CONSTRUCTION MONITORING AND AS-BUILT REPORT

On-Site Wetland Mitigation
Brewer Lowe's Project
Brewer, Maine

MDEP Permit #L-23075-TF-B-N
Corps Permit #NAE-2006-2537

December 2007

Submitted to:
Lowe's Home Improvement Warehouse
1605 Curtis Bridge Road
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PN 195600088

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1.0 INTRODUCTION

This report describes recent construction monitoring work that took place at the on-site wetland mitigation area associated with the new Lowe's Home Improvement Warehouse (Lowe's) in Brewer, Maine (Appendix A, Figure 1). Lowe's received Maine Department of Environmental Protection (MDEP) Natural Resources Protection Act (NRPA) and U.S. Army Corps of Engineers (Corps) permits (Permit Numbers L-23075-TF-B-N and NAE-2006-2537, respectively) for the new store that required construction monitoring of the mitigation by a wetland scientist and preparation of an as-built plan. Details of the approved wetland mitigation for the project are contained in the Wetland Mitigation Plan dated July 2006.[1] This report presents a summary of the construction methods, timeframe, and as-built mitigation conditions. Long-term mitigation monitoring will begin in 2008.

2.0 SUMMARY OF APPROVED MITIGATION PLAN

As outlined in the approved mitigation plan, Lowe's proposed on-site measures to compensate for 1.3 acres of primarily scrub/shrub and sparsely forested wetland at the Lowe's project site. The approved mitigation included the following work within a mowed wet meadow located directly north of the Lowe's development.

- 2.5 acres of wet meadow wetland enhancement through planting and cessation of mowing;
- 0.8 acre of upland buffer enhancement through planting; and
- 2.0 acres of wetland and upland preservation through covenants and deed restrictions.

Appendix B contains the existing and proposed condition figures from the approved mitigation plan, including a sketch map showing the boundary survey of the mitigation area that was prepared following Corps and MDEP approval of the mitigation plan. The wetland enhancement measures would focus on providing a more diverse assemblage of plants and wetland types to benefit wildlife habitat, floodwater alteration, and water quality functions, as well as maintaining the existing emergent and scrub-shrub swale that bisects the mitigation area from west to east. Within the mitigation area, mowing of the wet meadow and upland fields to the north and south of this swale would cease. The primary mitigation objective would be to establish shrub-dominated wetland communities within the existing wet meadow through natural regeneration and installation of containerized plants. In addition, trees would be planted along the outer edge of the shrub communities to provide additional structural diversity. Wooded uplands would be established in areas of existing upland field to buffer the wetland from the adjacent development. A fourth area of existing wooded uplands would be placed into preservation to also serve as an additional buffer.

As indicated in the approved plan, the primary mitigation objectives for the mitigation included:

1. Enhancement of the existing wetlands, to be achieved by planting native wetland vegetation, with a goal of improving the habitat for wetland-dependent wildlife species and increased toxicant removal to maintain or improve water quality;
2. Enhancement of sediment/toxicant retention, nutrient removal, and floodwater alteration wetland functions at the site through development of dense woody and herbaceous vegetation in the wet meadow and adjacent upland buffers; and
3. Preservation of remaining wetland and upland habitats within the mitigation area to protect habitats and functions/values from future development.

[1] Refer to Attachment 13 of the "NRPA Tier III and CWA Individual Permit Application, Lowe's Home Improvement Warehouse, Brewer, Maine." Prepared for Rizzo Associates by Woodlot Alternatives, Inc. July 2006.

3.0 SUMMARY OF MITIGATION CONSTRUCTION

Construction at the Brewer Lowe's mitigation site was limited to planting trees and shrubs. Much of the construction work was directly observed by a wetland scientist from Stantec Consulting (Stantec, formerly Woodlot Alternatives, Inc.).[2] Photos of the work, including during planting and a few weeks after planting, are provided below.

3.1 CONTRACTORS AND CONSTRUCTION TIMELINE

- *Construction Contractor:* Sargent Corporation, Stillwater, Maine
- *Planting Contractor:* Sprague's Nursery, Bangor, Maine
- *Wetland Mitigation Oversight:* Stantec
- *Pre-Construction Meeting:* June 5, 2007 (Sargent, Stantec)
- *Site Walk with Planting Contractor:* October 10, 2007 (Sprague's and Stantec)
- *Planting Dates:* October 1 through 5, 2007
- *As-Built Survey*: October 19, 2007 (Stantec)

3.2 METHODS

A Stantec wetland scientist first met on-site with the planting contractor to review the mitigation objectives and to assess conditions at the site in preparation for plant installation. The property lines and habitat types (i.e., wetland and upland) had been staked out by Sargent prior to that meeting. With direction from the wetland scientist, the planting contractor laid out plant locations using color-coded pin flags. In determining planting locations, careful attention was paid to the expected tolerance of each species to wetland conditions and to the mitigation plan's overall guidelines for establishing varying vegetative communities at the site. Other factors that were considered included drainage patterns, elevation above the swale, potential for seasonal flooding, and competition from existing vegetation.

Plants were delivered to the site by truck and distributed to the flag locations by hand or by bobcat. Planting holes were dug both by hand and by a hydraulic auger mounted on the bobcat. Following installation, plants were mulched with three to four inches of bark in accordance with the plans. No fertilizer was used in the planting process based on observations that the natural vegetation was quite dense and growing well. No coarse woody debris was specified in the approved mitigation plan.

3.3 AS-BUILT SURVEY

On October 19, 2007, Stantec conducted an as-built survey using a Global Positioning System (GPS) receiver to delineate the boundaries of the planting areas. As-built planting areas are shown on Figure 2 in Appendix A and can be compared to the approved proposed conditions figures contained in Appendix B.

3.4 PLANTING RESULTS

Table 1 below indicates the approximate numbers of plants installed, by species. The installed tree and shrub species are native to Maine. Plant materials were containerized and obtained from local and regional nurseries. Plants ranged from two to six feet in height and appeared to be in good health at the time of delivery and planting.

[2] On October 1, 2007, Woodlot Alternatives Inc., merged with Stantec Consulting Services Inc.

Table 1. Plants installed at the Brewer Lowe's mitigation site in 2007

Common Name	Scientific Name	Number Planted	General Habitat Type
Shrub Species			
High-bush blueberry	*Vaccinium coryumbosum*	37	Wetland
Virginia rose	*Rosa virginiana*	37	Upland
Northern arrowwood	*Viburnum dentatum*	112	Wetland
Pussy willow	*Salix discolor*	56	Wetland
Silky dogwood	*Cornus amomum*	30	Wetland/Up[land
Elderberry	*Sambucus canadensis*	57	Wetland/Upland
High-bush cranberry	*Viburnum trilobum*	149	Wetland/Upland
Witchhazel	*Hamamelis virginiana*	37	Upland
Black chokeberry	*Aronia melanocarpa*	113	Wetland/Upland
Tree Species			
Balsam fir	*Abies balsamea*	149	Wetland/Upland
Northern white cedar	*Thuja occidentalis*	25	Wetland/Upland
Black cherry	*Prunus serotina*	76	Wetland/Upland
Green ash	*Fraxinus pennsylvanica*	38	Wetland/Upland
Gray birch	*Betula populifolia*	38	Wetland/Upland
White pine	*Pinus strobus*	75	Upland
Striped maple	*Acer pensylvanicum*	37	Upland
Choke cherry	*Prunus virginiana*	76	Wetland/Upland
	Total:	**1,142**	

Figure 2 (Appendix A) illustrates the areas where plants were installed at the mitigation site, showing both wetland and upland habitat types. The planting area boundaries, as shown, were located by Stantec using GPS after plantings were installed. The two planting areas on the north side of the main swale total approximately 5,800 square feet (0.11 acre), while the large planting area on the south side is nearly 50,000 square feet (1.15 acres).

Per the mitigation plan, plantings were grouped into two general habitat types - wetland enhancement areas and upland buffer areas. Because some of the species are suited to both wetlands and uplands, there is some overlap in species distribution between the two habitat types. Overall, the species and types of plants installed followed the mitigation plan, except that some substitutions were necessary due to problems with availability. The planting contractor consulted with the wetland scientist, who approved the substitutions prior to their delivery to the site.

Trees were generally installed individually, or in pairs spaced four to six feet apart. Shrubs were installed in groups of 3 to 10 plants, with individual plants spaced approximately 1 to 4 feet apart. Per the plan, the trees were installed primarily in the upland areas and along the edge of the existing wet meadow habitat. Shrubs, particularly the willows and dogwoods, were placed in the wetter areas near the main swale and other drainage ways.

In years past, both sides of the main swale were mowed annually, which prohibited the natural growth of shrubs. In the summer of 2007, the north side of the swale was mowed but the south side was not. Because of this, many volunteer shrubs had become established on the south side of the swale, including willows, dogwoods, alders, and other native wetland shrub species. These plants ranged from one to three feet or more in height. To avoid competition, an effort was therefore made to install the mitigation plantings in areas that did not have this dense, natural shrub growth. It is anticipated that the natural shrub growth on both sides of the swale will supplement the plantings and accelerate the establishment of the planned shrub and forest communities at the site. The attached photos illustrate typical shrub growth

present at the time of planting. Note that even though the planting areas were somewhat reduced in size due to the amount of natural regeneration, the numbers of plants installed was not reduced over what was specified in the plans. This results in a higher stem density per unit area, which is consistent with the mitigation objectives in regard to enhancing both water quality and wildlife habitat functions.

3.5 OTHER MEASURES

After plants were installed and mulched (i.e., on or about October 5), the planting contractor placed boulders across the dirt access road into the site. The barrier was deemed necessary because the site had recently been used by four-wheel drive trucks "playing' in a mud hole they had formed in the main swale of the mitigation area. When Stantec returned to the site on October 19, they found the boulders had been moved out of the way, and there was additional damage to the site by the four-wheel drive vehicles. Over 85 of the newly installed plants had been run over and the rutted areas and mud hole was larger Stantec contacted Sargent that day to discuss ways of keeping unauthorized vehicles out of the mitigation area in the future.

Sargent immediately replaced the boulders and monitored access to the site. At one point, Sargent caught up with someone whose vehicle had become stuck in the field adjacent to the mitigation area (i.e., on an abutting property and not within the mitigation area). Sargent informed the person that it was important to stay out of the mitigation area, and asked that he please respect the fact that Lowe's has blocked access to the site to protect a re-vegetation effort. The person was also asked to relay the same message to anyone he knew who might try to access the site. As of November 14, 2007, the boulder barrier was still in place and Sargent has not seen any further unauthorized access to the mitigation area.

After October 19, Sargent also installed signs along the back (north) property line of the mitigation area indicating that no mowing was allowed beyond the signs. The signs are on posts spaced every 50 to 100 feet apart. The intent of this measure is to show the adjacent landowner where the property line is and keep the mowers out of the mitigation area. Sargent indicated that they will also place a sign at the access road boulder barrier indicating no vehicles beyond that point.

The rutted swale crossing (i.e., the "mud hole") was repaired and stabilized on November 30, 2007. At the direction of a Stantec wetland scientist, Sargent used a mini-excavator to drain the water-filled ruts, restore a single drainage channel in the swale, and generally re-grade the rutted area. Exposed soils were then covered with straw mulch. Photos 11 and 12 illustrate conditions at the mud hole before and after this repair work was completed.

4.0 RECOMMENDATIONS

At this time, Stantec has no specific recommendations for further construction or re-vegetation measures at the wetland mitigation site. A wetland scientist will visit the site in the spring of 2008 to assess winter mortality of planted stock, seeding and erosion control needs, vehicle/all-terrain vehicle use and the need for further measures to block access, and the overall condition of the site. Particular attention will be paid to the plants that were run over by the trucks after planting. Dead plants will be flagged and should be replaced in the spring when conditions are favorable.

Photo 1. Augered planting hole, showing vegetative conditions at the time of planting. Stantec, October 1, 2007.

Photo 2. Augered planting holes, showing vegetative conditions at the time of planting. Stantec, October 1, 2007.

Photo 3. Some of the trees and shrubs upon delivery to mitigation site.
Stantec, October 1, 2007.

Photo 4. Existing shrub and herbaceous on un-mowed, south side of main swale. Note density and size of natural willow regeneration. Plantings were not installed where these conditions existed.
Stantec, October 1, 2007.

Photo 5. Plantings installed on north side of main swale along property line. Note bark mulch and mowed conditions on this side of swale. Stantec, October 4, 2007.

Photo 6. Plantings installed on south (un-mowed) side of main swale. Stantec, October 4, 2007.

Photo 7. Plantings and natural shrub growth on south (un-mowed) side of main swale. Stantec, October 4, 2007.

Photo 8. Plantings and natural shrub growth on south (un-mowed) side of main swale along the wall on west side of mitigation area (looking west). Stantec, October 19, 2007.

Photo 9. Plantings and natural shrub growth on south side of main swale near the constructed wall on west side of mitigation area (looking east). Stantec, October 19, 2007.

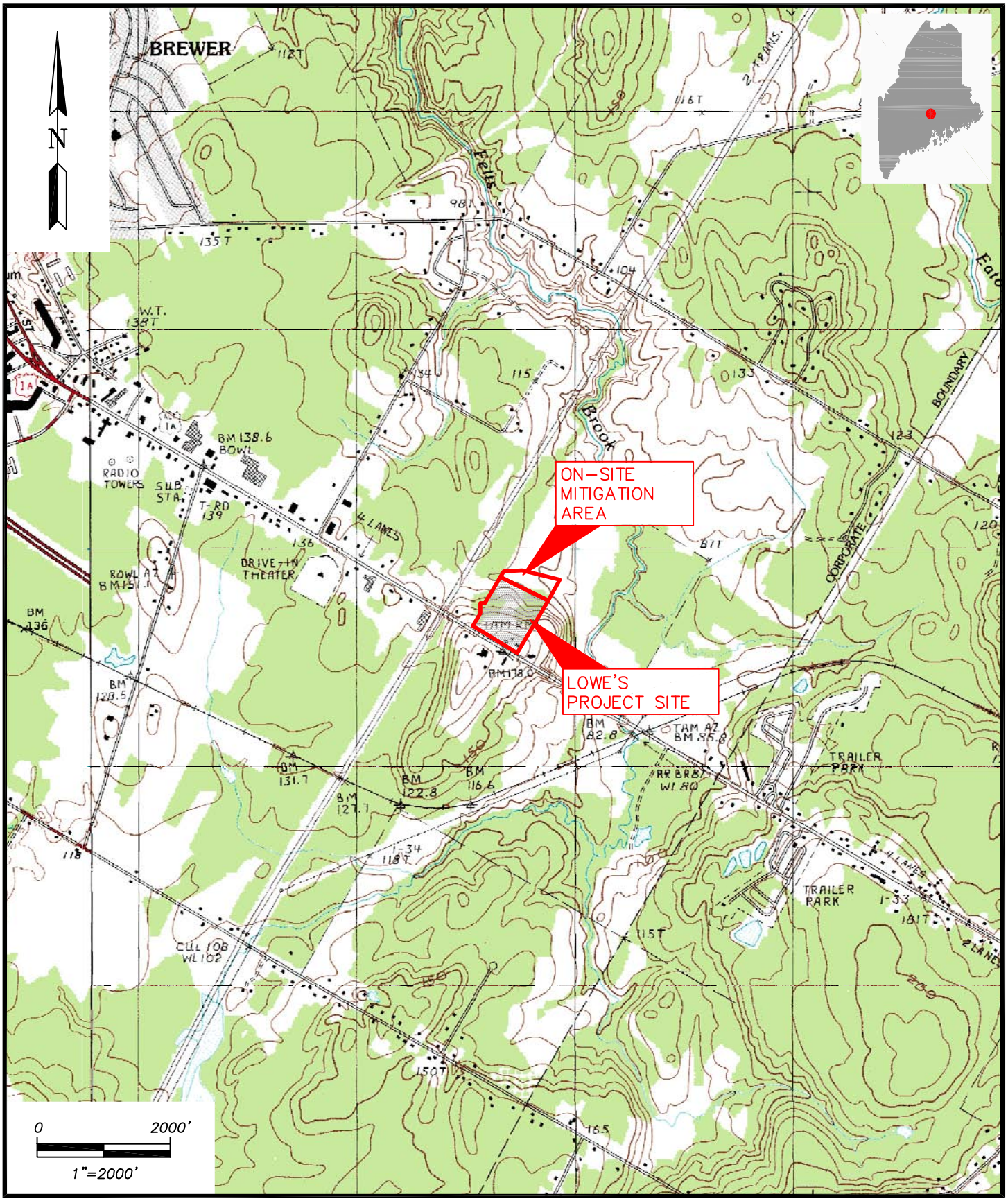
Photo 10. Access point that was blocked with boulders. Boulders were moved by unauthorized vehicles. Note plantings in background that were run over. Stantec, October 19, 2007.

Photo 11. Rutted section of central swale, looking north, before repair.
Stantec, November 30, 2007.

Photo 12. Rutted section of central swale, looking north, after repair.
Stantec, November 30, 2007.

APPENDIX A

As-Built Figures



PREPARED BY:

WOODLOT

Stantec

105132-F001-locus_map.dwg

SHEET TITLE:

Location Map
On-Site Wetland Mitigation Area

PROJECT:

Lowe's Home Improvement Warehouse Project
U.S. Route 1A, Brewer, Maine

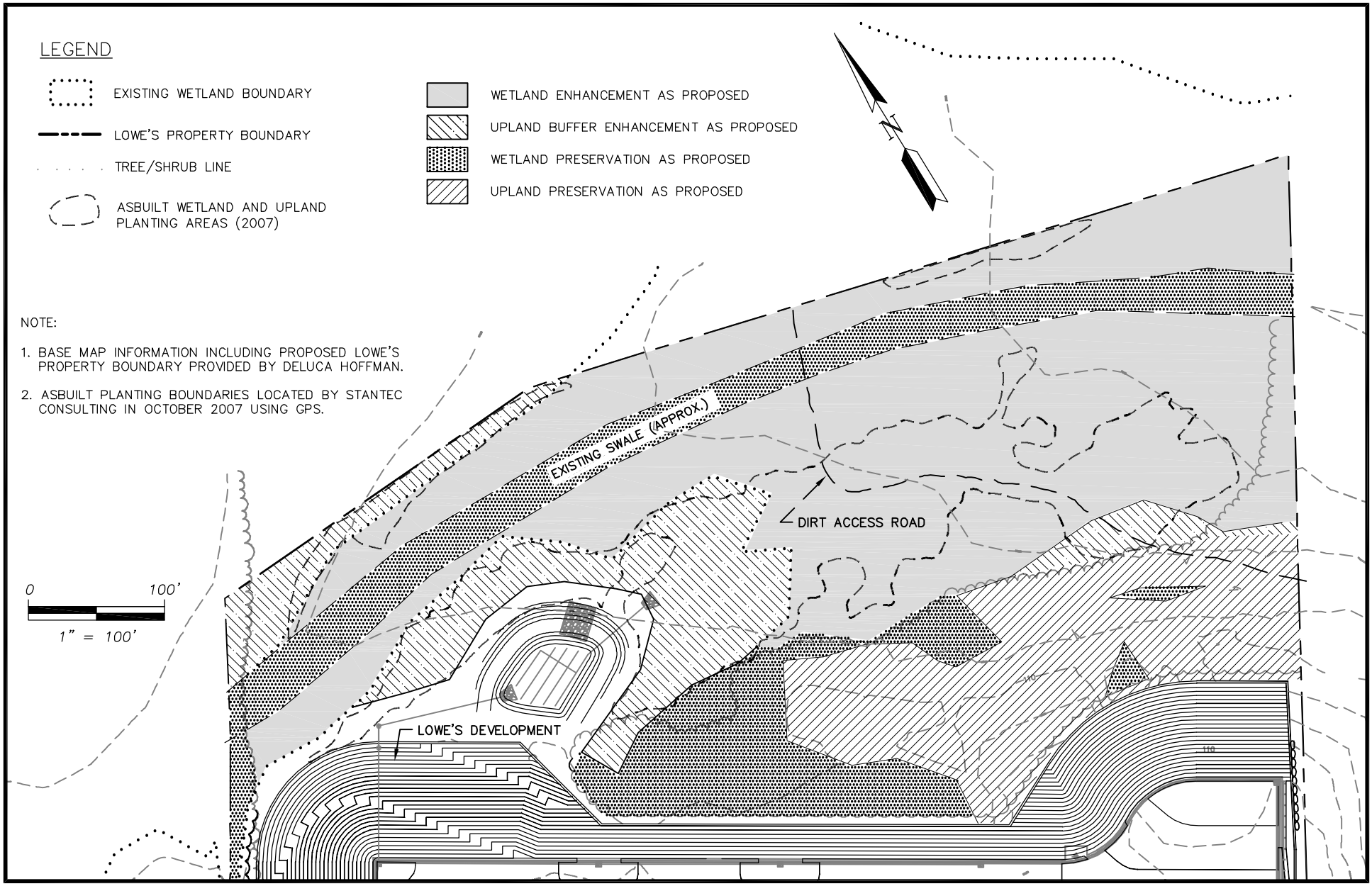
DATE: 11/16/07

SCALE: 1"=2000'

PROJ. NO.: 195600088

FIGURE:

1



PREPARED BY:

Stantec

WOODLOT

DESIGN:	DATE: 11/16/07
DRAFT:	PROJ. NO.: 195600088
CHECKED:	SCALE: 1" = 100'
FILE: 107016-F002-mit-asbuilt.dwg	

SHEET TITLE:

Proposed and Asbuilt Conditions
On-Site Wetland Mitigation Area

PROJECT:

Lowe's Home Improvement Warehouse Project
U.S. Route 1A, Brewer, Maine

FIGURE:

2

APPENDIX B

Proposed Condition Figures from NRPA Application Attachment 13

Stantec

PREPARED BY:

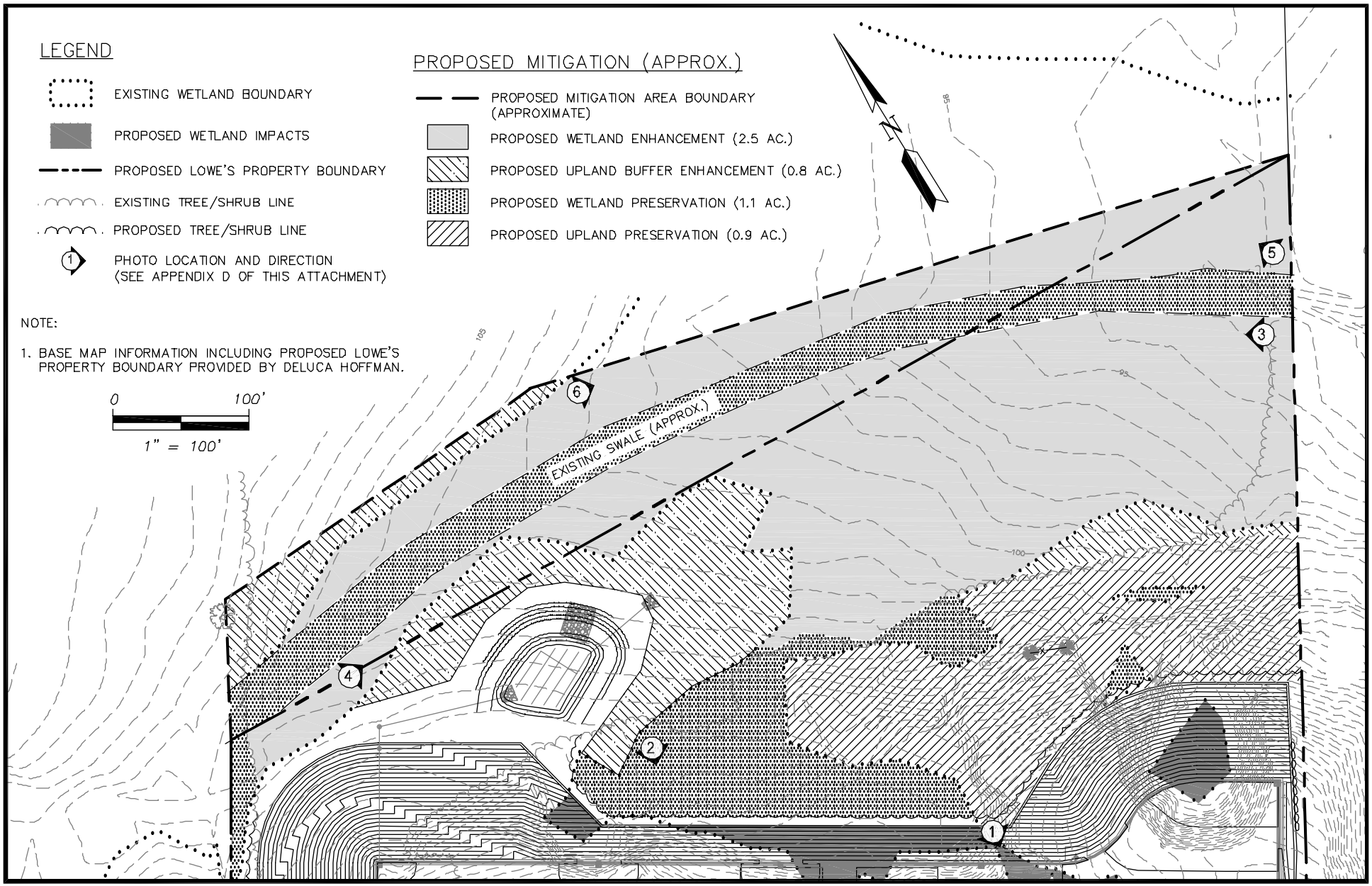
WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

105132-F002-E-Cond.dwg

SHEET TITLE: Aerial Photo / Existing Conditions Plan

PROJECT: Proposed Lowe's Home Improvement Warehouse
U.S. Route 1A, Brewer, Maine

DATE: July 2006
SCALE: 1"=200'
PROJ. NO.: 105132
FIGURE: 2



PREPARED BY:

WOODLOT ALTERNATIVES, INC.
ENVIRONMENTAL CONSULTANTS

DESIGN:	DATE: July 2006
DRAFT:	PROJ. NO.: 105132
CHECKED:	SCALE: 1" = 100'
FILE: 105132-F003-mit-p-cond.dwg	

SHEET TITLE:

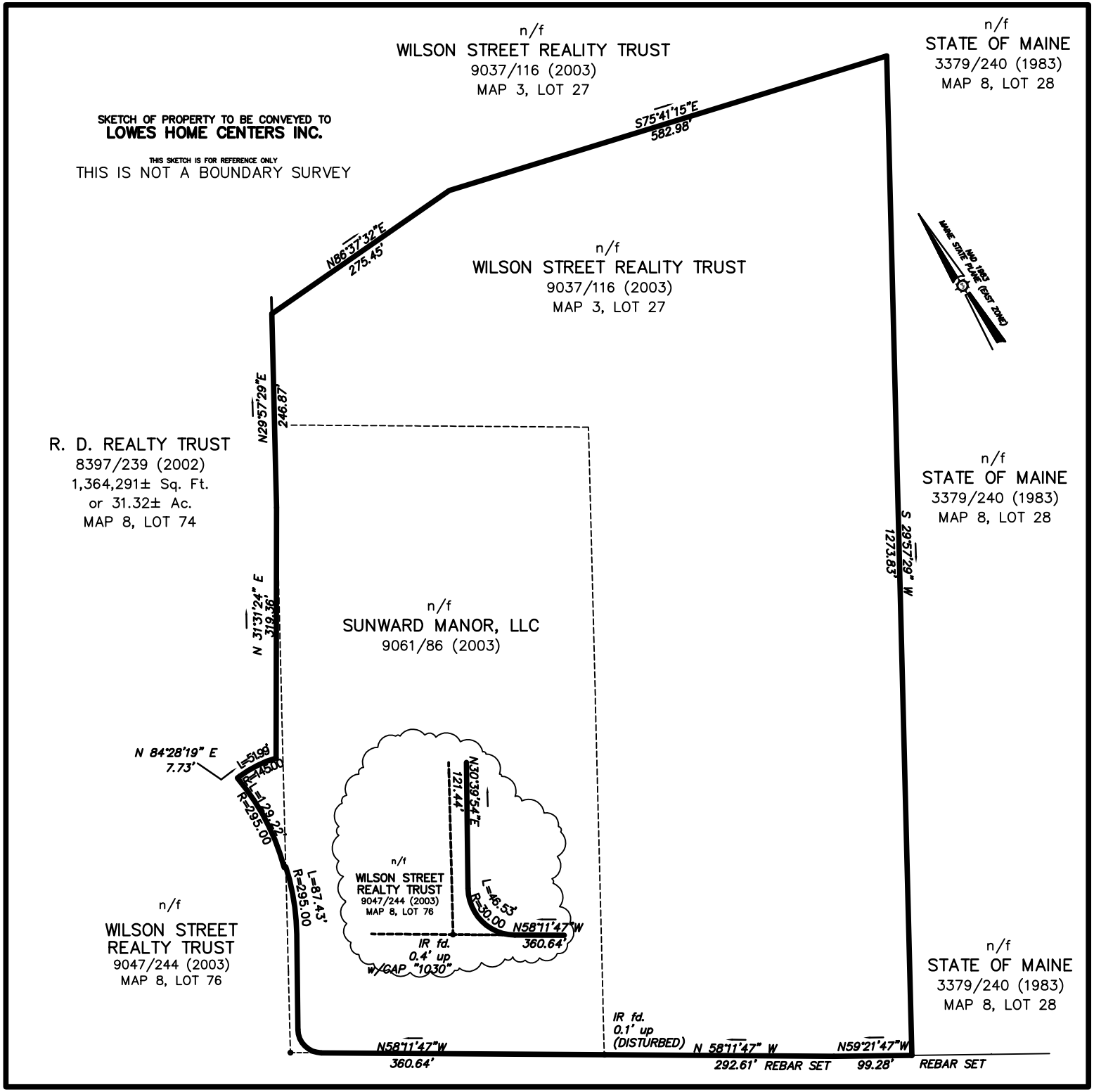
Proposed Conditions Wetland Mitigation Plan

PROJECT:

Proposed Lowe's Home Improvement Warehouse
U.S. Route 1A, Brewer, Maine

FIGURE:

3


SKETCH OF PROPERTY TO BE CONVEYED TO
LOWES HOME CENTERS INC.
THIS SKETCH IS FOR REFERENCE ONLY
THIS IS NOT A BOUNDARY SURVEY
n/f
WILSON STREET REALITY TRUST
9037/116 (2003)
MAP 3, LOT 27
n/f
STATE OF MAINE
3379/240 (1983)
MAP 8, LOT 28
S75°41'15"E
582.98'
N86°37'32"E
275.45'
n/f
WILSON STREET REALITY TRUST
9037/116 (2003)
MAP 3, LOT 27
MAINE STATE PLANE (EAST ZONE)
NAD 1983
N29°57'29"E
246.87'
R. D. REALTY TRUST
8397/239 (2002)
1,364,291± Sq. Ft.
or 31.32± Ac.
MAP 8, LOT 74
n/f
STATE OF MAINE
3379/240 (1983)
MAP 8, LOT 28
S 29°57'29" W
1273.83'
N 31°31'24" E
319.36'
n/f
SUNWARD MANOR, LLC
9061/86 (2003)
N 84°28'19" E
7.73'
L=51.99'
R=145.00
L=29.22'
R=295.00
N30°39'54"E
121.44'
n/f
WILSON STREET
REALTY TRUST
9047/244 (2003)
MAP 8, LOT 76
L=46.53'
R=30.00
N58°11'47"W
360.64'
IR fd.
0.4' up
w/CAP "1030"
L=87.43'
R=295.00
n/f
WILSON STREET
REALTY TRUST
9047/244 (2003)
MAP 8, LOT 76
IR fd.
0.1' up
(DISTURBED)
N58°11'47"W
360.64'
N 58°11'47" W
292.61' REBAR SET
N59°21'47"W
99.28'
REBAR SET
n/f
STATE OF MAINE
3379/240 (1983)
MAP 8, LOT 28