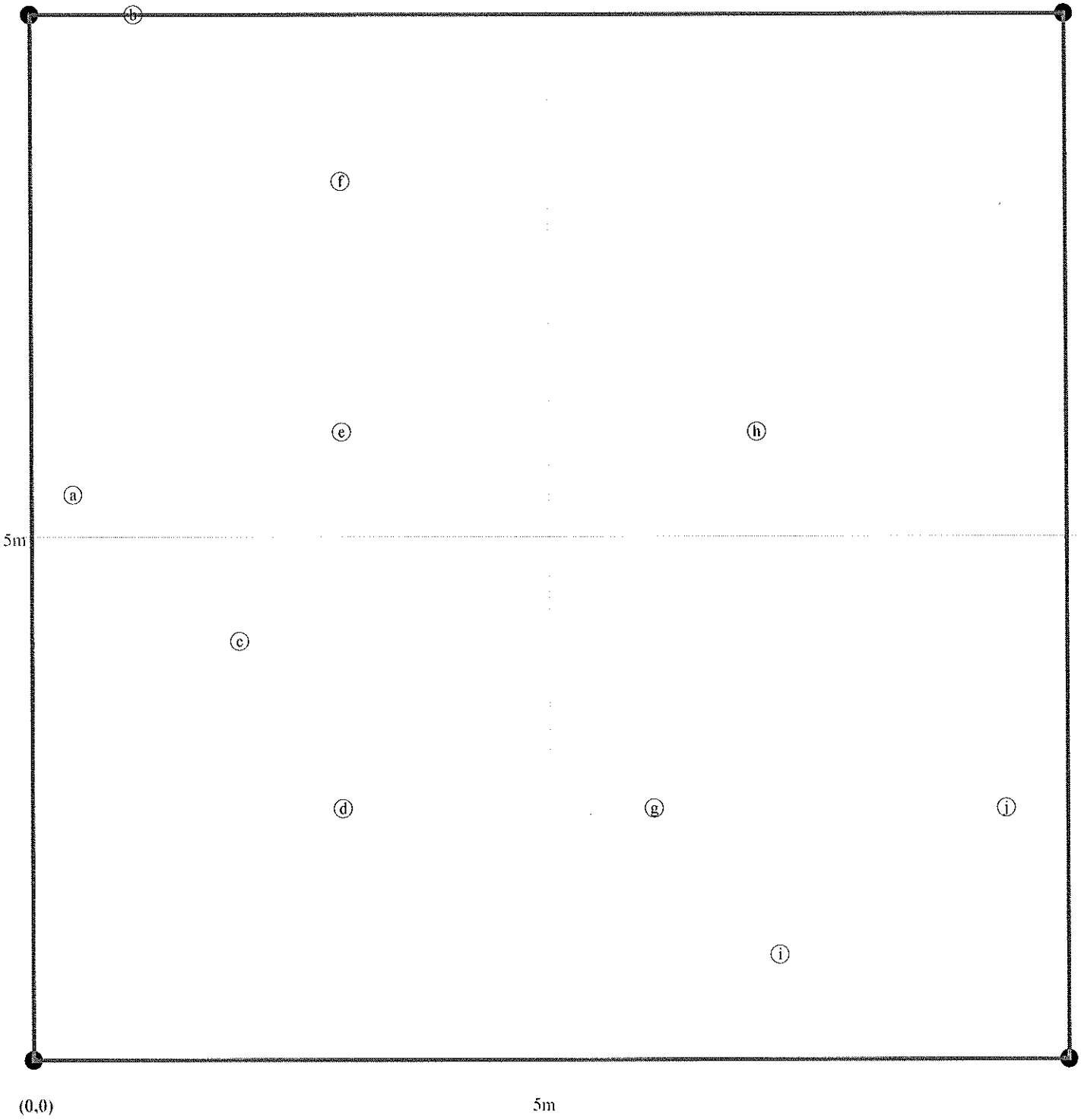
Map of stems on plot 92549-01-1

X-axis: 90°

N

 # stems: *10*

map size: *LARGE*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

Plot 92549-01-2 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / / Party: Role: Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.067179 Datum: NAD83/WGS84

Longitude or UTM-E: -78.229613 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
22	Gordonia lasianthus	a	Tu	0.5	0.5	0	7.5								
23	Gordonia lasianthus	h	Tu	5.5	2.5	0	9.0								
24	Gordonia lasianthus	j	Tu	9.0	2.0	4	15.0								
25	Gordonia lasianthus	i	Tu	6.0	6.0	4	13.0								
26	Pinus serotina	c	Tu	1.5	0.5	2	16.0								
27	Pinus serotina	d	Tu	2.0	2.0	4	25.0								
28	Pinus serotina	b	Tu	0.5	2.0	4	25.0								
29	Pinus serotina	e	Tu	2.0	6.0	3	27.0								
30	Pinus serotina	f	Tu	2.0	7.5	4	27.0								
31	Pinus serotina	g	Tu	4.0	9.0	3	26.0								

 # stems: *10*

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

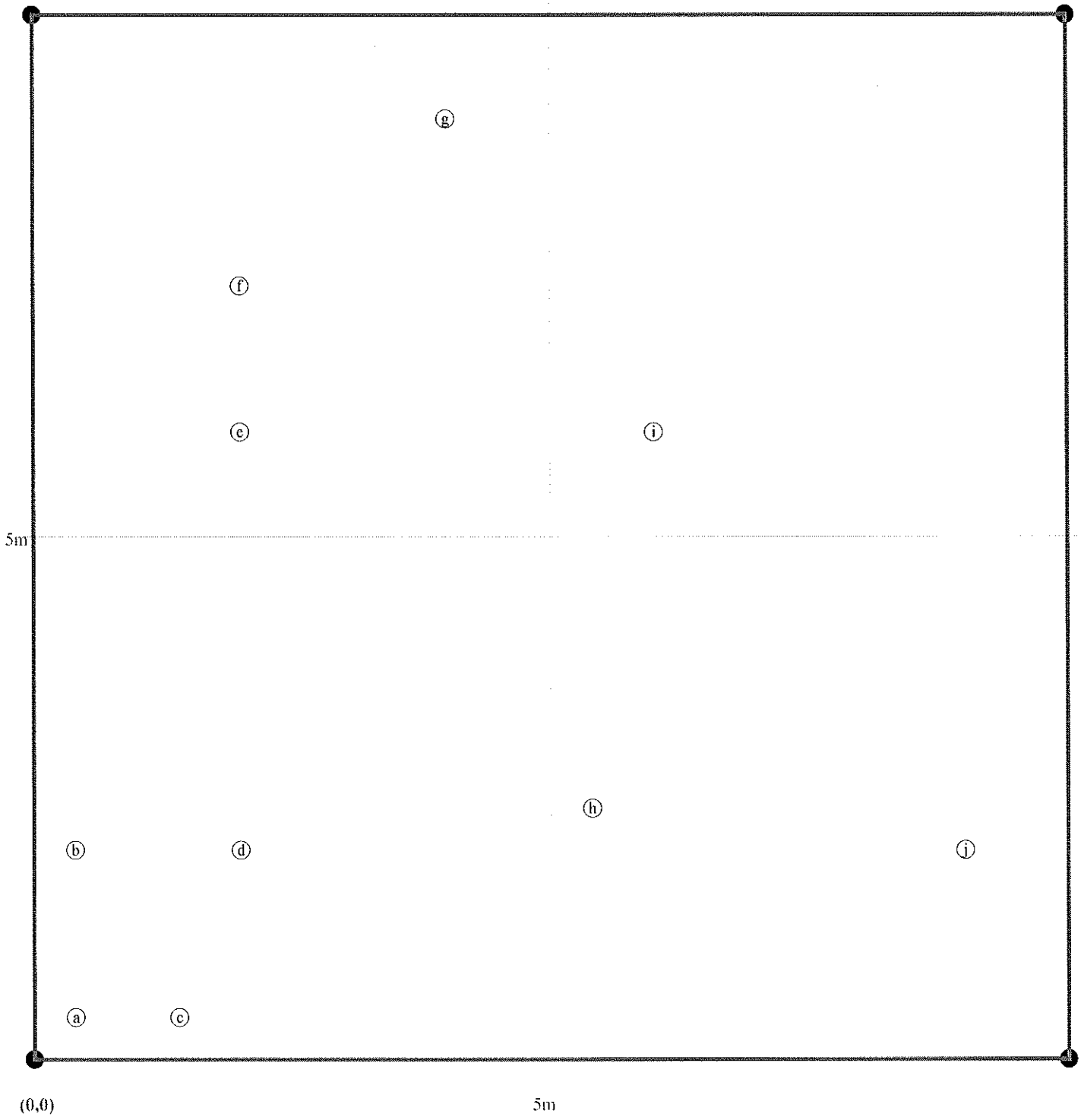
Map of stems on plot 92549-01-2

X-axis: 90°

N

 # stems: *10*

map size: *LARGE*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Plot 92549-01-3

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.068045 Datum: NAD83/WGS84

Longitude or UTM-E: -78.22635 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
42	Pinus serotina	b	Tu	1.0	1.0	3	21.5								
43	Gordonia lasianthus	f	Tu	6.0	2.0	3	13.0								
44	Chamaecyparis thyoides	g	Tu	6.5	3.5	2	19.5								
45	Pinus serotina	h	Tu	6.5	7.0	2	22.5								
46	Gordonia lasianthus	c	Tu	1.0	5.0	0	8.0								
47	Pinus serotina	a	Tu	0.5	9.0	4	17.0								
48	Gordonia lasianthus	d	Tu	3.0	1.5	4	16.0								
49	Pinus serotina	e	Tu	4.5	4.5	3	30.0								
50	Pinus serotina	i	Tu	7.0	5.0	3	16.0								
51	Pinus serotina	j	Tu	9.0	3.5	3	22.0								

 # stems: *10*

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

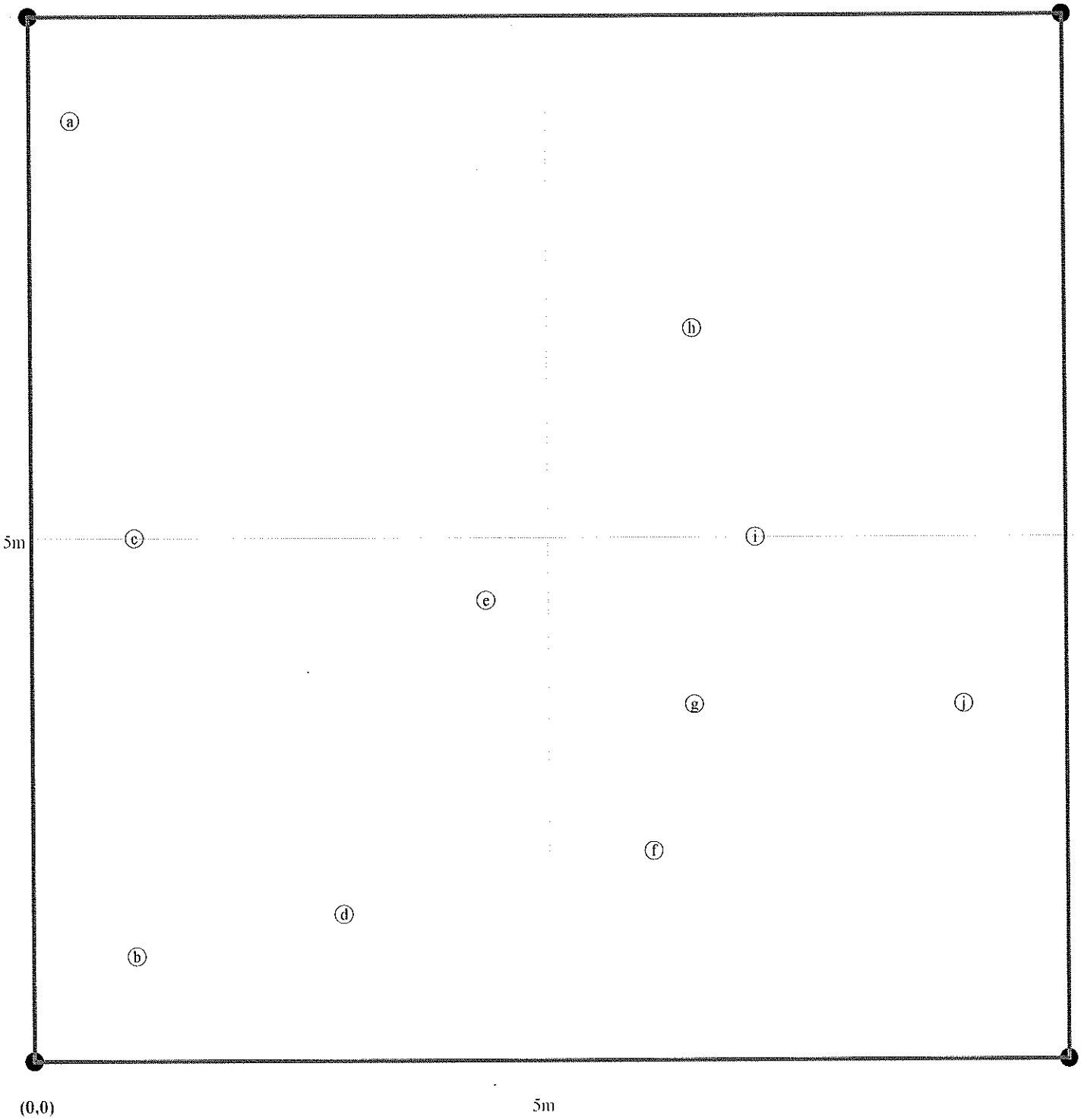
Map of stems on plot 92549-01-3

X-axis: 90°

N

 # stems: 10

map size: LARGE



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

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Plot 92549-01-4

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.070267 Datum: NAD83/WGS84

Longitude or UTM-E: -78.227536 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
71	Pinus serotina	i	Tu	8.0	3.0	3	20.5								
72	Pinus serotina	g	Tu	5.5	2.0	3	18.0								
73	Gordonia lasianthus	d	Tu	3.5	5.5	4	13.5								
74	Pinus serotina	c	Tu	3.0	7.5	5	35.0								
75	Gordonia lasianthus	f	Tu	5.0	9.0	2	12.0								
76	Pinus serotina	h	Tu	6.5	5.5	3	15.0								
77	Pinus serotina	e	Tu	4.0	2.0	2	36.0								
78	Pinus serotina	a	Tu	1.5	1.0	4	31.0								
79	Chamaecyparis thyoides	b	Tu	2.0	3.0	1	14.0								
80	Pinus serotina	i	Tu	7.5	3.0	3	20.0								

 # stems: *10*

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

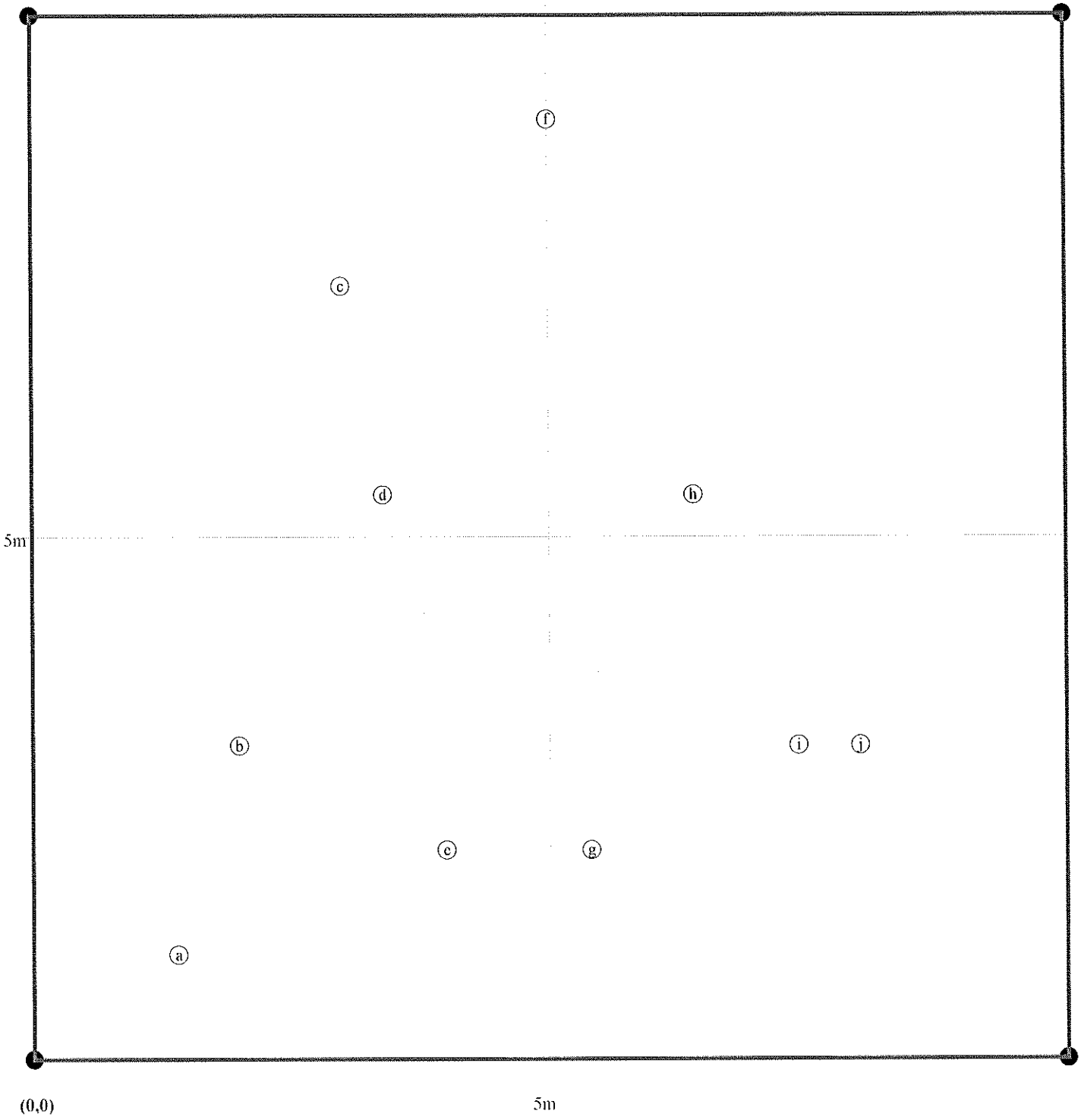
Map of stems on plot 92549-01-4

X-axis: 90°

N

 # stems: *10*

map size: *LARGE*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

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Plot 92549-01-5 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.071367 Datum: NAD83/WGS84

Longitude or UTM-E: -78.228016 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	THIS YEAR'S DATA Height (cm)	THIS YEAR'S DATA DBH (cm)	THIS YEAR'S DATA Re-sprout	THIS YEAR'S DATA Vigor*	THIS YEAR'S DATA Damage*	THIS YEAR'S DATA Notes
91	Gordonia lasianthus	e	Tu	2.0	10.0	5	18.5								
92	Pinus serotina	i	Tu	6.0	8.5	4	23.0								
93	Pinus serotina	l	Tu	7.0	4.5	2	22.0								
94	Chamaecyparis thyoides	j	Tu	6.5	3.5	2	17.5								
95	Pinus serotina	g	Tu	3.5	4.5	3	18.0								
96	Gordonia lasianthus	b	Tu	0.5	3.5	3	15.0								
97	Pinus serotina	h	Tu	4.5	2.5	3	26.0								
98	Gordonia lasianthus	k	Tu	7.0	0.5	4	21.0								
99	Gordonia lasianthus	c	Tu	10.0	6.0	3	15.0								
100	Chamaecyparis thyoides	f	Tu	3.0	5.5	1	12.0								
101	Chamaecyparis thyoides	d	Tu	2.0	0.5	2	17.5								
102	Chamaecyparis thyoides	a	Tu	0.5	0.5	1	15.0								

 # stems: 12

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

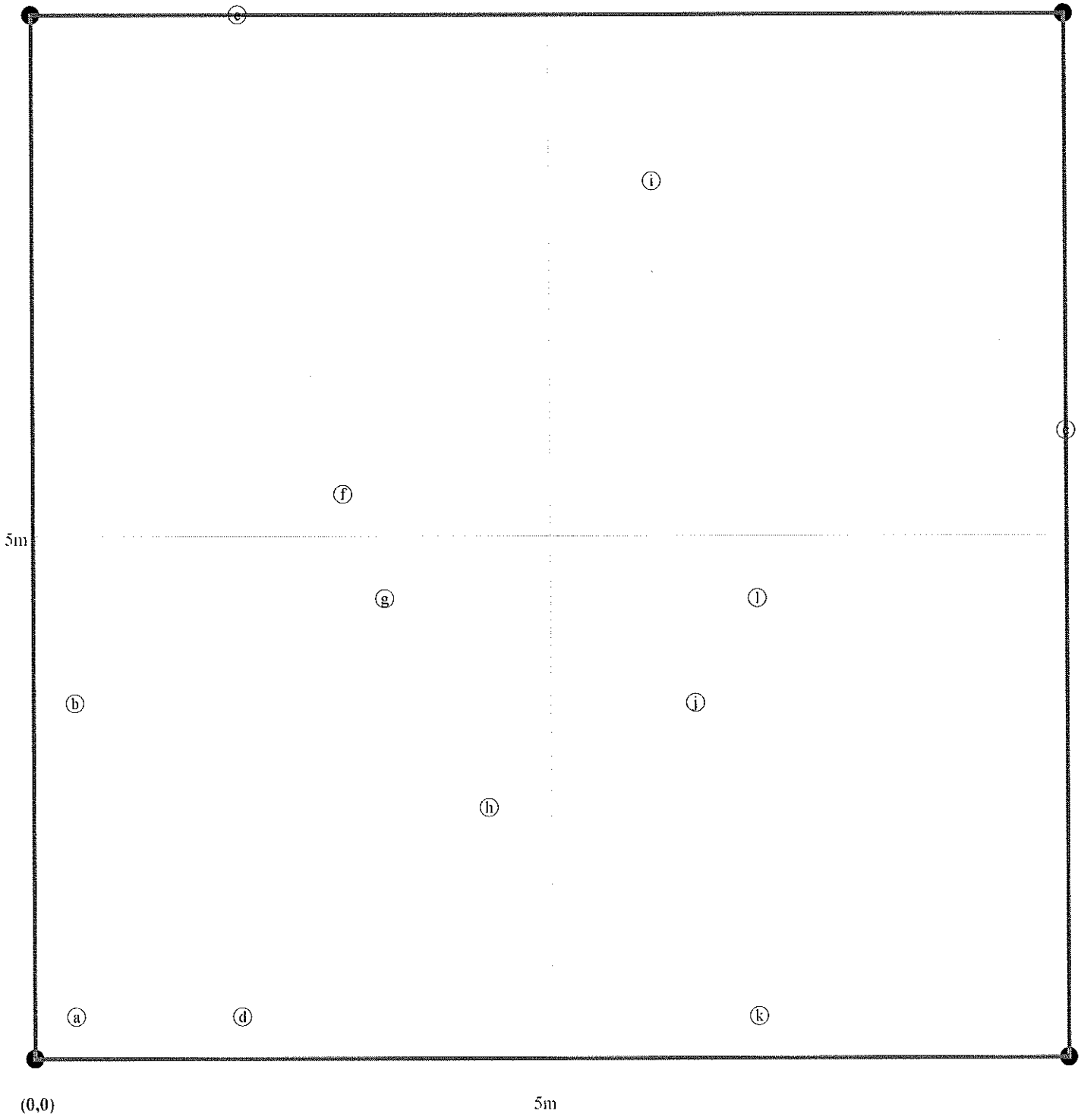
Map of stems on plot 92549-01-5

X-axis: 90 °

N

 # stems: *12*

map size: *LARGE*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Plot 92549-01-6 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.069092 Datum: NAD83/WGS84

Longitude or UTM-E: -78.23333 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
103	Pinus serotina	a	Tu	0.0	1.0	4	29.5								
104	Pinus serotina	c	Tu	1.5	2.5	2	21.0								
105	Pinus serotina	h	Tu	7.0	1.5	4	27.0								
106	Pinus serotina	d	Tu	10.0	2.5	4	21.5								
107	Pinus serotina	i	Tu	7.0	3.0	3	25.5								
108	Pinus serotina	j	Tu	7.5	5.5	3	32.0								
109	Pinus serotina	e	Tu	2.5	6.0	3	25.0								
110	Quercus laurifolia	g	Tu	5.5	8.5	2	20.0								
111	Pinus serotina	b	Tu	1.5	1.5	3	28.0								
112	Pinus serotina	f	Tu	3.0	1.5	4	28.0								

 # stems: *10*

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

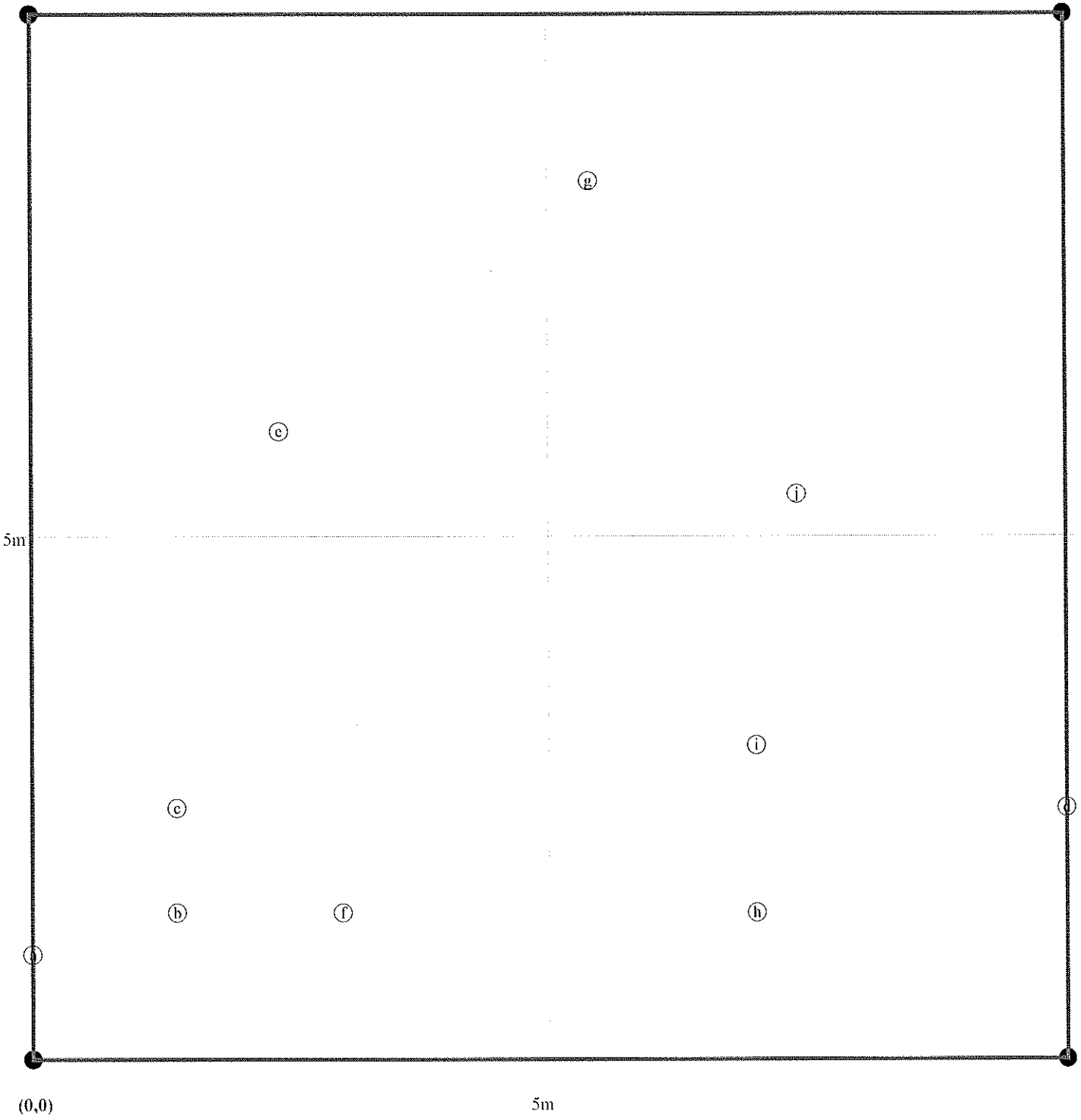
Map of stems on plot 92549-01-6

X-axis: 90°

N

 # stems: 10

map size: LARGE



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Plot 92549-01-7 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.069445 Datum: NAD83/WGS84

Longitude or UTM-E: -78.231294 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
124	Pinus serotina	e	Tu	2.5	3.5	3	18.0								
125	Pinus serotina	h	Tu	6.5	3.5	3	33.0								
126	Pinus serotina	d	Tu	2.0	7.0	3	21.0								
127	Pinus serotina	a	Tu	0.5	1.5	3	27.0								
128	Pinus serotina	c	Tu	2.0	2.5	4	32.0								
129	Pinus serotina	f	Tu	4.5	4.5	4	22.0								
130	Gordonia lasianthus	i	Tu	8.0	5.0	3	14.0								
131	Pinus serotina	g	Tu	4.5	6.5	3	18.0								
132	Pinus serotina	b	Tu	0.5	7.0	3	21.0								

 # stems: 9

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

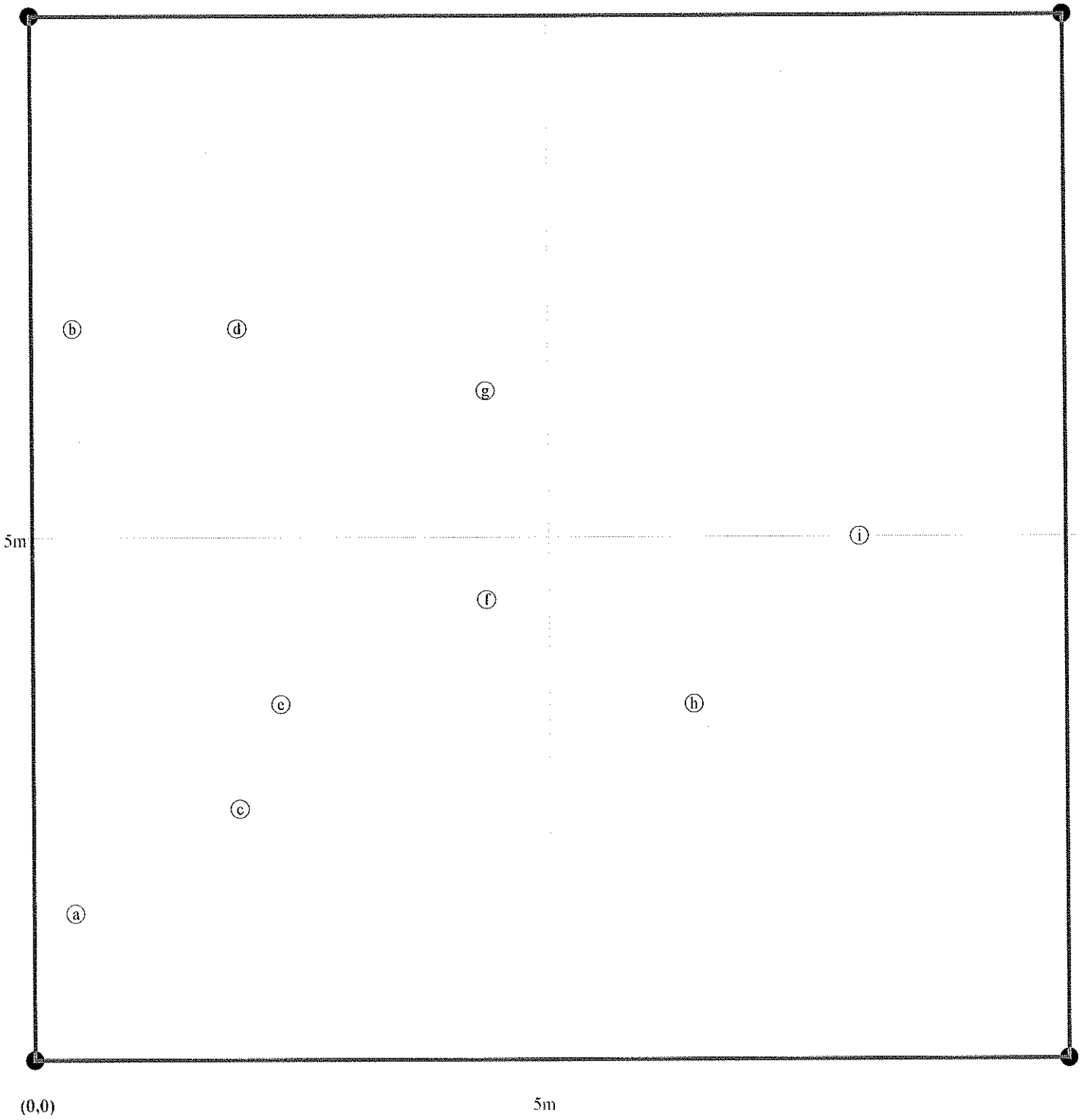
Map of stems on plot 92549-01-7

X-axis: 90°

N

 # stems: 9

map size: LARGE



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

Plot 92549-01-8 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.068375 Datum: NAD83/WGS84

Longitude or UTM-E: -78.230937 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

Party: Role:

Notes on plot:

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
144	Pinus serotina	a	Tu	1.5	1.5	4	15.5								
145	Pinus serotina	c	Tu	2.0	5.0	3	27.0								
146	Pinus serotina	g	Tu	7.5	3.0	4	34.0								
147	Pinus serotina	i	Tu	7.5	5.5	4	22.0								
148	Pinus serotina	j	Tu	8.5	7.5	2	29.0								
149	Gordonia lasianthus	h	Tu	7.5	4.5	0	7.0								
150	Pinus serotina	e	Tu	3.0	6.0	4	3.1								
151	Pinus serotina	f	Tu	4.5	3.0	4	28.0								
152	Pinus serotina	d	Tu	2.5	2.0	4	30.0								
153	Pinus serotina	b	Tu	1.5	3.5	4	24.0								

 # stems: 10

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

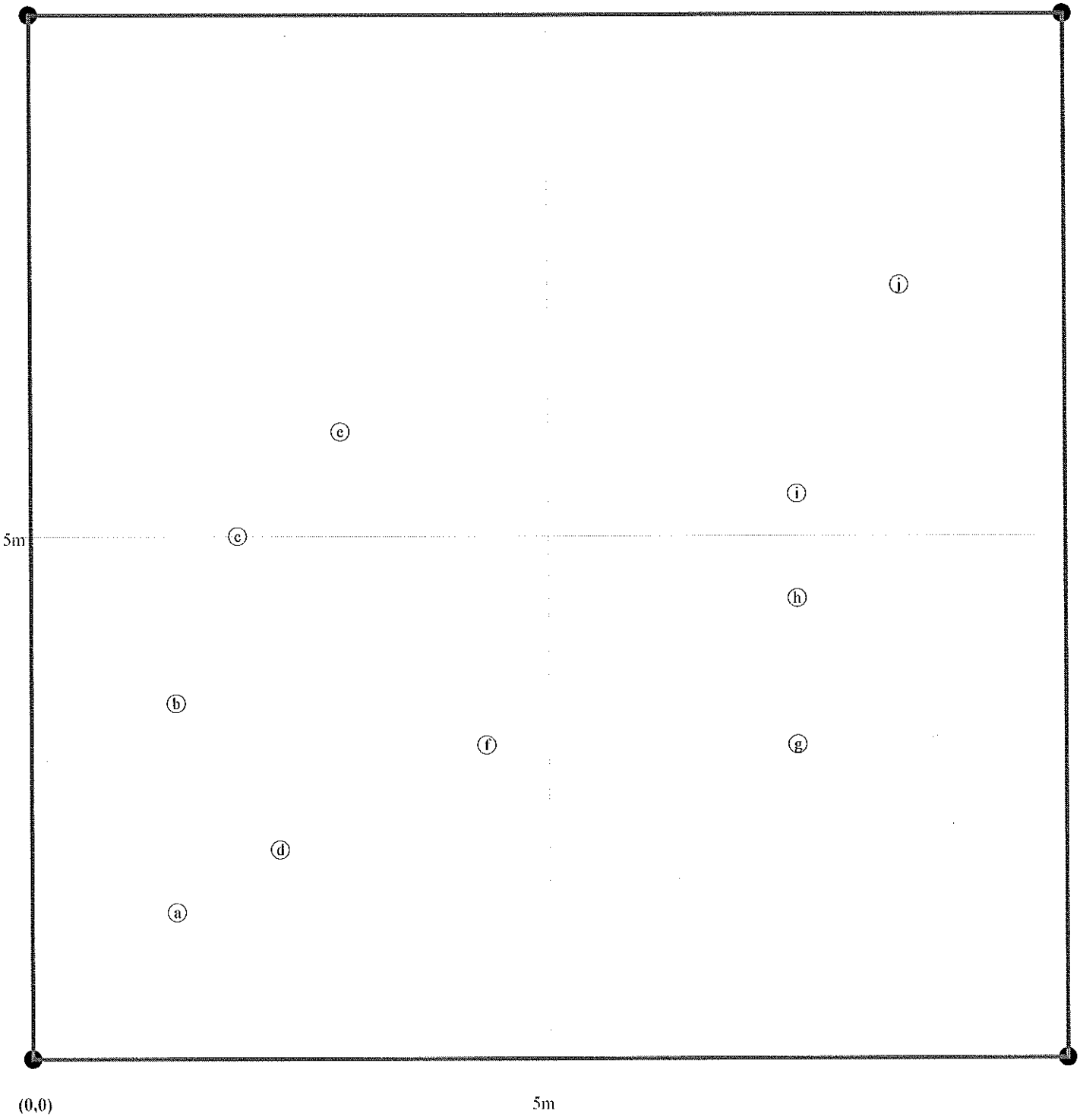
Map of stems on plot 92549-01-8

X-axis: 90 °

N

 # stems: *10*

map size: *LARGE*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

Plot 92549-01-9 — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 1 Date: / / - / /

Party: Role:

Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 34.067904 Datum: NAD83/WGS84

Longitude or UTM-E: -78.233005 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 90

ID	Species	map char	source *	X (m)	Y (m)	Jan 2009 Data ddh (mm)	Jan 2009 Data Height (cm)	Jan 2009 Data DBH (cm)	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
164	Gordonia lasianthus	a	Tu	0.0	5.0	4	13.0								
165	Chamaecyparis thyoides	b	Tu	1.0	6.0	2	14.0								
166	Pinus serotina	d	Tu	3.0	5.5	4	20.0								
167	Pinus serotina	f	Tu	3.5	10.0	3	24.0								
168	Chamaecyparis thyoides	i	Tu	6.5	10.0	0	10.0								
169	Pinus serotina	j	Tu	6.5	6.0	3	25.0								
170	Gordonia lasianthus	g	Tu	4.5	6.5	3	13.0								
171	Gordonia lasianthus	c	Tu	10.0	6.0	3	12.0								
172	Pinus serotina	k	Tu	9.0	1.5	2	13.0								
173	Pinus serotina	e	Tu	3.3	0.0	2	18.0								
174	Gordonia lasianthus	h	Tu	5.5	10.0	0	9.5								

 # stems: 11

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species	source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

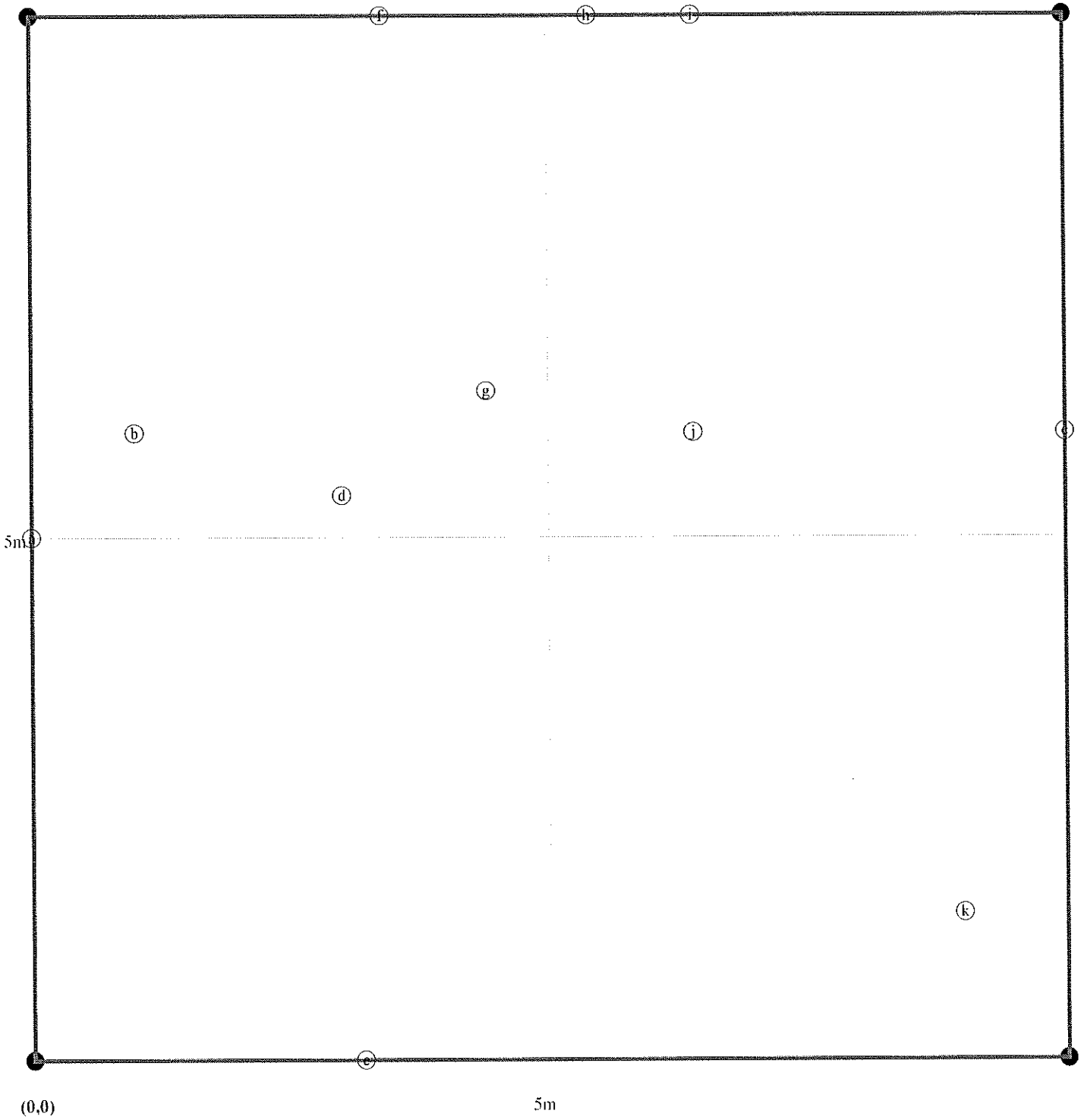
Map of stems on plot 92549-01-9

X-axis: 90°

N

 # stems: 11

map size: LARGE



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=barc Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

Printed in the CVS-EEP Entry Tool ver. 2.2.6

APPENDIX B
SITE PHOTOGRAPHS

Photograph Stations

Photo Station 1: View looking north
December 22, 2008

Photo Station 2: View looking east
December 22, 2008

Photo Station 3: View looking east
December 22, 2008

Photo Station 4: View looking east
December 22, 2008

Photo Station 5: View looking east
December 22, 2008

Photo Station 6: View looking west
December 22, 2008

Photo Station 7: View looking east
December 22, 2008

Photo Station 8: View looking north
December 22, 2008

Vegetation Plot Photographs

Veg Plot 1
January 7, 2009

Veg Plot 2
January 7, 2009

Veg Plot 3
January 8, 2009

Veg Plot 4
January 8, 2009

Veg Plot 5
January 8, 2009

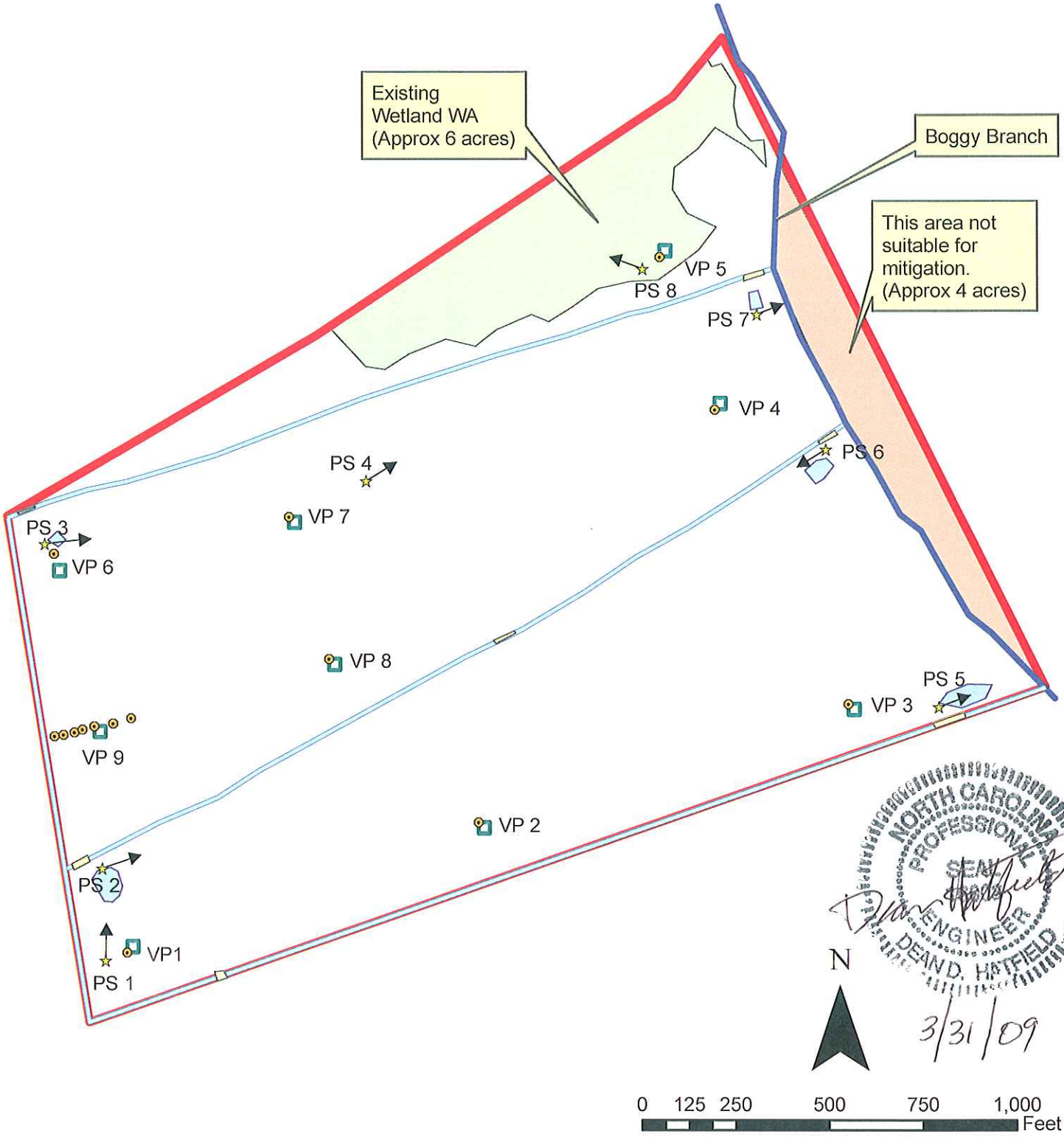
Veg Plot 6
January 7, 2009

Veg Plot 7
January 7, 2009

Veg Plot 8
January 7, 2009

Veg Plot 9
January 7, 2009

APPENDIX C
SEALED AS-BUILT PLANS



NORTH CAROLINA PROFESSIONAL SEAL ENGINEER DEAN D. HATFIELD

3/31/09

Legend

- Project Easement Boundary
- Monitoring Wells
- Vegetation Plots
- Ditches
- Streams
- Wetlands
- Vernal Pools
- Ditch Plugs
- Photo Stations
- Photo Station Direction

North Carolina
Ecosystem Enhancement Program

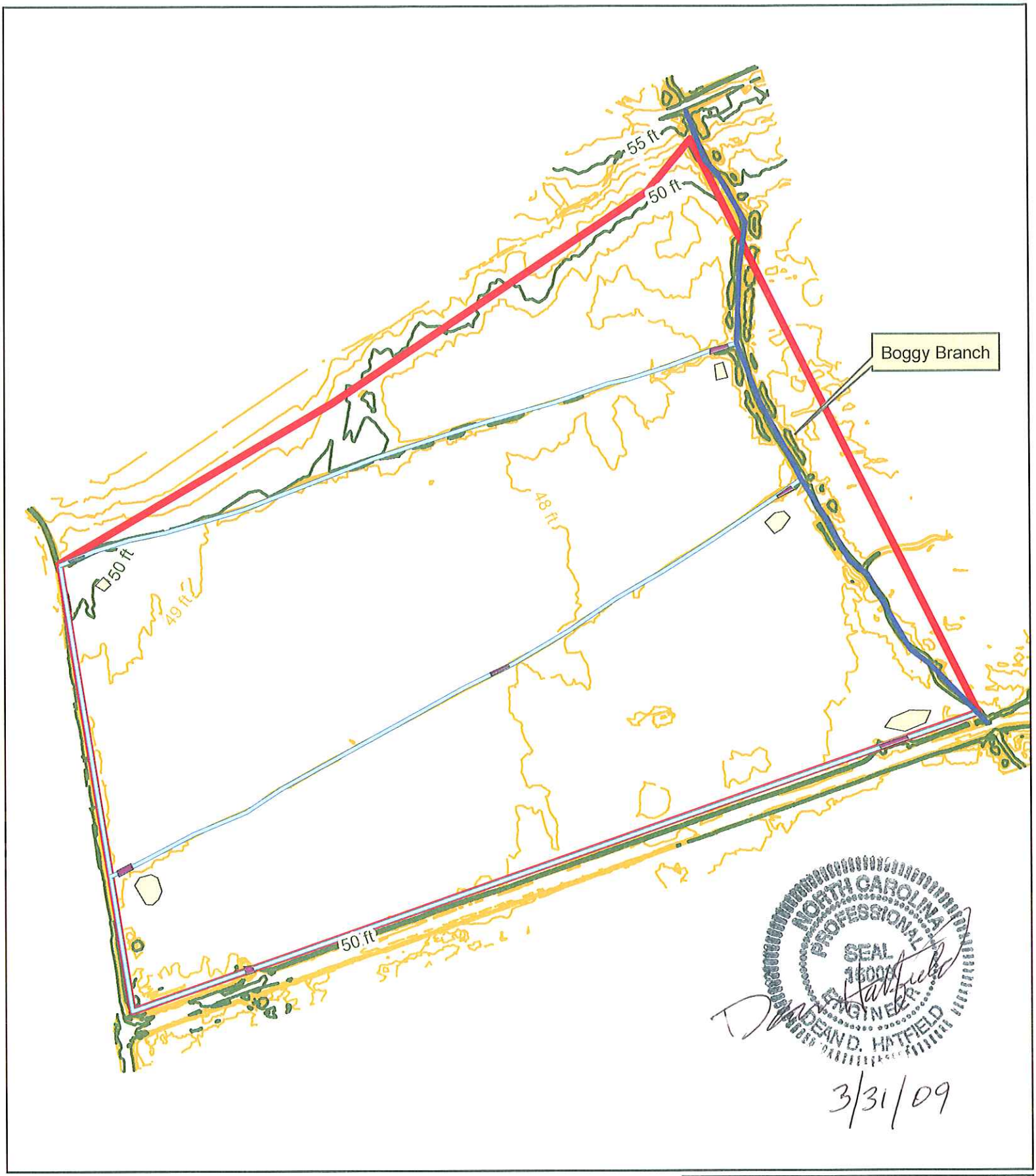
Plum Creek Wetland Mitigation Site
Brunswick County
EEP Project No. D06040

As-Built Plans / Monitoring Plan View

The Louis Berger Group, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605

FIGURE 2

April 2009



Legend

- Project Easement Boundary
- Vernal Pools - dug 1 foot below existing elevation
- Ditch plugs - at grade with existing elevation
- Ditches
- Streams
- 5 foot contour intervals
- 1 foot contour intervals

N

0 125 250 500 750 1,000 Feet

North Carolina
Ecosystem Enhancement Program

Plum Creek Wetland Mitigation Site
Brunswick County
EEP Project No. D06040

Site Contours

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FIGURE 4

April 2009