

CONSTRUCTION MONITORING AND AS-BUILT REPORT

Stoney Ridge Road Wetland Mitigation Site
Ellsworth Lowe's Project
Ellsworth, Maine

December 2007

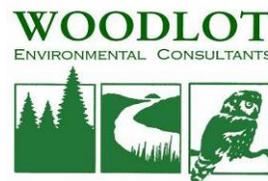


Submitted to:

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1.0 INTRODUCTION

This report describes recent construction monitoring work that took place at the Stoney Ridge Road wetland mitigation site in Ellsworth, Maine (Figure 1), as required by the Maine Department of Environmental Protection (MDEP) Natural Resources Protection Act (NRPA) and U.S. Army Corps of Engineers (Corps) permits¹ for a new Lowe's Home Improvement Store (Lowe's) in Ellsworth. Details of the approved wetland mitigation are contained in the Wetland Mitigation Plan dated July 2006 (Revised April 2007).² The Corps and MDEP permits required construction monitoring by a wetland scientist and preparation of an as-built plan. This report presents a summary of the construction methods, timeframe, and as-built conditions. Long-term mitigation monitoring will begin in 2008.

2.0 APPROVED MITIGATION PLAN

As outlined in the approved mitigation plan, the applicant proposed to mitigate for 3.7 acres of impacts to forested wetlands at the Lowe's project site with approximately 60.5 acres of preservation at two sites (i.e., the Branch Lake and Stoney Ridge Road sites), as well as the following measures at the Stoney Ridge Road site:

- 0.1 acre (approximate) of wetland and stream restoration; and
- 1.3 acres (approximate) of upland forest habitat restoration;

The Stoney Ridge Road site contains an existing gravel road associated with a planned subdivision that was never developed. The mitigation plan called for portions of the road to be restored and enhanced to benefit wildlife habitat and water quality functions. Appendix B of this report contains plan figures from the approved mitigation plan illustrating the proposed mitigation treatments. Based on an estimation of prior wetland impacts from the road's construction, approximately 0.1 acre (4,257 square feet) of palustrine forested and palustrine scrub-shrub wetlands, wetland buffer, and two stream channels were to be restored by removing road fill and a culvert. In this area, the road fill would be removed to the existing grades of adjacent wetlands and the area re-soiled to restore wetland conditions and functions. The stream channels were to be restored using clean gravel fill and rocks to mimic the undisturbed conditions found immediately upstream and downstream of the crossing. The restored floodplain wetland and riparian bank areas would then be seeded and planted with wetland and transitional (i.e., facultative) species. Existing all-terrain vehicle trails at the site were to be blocked or re-routed to limit the disturbance to soils and vegetation in the wetlands and vernal pools.

In addition, portions of the gravel road within the site were to be restored to upland forested habitat by re-grading the road bed, re-soiling, seeding, and planting trees. This upland restoration would ameliorate fragmentation effects from the road and enhance the upland "life zone" associated with the nearby vernal pools (i.e., providing additional terrestrial habitat for vernal pool species such as wood frog [*Rana sylvatica*] and spotted salamander [*Ambystoma maculatum*], and removing a potential barrier to amphibian movement). Because local residents will likely continue to walk the restored road, a two to three-foot wide path along the road was to be maintained as gravel to encourage foot traffic to avoid newly planted and seeded areas. Likewise, large flat stones were to be installed at the restored wetland and stream crossing for fording purposes.

The entire 25.6 acres (+/-) of the Stoney Ridge Road site was to be preserved through deed restrictions. Preservation would maintain the important wetland functions and values in this developing area, prohibiting probable impacts that would occur if the subdivision was fully developed. This mitigation parcel directly abuts both the Lowe's project site and the so-called "Birdsacre" preserve, and as such will serve as protected open space and natural buffer.

1 DEP Permit # L-23077-26-A-N/L-23077-TF-B-N (January 31, 2007)
US Army Corps Permit # NAE-2006-1328 (April 9, 2007)

2 Refer to Attachment 13 of the NRPA application for this project.

As indicated in the approved plan, the primary mitigation objectives for the Stoney Ridge Road site were to:

1. Restore palustrine scrub-shrub and palustrine forested wetland, wetland buffer, and stream habitats in the western portion of the site by removing a section of gravel road, including one stream culvert, and planting and seeding with hydrophytic plant species;
2. Convert remaining portions of gravel road back to forested upland habitat through limited road gravel removal, re-grading, re-soiling, seeding, limited planting and spreading of coarse woody debris;
3. Enhance the functioning of existing wetlands and vernal pools on-site by re-routing all-terrain vehicle traffic and blocking access to existing and restored wetlands; and
4. Preserve the entire site to protect wetland functions and wildlife habitat, including at least two existing vernal pools and their associated life zones.

3.0 SUMMARY OF MITIGATION CONSTRUCTION

The various aspects of mitigation construction are summarized below. Much of the construction work was directly observed by a wetland scientist from Stantec Consulting (Stantec, formerly Woodlot Alternatives, Inc. [Woodlot]).³ Photos of the work, including in-progress construction, immediately post-construction, and a few weeks following construction, are also provided.

3.1 CONTRACTORS AND CONSTRUCTION TIMELINE

- *Construction Contractor:* Sargent Corporation, Stillwater, Maine
- *Planting Contractor:* Norpine, Kingfield, Maine
- *Wetland Mitigation Oversight:* Stantec
- *Pre-Construction Meeting:* May 14, 2007 (Sargent, Norpine, Stantec)
- *Site Walks with Construction Contractor:* July 2 and 19, 2007 (Sargent, Stantec)
- *Construction Dates:*
 - ❖ Earthwork (re-grading, culvert removal): July 23 to July 27 (\pm), 2007
 - ❖ Seeding: July 27 and 28, 2007
 - ❖ Planting: September 30 to October 2, 2007

3.2 RESTORATION METHODS

Upland Restoration: The contractor began at the east end of the upland restoration area by removing gravel, re-grading, and placing topsoil. This work was completed by an excavator, progressing down the hill towards the lower end of the gravel road at the intersection of the Deerfield Road. A minimum of one foot of gravel was removed throughout the upland restoration area. More than one foot was removed where the road banks were cut back to reduce the steepness of side slopes and to reduce the potential for erosion, and where water bars were constructed. The three water bars were constructed on the steeper section of restored roadway as a permanent erosion control measure to divert runoff into adjacent vegetated areas. The excavator left a meandering three-foot wide gravel path within the roadway as specified in the plans.

Following gravel removal and re-grading, the contractor installed a minimum of one foot of topsoil salvaged from the nearby Lowe's construction site. This material was spread using the excavator and was compacted only minimally with the bucket. Some micro-topography was built into the final grading in upland restoration areas, although not to the same degree as the wetland restoration area (see photos).

³ On October 1, 2007, Woodlot Alternatives Inc., merged with Stantec Consulting Services, Inc.

Wetland Restoration: Wetland restoration involved removal of a section of the gravel road bed and a 50-inch diameter concrete culvert, followed by placement of topsoil and a rock path. This work was also done with an excavator. A Stantec wetland scientist was on-site to observe a portion of wetland restoration, and provided recommendations to the contractor regarding rough and finish grades, stream channel locations, and micro-topography. Observation of the original soil under the roadbed helped guide the vertical extent of roadbed excavation necessary to restore wetland conditions. The same topsoil used in the upland restoration areas was used for wetland restoration. Gravel and small rocks were used to form the stream channels (see photos).

3.3 COARSE WOODY DEBRIS

Small dead trees, logs, tree tops, and branches were pulled by hand from the adjacent forests and scattered in the upland and wetland restoration areas. The exact quantity (i.e., volume) of this coarse woody debris is not known.

3.4 SEEDING

Following finish grading, upland and wetland restoration areas at the Stoney Ridge Road mitigation site were seeded with the mixes specified in the mitigation plan (Table 1 below). Winter rye (*Secale cereale*) was also applied to re-soiled areas to provide a quick cover crop going in to the early winter season. Steeper portions of the seeded areas were covered with straw or erosion control blanket. Both seed types were applied by hand using a broadcast seeder. A quick-release fertilizer was also applied by hand.

Table 1. Seed mixes used at the Stoney Ridge Road mitigation site in 2007

WETLAND SEED MIX

Common Name	Scientific Name	Percent Abundance
Fringed sedge	(<i>Carex crinita</i>)	54%
Bristly sedge	(<i>Carex comosa</i>)	14%
American mannagrass	(<i>Glyceria grandis</i>)	13%
Lurid sedge	(<i>Carex lurida</i>)	6%
Blue vervain	(<i>Verbena hastata</i>)	3%
Green bulrush	(<i>Scirpus atrovirens</i>)	3%
Wool-grass	(<i>Scirpus cyperinus</i>)	2%
Joe-pye weed	(<i>Eupatorium maculatum</i>)	2%
Hop sedge	(<i>Carex lupulina</i>)	1%
Boneset	(<i>Eupatorium perfoliatum</i>)	1%
Smooth Panic Grass	(<i>Panicum dichotomiflorum</i>)	1%

UPLAND SEED MIX

Common Name	Scientific Name	Percent Abundance
Little bluestem	(<i>Andropogon scoparius</i>)	30%
Big bluestem	(<i>Andropogon gerardii</i>)	25%
Shelter switchgrass	(<i>Panicum virgatum</i>)	12%
Tioga deer tongue	(<i>Panicum clandestinum</i>)	10%
Smartweed	(<i>Polygonum pensylvanicum</i>)	5%
Canada wild rye	(<i>Elymus canadensis</i>)	5%
Fox sedge	(<i>Carex vulpinoidea</i>)	5%
Annual sunflower	(<i>Helianthus annuus</i>)	6%
Showy tick trefoil	(<i>Desmodium canadense</i>)	2%

3.5 PLANTING

One hundred and eighty plants were installed in upland and wetland restoration areas at the Stoney Ridge Road mitigation site in 2007, as shown in Table 2 below. This number was derived from the proposed planting densities outlined in the approved mitigation plan.

The installed tree and shrub species are native to Maine and the local region. Plants were nursery-grown and containerized, ranging in height from two to four feet. Individual plants and plant groupings were top-dressed with three to four inches of natural bark mulch to control weed growth.

Table 2. Plants installed at the Stoney Ridge Road mitigation site in 2007

Common Name	Scientific Name	Number Planted	Size (Height) in feet
Wetland Area – Shrub and Tree Species			
Red osier dogwood	<i>Cornus sericea</i>	9	2 – 3
Silky dogwood	<i>Cornus amomum</i>	16	2 – 3
Red maple	<i>Acer rubrum</i>	9	3 – 4
Balsam fir	<i>Abies balsamea</i>	8	2 – 3
Northern white cedar	<i>Thuja occidentalis</i>	8	2 – 4
Upland Area – Tree Species Only			
Red Oak	<i>Quercus rubra</i>	25	3 – 4
Quaking aspen	<i>Populus tremuloides</i>	40	3 – 4
Paper birch	<i>Betula papyrifera</i>	25	3 – 4
White pine	<i>Pinus strobus</i>	40	3 – 4
Total:		180	

4.0 AS-BUILT RESULTS

On October 19, 2007, Stantec conducted an as-built survey using a Global Positioning System (GPS) receiver and auto-level instruments. The GPS was used to delineate the boundaries of the upland and wetland restoration areas and stream channels, as well as the starting and ending points of two sample transects. The auto-level was used to collect elevation and distance data along these transects. The data were processed in AutoCad® and used to produce the attached as-built figures (Appendix A). As-built grading and planting conditions are shown on Figures 2, 3, and 4. As-built conditions can be compared to the proposed conditions figures presented in Appendix A.

4.1 UPLAND RESTORATION

Results of the as-built survey indicate that the actual area available for upland restoration was less than estimated in the plan. GPS data show that the amount of upland area re-graded, re-soiled, and planted was approximately 0.84 acre (36,585 square feet), compared to 1.3 acres estimated in the mitigation plan. The primary reason for this discrepancy is that the actual width of restored roadway was less than originally estimated. This is because the roadway edges were vegetated with a variety of native trees and shrubs that had become established naturally. Many of the trees were 15 to 20 feet or more in height, and the decision was made to leave them in place rather than destroy and replant them. This reduced the width of roadway restoration but is considered beneficial because the clearing width, or gap, was reduced and the degree of additional fragmentation minimized. The number of plants installed in the upland area was not reduced, so the planting density is actually greater than proposed.

4.2 WETLAND AND STREAM RESTORATION

The wetland and stream restoration component was completed largely as planned. As the excavation proceeded, the soil characteristics encountered were used by Stantec to identify the approximate pre-development boundaries of the wetland. These observations dictated the extent of excavation, and it appears that the restored wetland closely resembles the original wetland before the road was constructed. GPS data show that the wetland restoration is likely to be approximately 0.12 acre (2,476 square feet) in area,⁴ with an additional 0.06 acre (2,602 square feet) of restored riparian buffer (Figure 3).

As can be seen in the attached photographs, removal of the culvert and re-grading of the area between the two streams coming in from the north allowed the contractor to construct two new channels totaling approximately 150 linear feet. The restored channels merge just upstream of the undisturbed channel on the west side of the roadway (see Figure 3 and photos). The combined area of wetland and riparian buffer restoration closely matches the area of planned restoration, and is expected to provide the functions stated in the mitigation objectives.

4.3 OTHER MEASURES

Per the approved plan, the contractor placed boulder barriers at either end of the restored road to restrict access by all-terrain vehicles and other vehicles. The boulders still allow easy walking access. The plan also called for blocking some interior trails that appeared to have been used by all-terrain vehicles in the past. However, it appeared that those trails had not been used in some time, and that blocking the two ends of the road would be sufficient to control access. Based on that assessment, the decision was made not to barricade the old trails.

The contractor has recently added coarse woody debris to both wetland and upland restoration areas, in accordance with the mitigation plan. This measure is not reflected in the attached photos, which were taken before this work was completed.

5.0 RECOMMENDATIONS

At this time, Stantec has no specific recommendations for further construction or re-vegetation measures at the Stoney Ridge Road wetland mitigation site. A wetland scientist will visit the site in the spring of 2008 to assess potential winter mortality of planted stock, seeding and erosion control needs, all-terrain vehicle use, and the overall condition of the site.

⁴ Actual wetland boundaries will be determined in the coming years in association with long-term monitoring and reporting.

DURING RE-GRADING OF UPLAND AND WETLAND RESTORATION AREAS



Photo 1. Excavator stripping gravel and adding topsoil in upland restoration area. Woodlot, July 25, 2007.



Photo 2. Eastern end of upland restoration, looking east, after re-grading and re-soiling. Lighter color is gravel path. Woodlot, July 25, 2007.



Photo 3. Newly-re-graded and re-soiled conditions in central portion of upland restoration area. Woodlot, July 25, 2007.



Photo 4. Removing 50-inch concrete culvert from wetland restoration area. Woodlot, July 25, 2007.



Photo 5. Re-established stream channel after culvert removal and placement of rocks, looking upstream (east). Woodlot, July 25, 2007.



Photo 6. Adding topsoil to wetland restoration area, looking west (downstream). Re-established channel where culvert was is shown on right. Woodlot, July 25, 2007.

APPROXIMATELY 3 MONTHS AFTER RE-GRADING / 2 WEEKS AFTER PLANTING



Photo 7. Looking at eastern end of restored upland after seeding and planting. Stantec, October 19, 2007.



Photo 8. Water bar on sloped section of restored road. Also note trees already established along edges of old road. Stantec, October 19, 2007.



Photo 9. Wetland/stream restoration area, looking north. Stantec, October 19, 2007.

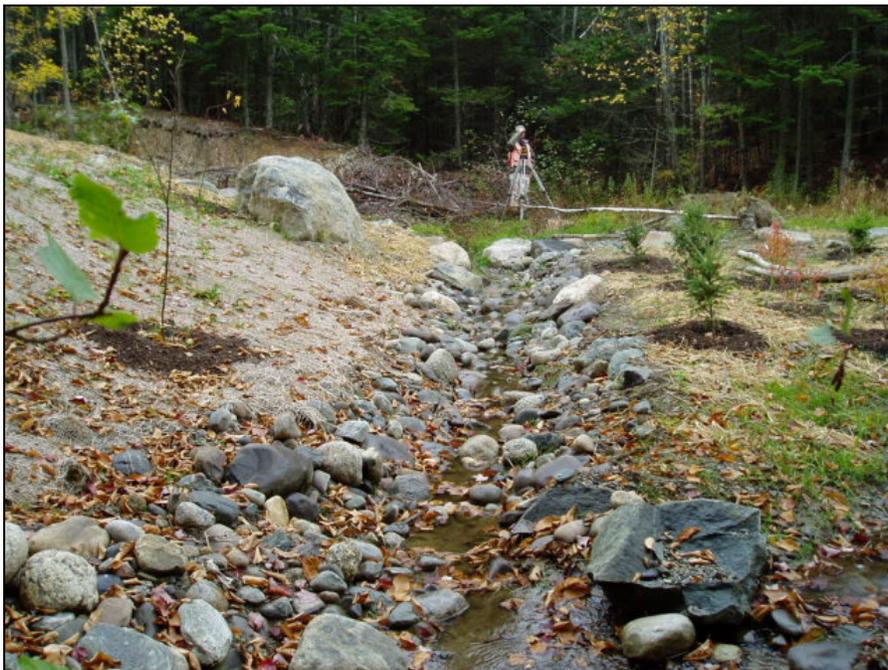


Photo 10. Restored stream channel at culvert removal location, looking upstream (east).
Stantec, October 19, 2007.



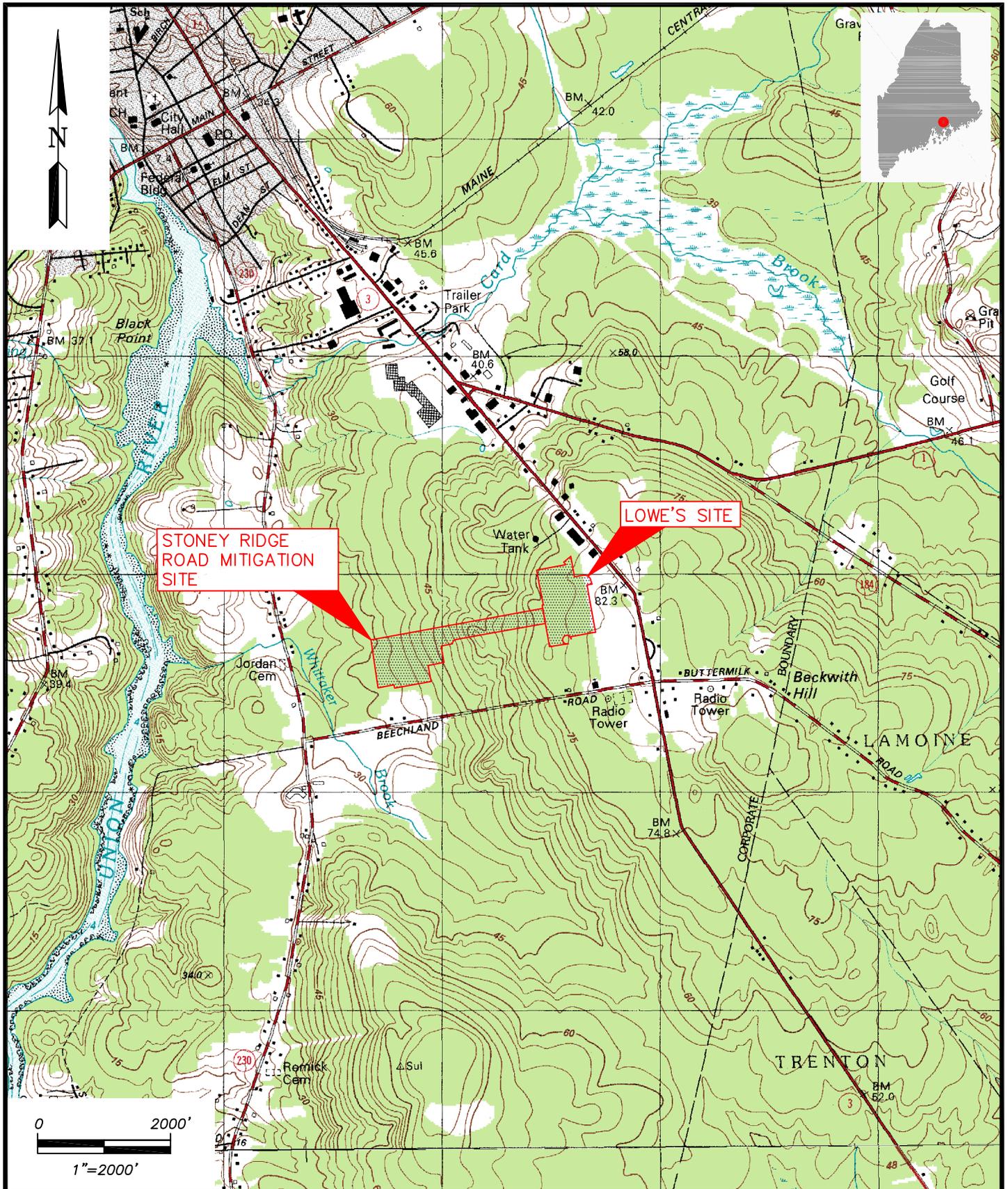
Photo 11. Second restored stream channel, looking upstream (southeast).
Stantec, October 19, 2007.



Photo 12. Plantings within wetland restoration area.
Stantec, October 19, 2007.

APPENDIX A

As-Built Figures



PREPARED BY:



Stantec

107018-F001-locus_map.dwg

WOODLOT



SHEET TITLE:

Project and Mitigation Location Map

PROJECT:

Lowe's Warehouse Project
Ellsworth, Maine

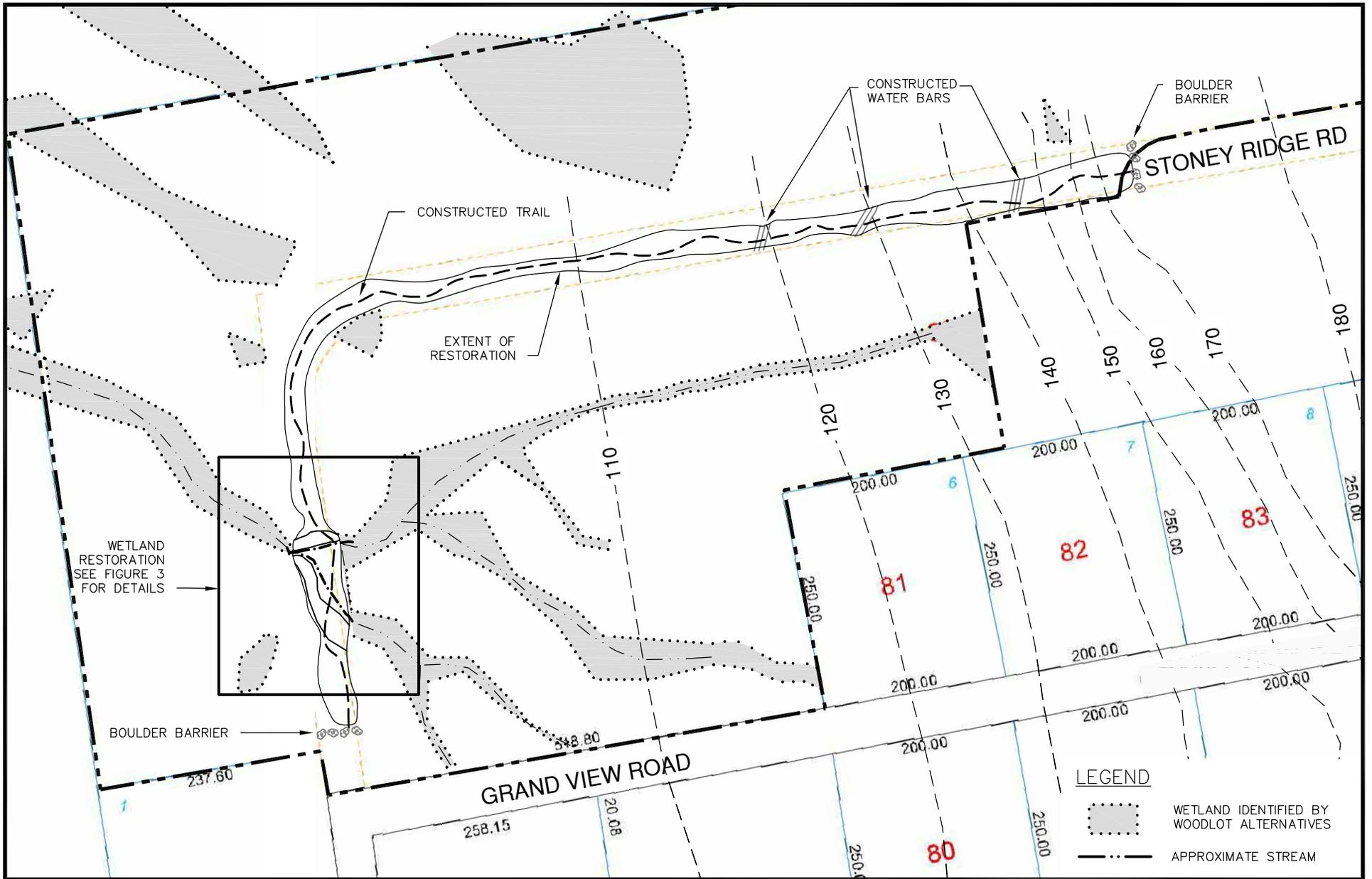
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SCALE: 1"=2000'

PROJ. NO.: 195600089

FIGURE:

1



PREPARED BY:




107018-000-asbuiltGPS.dwg

0 150'

1" = 150'

SHEET TITLE:

**As-Built Conditions
Wetland and Upland Restoration Areas**

PROJECT:

Stoney Ridge Road Mitigation Site
Lowe's Warehouse Project, Ellsworth, Maine

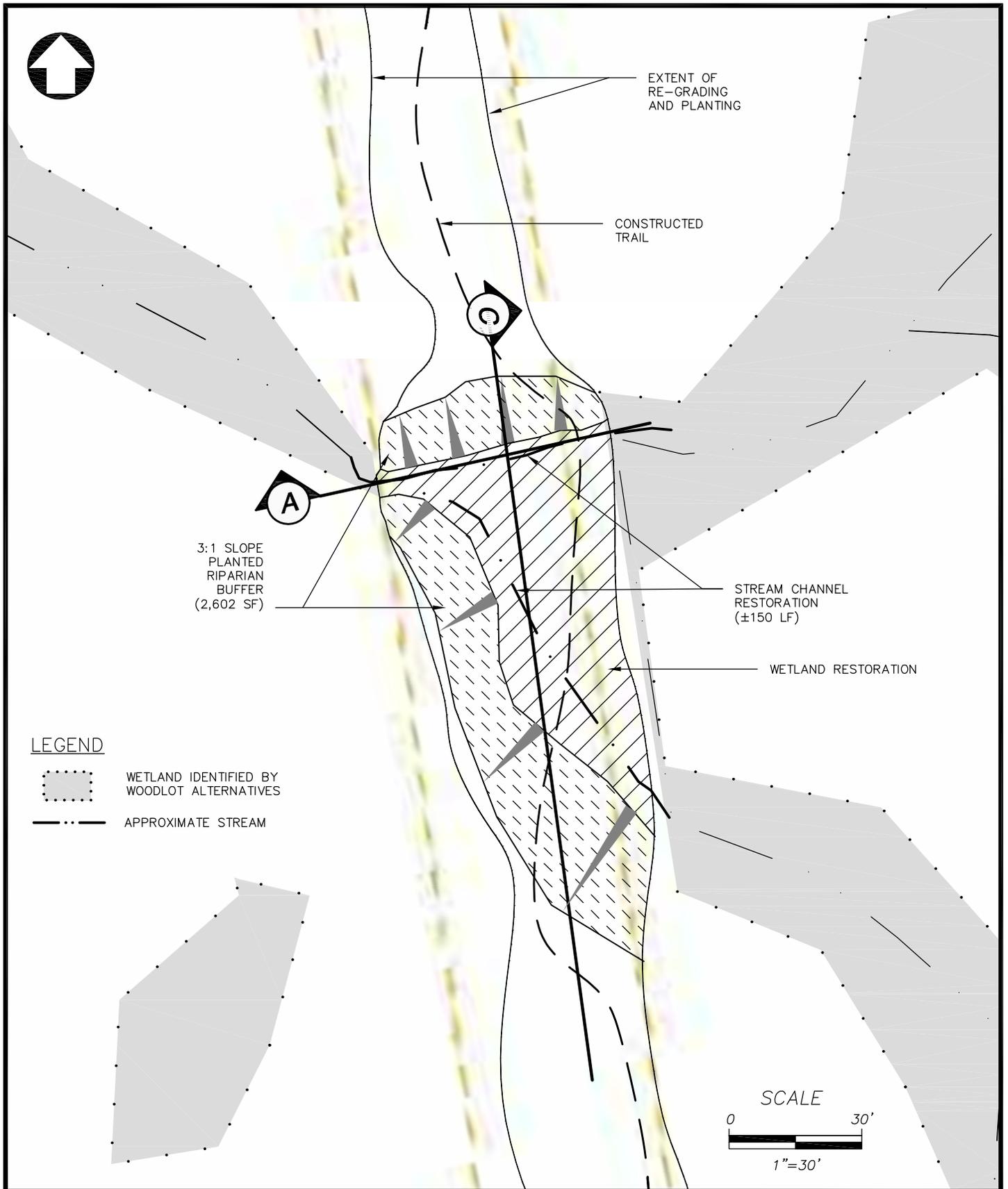
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PN: 19560089

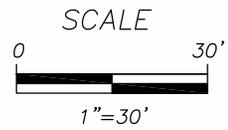
FIGURE:

2



LEGEND

-  WETLAND IDENTIFIED BY WOODLOT ALTERNATIVES
-  APPROXIMATE STREAM



PREPARED BY:




107018-000-asbuiltGPS.dwg

SHEET TITLE: **As-Built Conditions
Wetland & Stream Restoration Area**

PROJECT: **Stoney Ridge Road Mitigation Site
Lowe's Warehouse Project, Ellsworth, Maine**

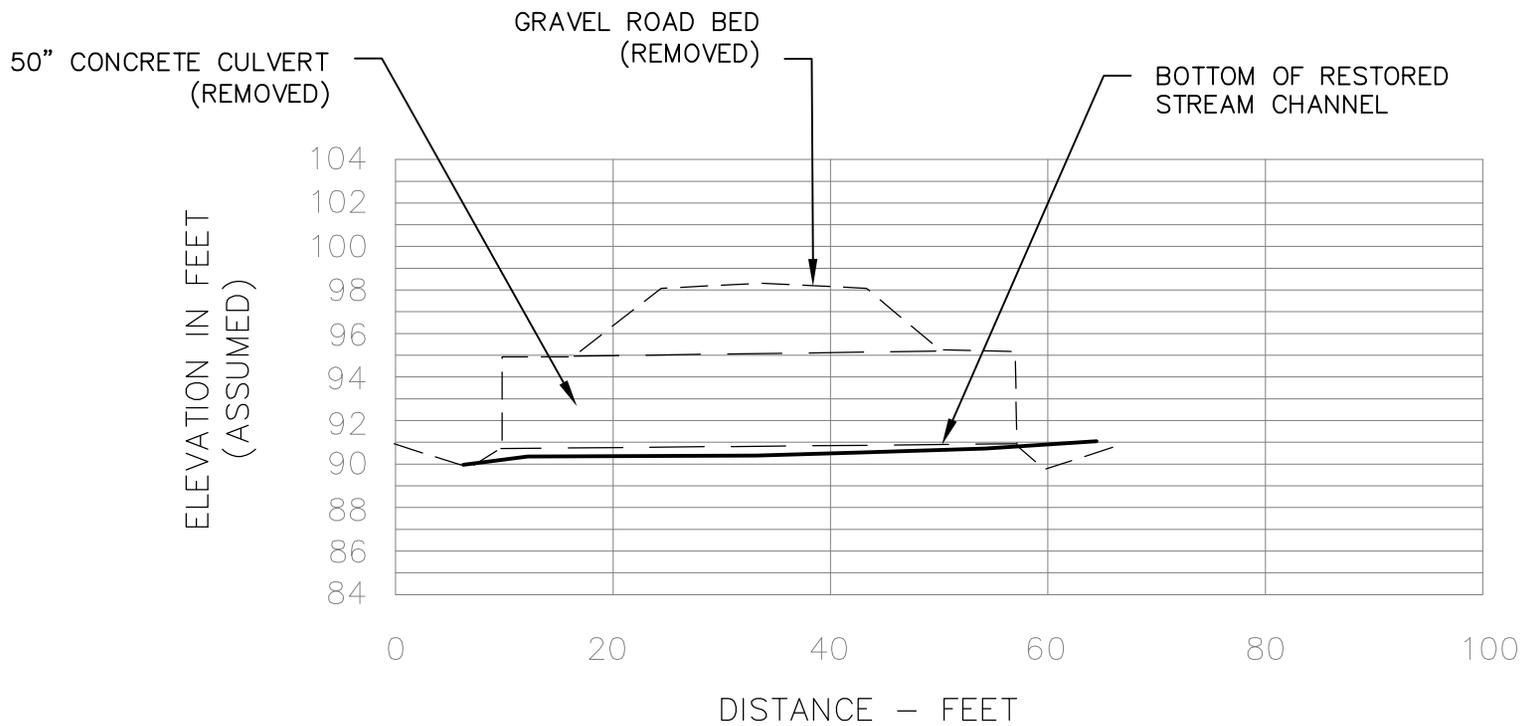
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SCALE: 1" = 30'

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FIGURE:

3



SECTION A

LEGEND

- EXISTING GRADE
- PROPOSED GRADE

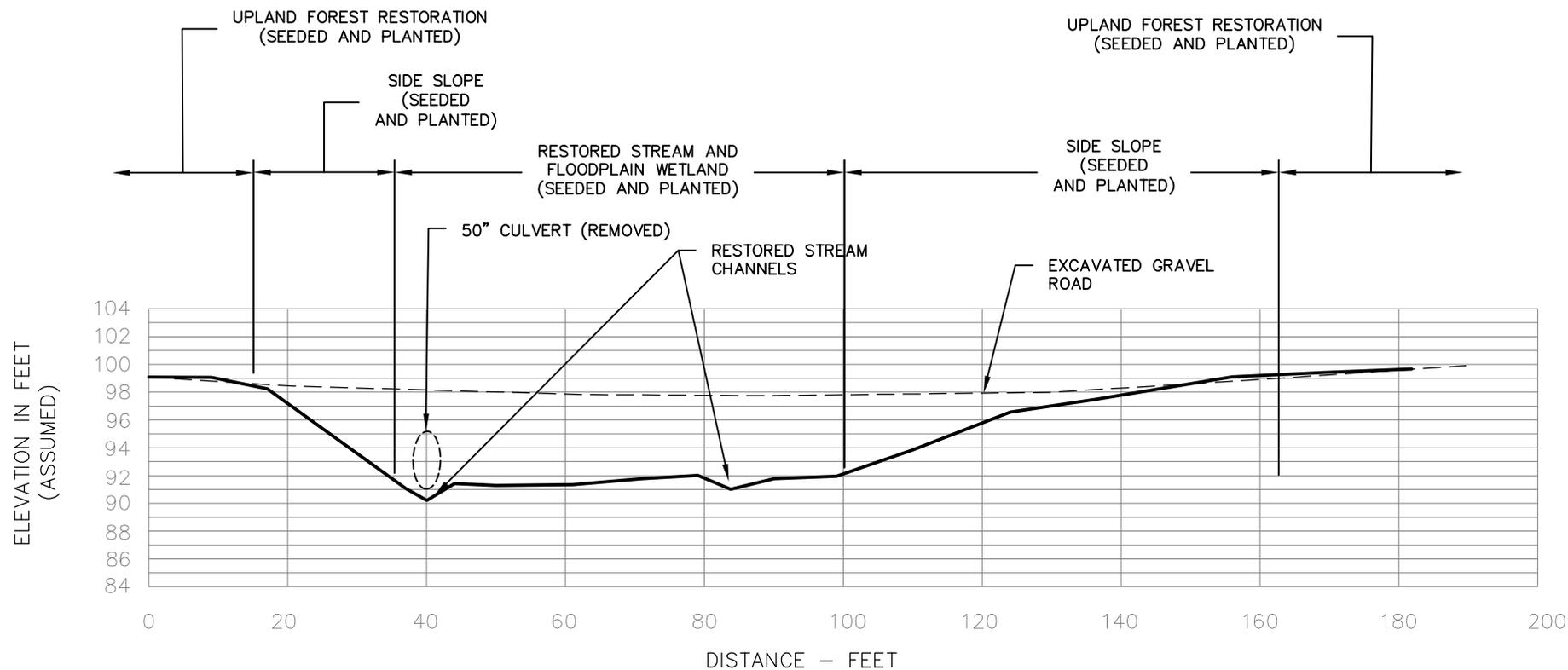
PREPARED BY:




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SHEET TITLE:	Wetland & Stream Restoration – Section A Stoney Ridge Road Mitigation Site
PROJECT:	As-Built Mitigation Plan Lowe's Warehouse Project Ellsworth, Maine

FIGURE:	4
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SECTION C

LEGEND

- EXISTING GRADE
- PROPOSED GRADE

PREPARED BY:



Stantec

WOODLOT



DESIGN:	DATE: 11/13/07
DRAFT:	PROJ. NO.: 195600089
CHECKED:	SCALE: As Shown
FILE: 107018-F4_5-As-xsec.dwg	

SHEET TITLE:

Wetland & Stream Restoration – Section C
Stoney Ridge Road Mitigation Site

PROJECT:

As-Built Mitigation Plan
Lowe's Warehouse Project
Ellsworth, Maine

FIGURE:

5

APPENDIX B

Proposed Condition Figures from NRPA Application Attachment 13



PREPARED BY:



DESIGN:	DATE: Dec 2006
DRAFT:	PROJ. NO.: 104204
CHECKED:	SCALE: 1" = 400'
FILE: 104204-F2_3-Stoney-plans.dwg	

SHEET TITLE:

Aerial Photo Of Stoney Ridge Road Mitigation Site

PROJECT:

Wetland Compensation Plan
Proposed Lowe's Home Improvement Center
U.S. Route 3, Ellsworth, Maine

FIGURE:

2

MATCH LINE A

LOT 15-21
STANWOOD WILDLIFE
FOUNDATION

ZONING LINE

LIMITS OF WETLAND
SURVEY

PSS

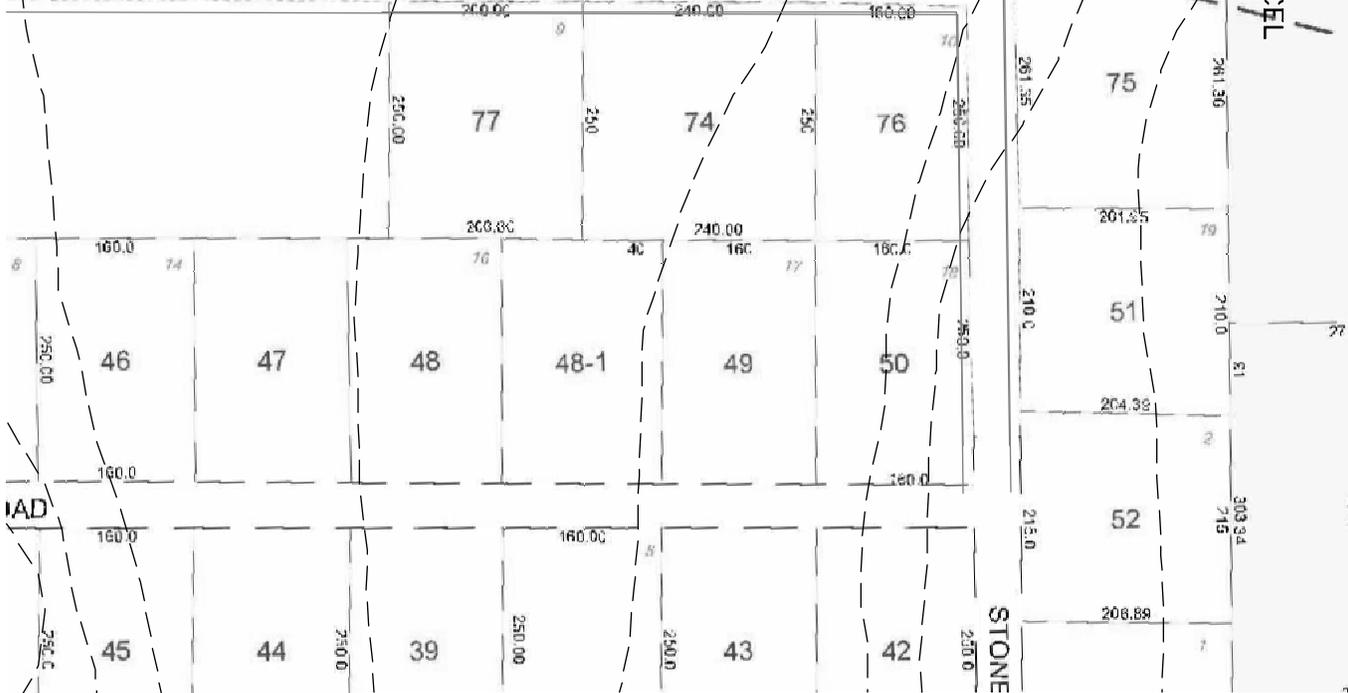
PFO

APPROXIMATE
WETLAND BOUNDARIES
(SEE NOTE)

PROPOSED
DE-SAC
W. RADIUS = 65'

PROPOSED LOWE'S PARCEL

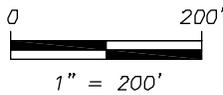
STONEY RIDGE ROAD



LEGEND

- WETLAND IDENTIFIED BY WOODLOT ALTERNATIVES (SEE NOTE)
- APPROXIMATE STREAM
- PROPOSED EASEMENT BOUNDARY
- APPROXIMATE ATV TRAIL
- PHOTO LOCATION

APPROXIMATE AREAS	
TOTAL MITIGATION PARCEL	25.6 ACRES
WETLANDS	6.2 ACRES
UPLANDS	19.4 ACRES
PROPOSED MITIGATION	
WETLAND RESTORATION	0.1 ACRES
UPLAND BUFFER RESTORATION	1.3 ACRES
WETLAND/UPLAND PRESERVATION	24.2 ACRES



MATCH LINE B

SHEET TITLE:

EXISTING AND PROPOSED CONDITIONS
Restoration and Easement Areas
Stoney Ridge Road Site, Ellsworth, Maine

PROJECT:

Wetland Compensation Plan
Proposed Lowe's Home Improvement Warehouse
Ellsworth, Maine

PREPARED BY:

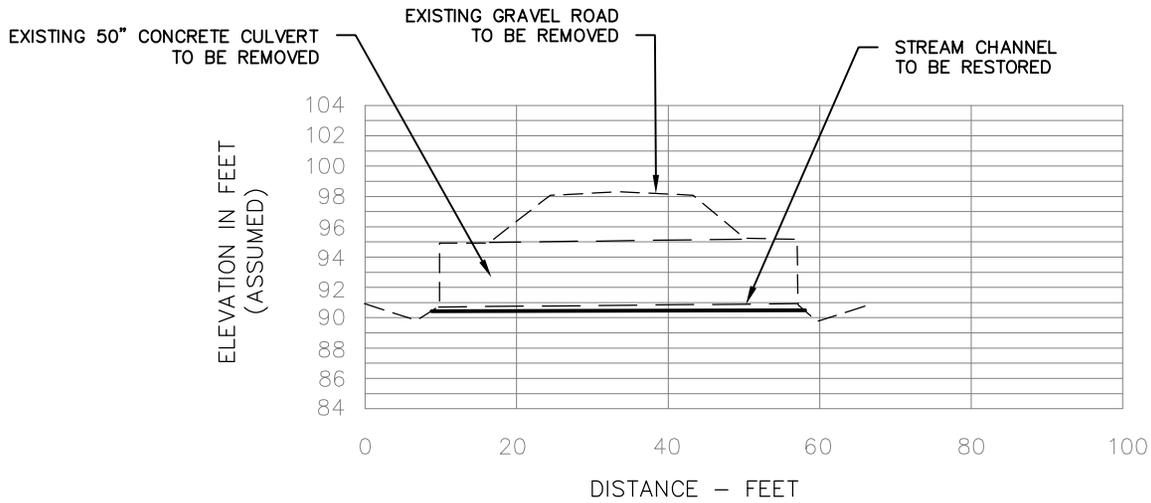


WOODLOT
ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

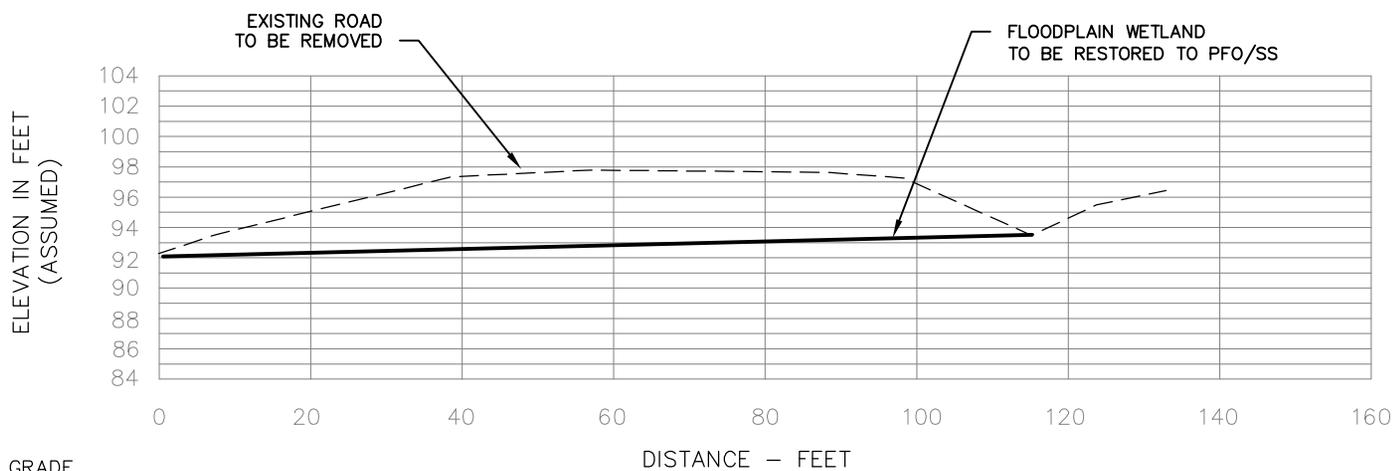
104204-f2_3--Stoney-plans.dwg

DATE: Dec 2006
SCALE: 1" = 200'
PROJ. NO. 104204
FIGURE:

3



SECTION A



SECTION B

LEGEND

- EXISTING GRADE
- PROPOSED GRADE

PREPARED BY:



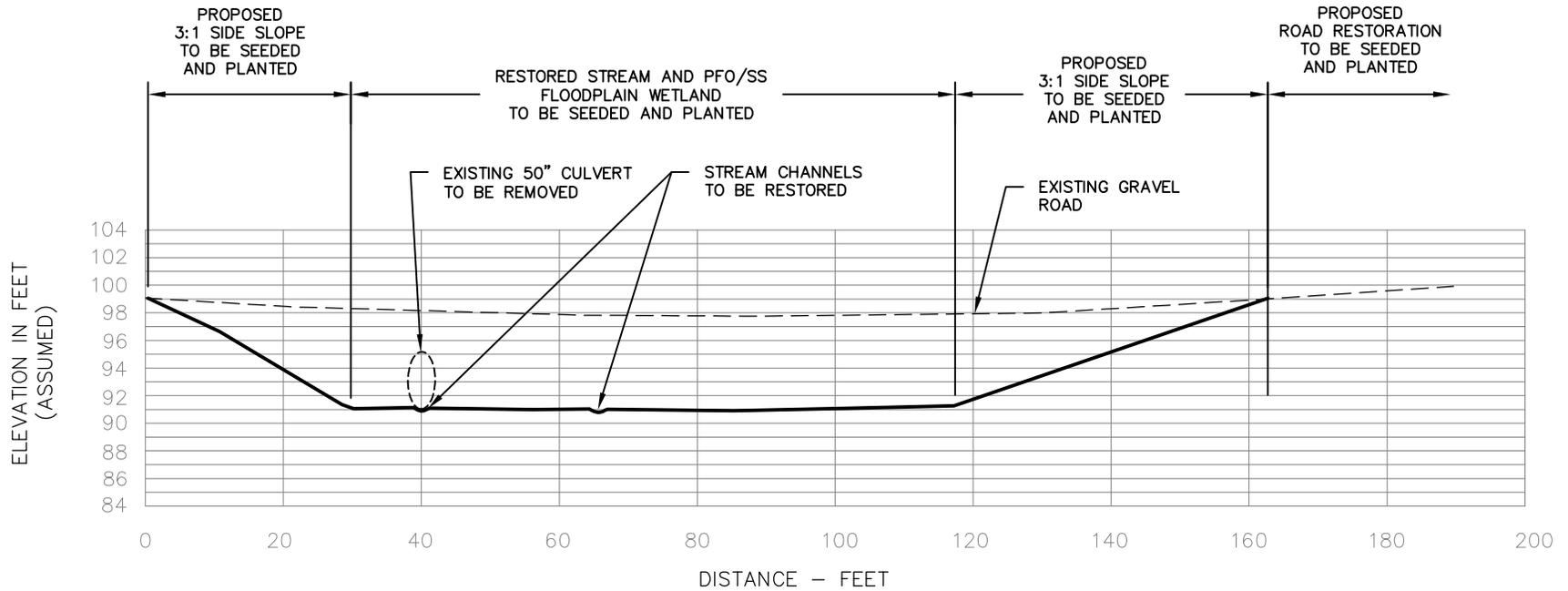
WOODLOT
ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

DESIGN:	DATE: Dec 2006
DRAFT:	PROJ. NO.: 104204
CHECKED:	SCALE: As Shown
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SHEET TITLE:	Proposed Wetland Restoration – Sections A and B Stoney Ridge Road Mitigation Site
PROJECT:	Wetland Mitigation Plan Proposed Lowe’s Warehouse Ellsworth, Maine

FIGURE:

5



SECTION C

LEGEND

- EXISTING GRADE
- PROPOSED GRADE

PREPARED BY:



WOODLOT
ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

DESIGN:	DATE: Dec 2006
DRAFT:	PROJ. NO.: 104204
CHECKED:	SCALE: As Shown
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SHEET TITLE:	Proposed Wetland Restoration – Section C Stoney Ridge Road Mitigation Site
PROJECT:	Wetland Mitigation Plan Proposed Lowe’s Warehouse Ellsworth, Maine

FIGURE:

6