BAR BEACH SALT MARSH RESTORATION
HEMPSTEAD HARBOR, NEW YORK

FOURTH YEAR MONITORING REPORT

Submitted to:
National Oceanic and Atmospheric Administration
New York, New York

Prepared by:
The Louis Berger Group, Inc.
Morristown, New Jersey

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EXECUTIVE SUMMARY

In 2003, The National Oceanic and Atmospheric Administration (NOAA), New York Department of Environmental Conservation, U.S. Fish and Wildlife Service restored the salt marsh in Bar Beach Lagoon, North Hempstead, New York, as part of a Superfund settlement (AES Shoreline Realty) addressing natural resource damages that had occurred as a result of the release of contaminants into Hempstead Harbor. Restoration activities included the removal of substantial volumes of fill consisting of sand, gravel, concrete, and solid waste debris from the site, as well as the physical removal of approximately 0.2 acres of common reed (*Phragmites australis*). Each of the fill removal areas was excavated to sub-grade, backfilled with clean soils, and planted with native wetland and coastal upland plant species. The Town of North Hempstead participated in the restoration through receipt of a NOAA Community-based Restoration Program grant and in providing site access, labor, trucks and waiving of disposal site fees for the excavated materials at the nearby landfill, as part of their in-kind match for the NOAA grant.

The Louis Berger Group, Inc. conducted the fourth year monitoring of the five year monitoring program on September 20th, 2007. This monitoring consisted of biological sampling of vegetation at the restoration site and at a nearby reference site. Avian monitoring was conducted by an experienced birder (volunteer) affiliated with the North Shore Audubon Society and arranged by NOAA staff. The monitoring program was developed in collaboration with NOAA staff, and in accordance with the Final Restoration Plan (NOAA *et al*. 2002).

After the fourth year of monitoring, the restoration site has met the 85 percent native species vegetative cover requirement. *Phragmites australis* and other undesirable invasive species have been limited to 10 percent or less of the total vegetative cover of the restored area, as set forth in the restoration plan. Quadrat sampling revealed that an average of 90.6 percent of the restoration site was covered with native vegetation, compared to 22.5 percent recorded during baseline pre-construction monitoring. The average height of *Spartina alterniflora* at the restoration site increased from 93 cm in 2004 to 115 cm in 2007. The percent of *Spartina* which were flowering was higher at the restoration site than at the reference site. Based on quadrat sampling, ground cover by *Phragmites australis* was limited to 0.6 percent of the restoration site.

Monitoring results indicate that the restoration site had higher avian abundance and higher diversity than the reference site, probably due to differences in the surrounding habitats of each site. Thirty-seven bird species were observed at the restoration site, whereas fifteen species were observed at the reference site.

The fourth year monitoring results indicate that restoration efforts to date have been successful in establishing a diverse population of salt marsh plant and avian species. The planted salt marsh grasses are well established and flowering. The coastal shoreline zone in particular, has greater cover than in previous years. Recommendations include removal of mugwort, Queen Anne's Lace and Japanese knotweed along the mowed lawn and gazebo area. While the Town has mowed the stand of *Phragmites australis* by the boat ramp, it will likely continue to expand unless more aggressive methods (i.e. herbicide) are employed.

1.0 INTRODUCTION

In 2003, The National Oceanic and Atmospheric Administration (NOAA), New York Department of Environmental Conservation, U.S. Fish and Wildlife Service, and the Town of North Hempstead restored the salt marsh in Bar Beach Lagoon (also known as Hempstead Harbor Cove, see Figure 1), North Hempstead, New York, as part of a Superfund settlement addressing natural resource damages that had occurred as a result of the release of contaminants into Hempstead Harbor. Prior to restoration activities, Bar Beach Lagoon consisted of mudflats and sparsely vegetated hummocks, and dense stands of common reed (*Phragmites australis*) covered a portion of the high marsh and coastal fill uplands. Concrete debris and other fill had been dumped along much of the shoreline, possibly for erosion control. Restoration activities included the removal of substantial volumes of fill consisting of sand, gravel, concrete, and solid waste debris from the site. Removal of *Phragmites australis* was also a component of the project, and involved physical removal of approximately 0.2 acres. Each of the fill removal areas was excavated to sub-grade, backfilled with clean soils, and planted with native wetland and coastal upland plant species.

Smooth cordgrass (*Spartina alterniflora*) was planted in the intertidal zone at elevations from 2.5 to 4 feet National Geodetic Vertical Datum (NGVD). Salt marsh cordgrass (*Spartina patens*) and spikegrass (*Distichlis spicata*) were planted in the high marsh at elevations from 4 to 5 feet NGVD. Between the high marsh and the upland, a coastal shoreline zone consisting of marsh elder (*Iva frutescens*), groundsel-bush (*Baccharis halimifolia*), perennial ryegrass (*Panicum amarum*), and seaside goldenrod (*Solidago sempervirens*) was planted. Upland areas adjacent to the restoration site were seeded with a native warm season grass mixture and various native shrubs were planted in the upland periphery. Additional plantings in 2004 augmented the 2003 plantings where mortality, erosion, and fill compaction occurred. In 2004, switch grass (*Panicum virgatum*) plugs were planted in the upland to address areas that did not respond well to seeding. Virginia creeper (*Parthenocissus virginiana*) was initially planted in the upland area, but because its survival was poor and the primary purpose for the plantings was stabilization of soils, it was not replanted. In the spring of 2005, the Performing Parties Group replanted the center portion of the peninsula area of the restoration site with *Spartina alterniflora* and also erected herbivore-exclusion fence and overhead string. Dead shrubs in the coastal shoreline zone were also replaced and *Spartina patens* was replanted at the eastern end of the site where ice damage had occurred.

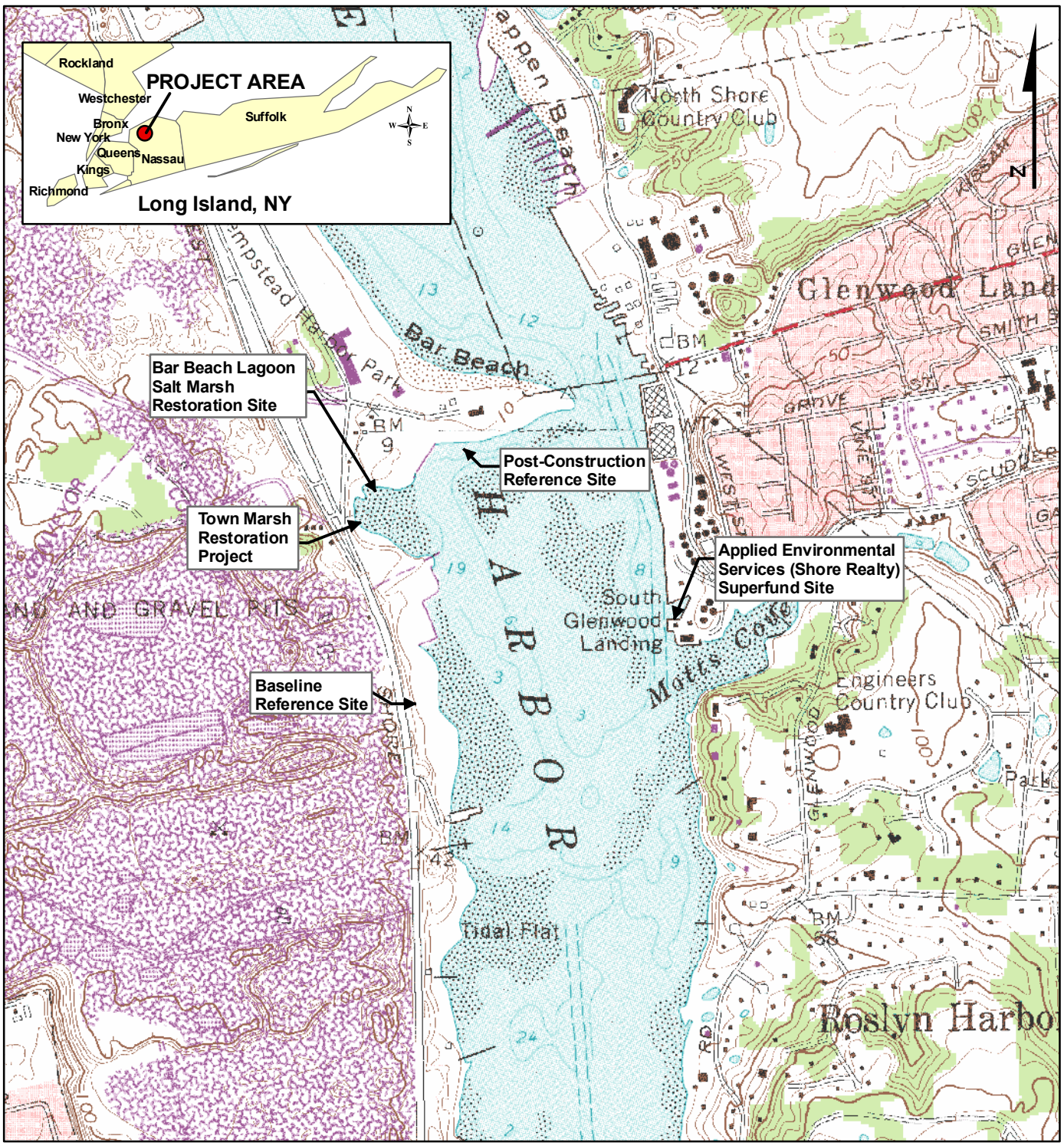
As part of the Superfund settlement, a monitoring program was implemented to assess the extent of success of the restoration project. The performance criteria for the restoration project requires 85 percent vegetative cover of the restoration area (marsh and stabilized coastal shoreline) within 5 years of initial planting and minimal re-establishment of *Phragmites* australis and other undesirable invasive vegetation to 10 percent or less of the total restored area. Performance criteria also included 90 percent survival of *Spartina alterniflora* and shoreline vegetation after two full growing seasons, which was independently evaluated by NOAA and not discussed in this report. In addition, fish, benthic macroinvertebrate, and avian species abundance, richness, and composition must demonstrate a strong positive trend toward and not significantly differ from that of a reference marsh. The reference marsh, located 600 feet to the northeast of the restoration site, is also a fringing marsh and was selected to serve as the reference site for this monitoring program. The baseline reference marsh used by NOAA during pre-restoration monitoring, located approximately half a mile south of Bar Beach Lagoon, was not selected as the reference site for post-construction monitoring because it is larger and similarly exposed as the newly selected reference site. The restoration site and the post-construction reference site are similar in size, each consisting of approximately 0.75 acres.

On behalf of NOAA, The Louis Berger Group, Inc. conducted the Year 4 monitoring on September 20th, 2007, in accordance with the schedule presented in Table 1. Vegetation monitoring occurs annually in the fall, while nekton and benthic monitoring is conducted during the spring and fall, but only every other year. Avian monitoring was conducted by an experienced birder (volunteer) arranged by NOAA staff. The monitoring program was developed in collaboration with NOAA staff, and in accordance with the Final Restoration Plan (NOAA *et al*. 2002).

Table 1. Monitoring Schedule.

Year	Season	Monitoring Parameter		
		Vegetation	Nekton and Benthos	Avian
2004	Spring			
	Fall	✓	✓	✓
2005	Spring			✓
	Fall	✓		✓
2006	Spring		✓	✓
	Fall	✓	✓	✓
2007	Spring			✓
	Fall	✓		✓
2008	Spring		✓	✓
	Fall	✓	✓	✓

Monitoring is expected beyond 2008, pending availability of funds.



Feet

1,250 625 0 1,250

SOURCES:
Base Mapping: USGS 7.5 Minute Topographic Map, Sea Cliff Quadrangle.

National Oceanic and Atmospheric Administration

Bar Beach Salt Marsh Ecological Restoration Monitoring Site Location Map

Location: Hempstead Harbor, Long Island, NY

Date: FEB 2008 ID: JR 5110

The Louis Berger Group, Inc.
412 Mount Kemble Ave
Morristown, NJ 07960

Figure 1

2.0 VEGETATION MONITORING

2.1 Methodology

Plant cover at the restoration site and reference site was measured within one-meter square quadrats placed along permanently established transects. The restoration site was sampled along seven transects composed of forty quadrats. Six of these transects were oriented from the upland to the lower edge of the marsh, while the seventh transected the peninsula area from southwest to northeast. The reference site was sampled along three transects composed of ten quadrats, also oriented from upland to the lower edge of the marsh. Quadrats were arranged so that the first quadrat was positioned in the coastal shoreline zone (above 5 feet NGVD), the second quadrat was placed in the high marsh (4 to 5 feet NGVD), and subsequent quadrats were placed in the low marsh (2.5 to 4 feet NGVD).

The ends of each transect were marked in the field with PVC pipes driven into the substrate and were surveyed with a Trimble Pro XRS Global Positioning System (GPS) with Asset Surveyor. The distance of each quadrat along the transect was measured and recorded to ensure that the same quadrats will be sampled each year. The locations of the vegetation transects appear in Figure 2, and the positions of the transect ends and quadrats are presented in Appendix A. The elevations of each quadrat were measured in 2004 and 2005, to determine if any fill compaction was occurring, but results indicated that there were no discernable elevation changes during this period.

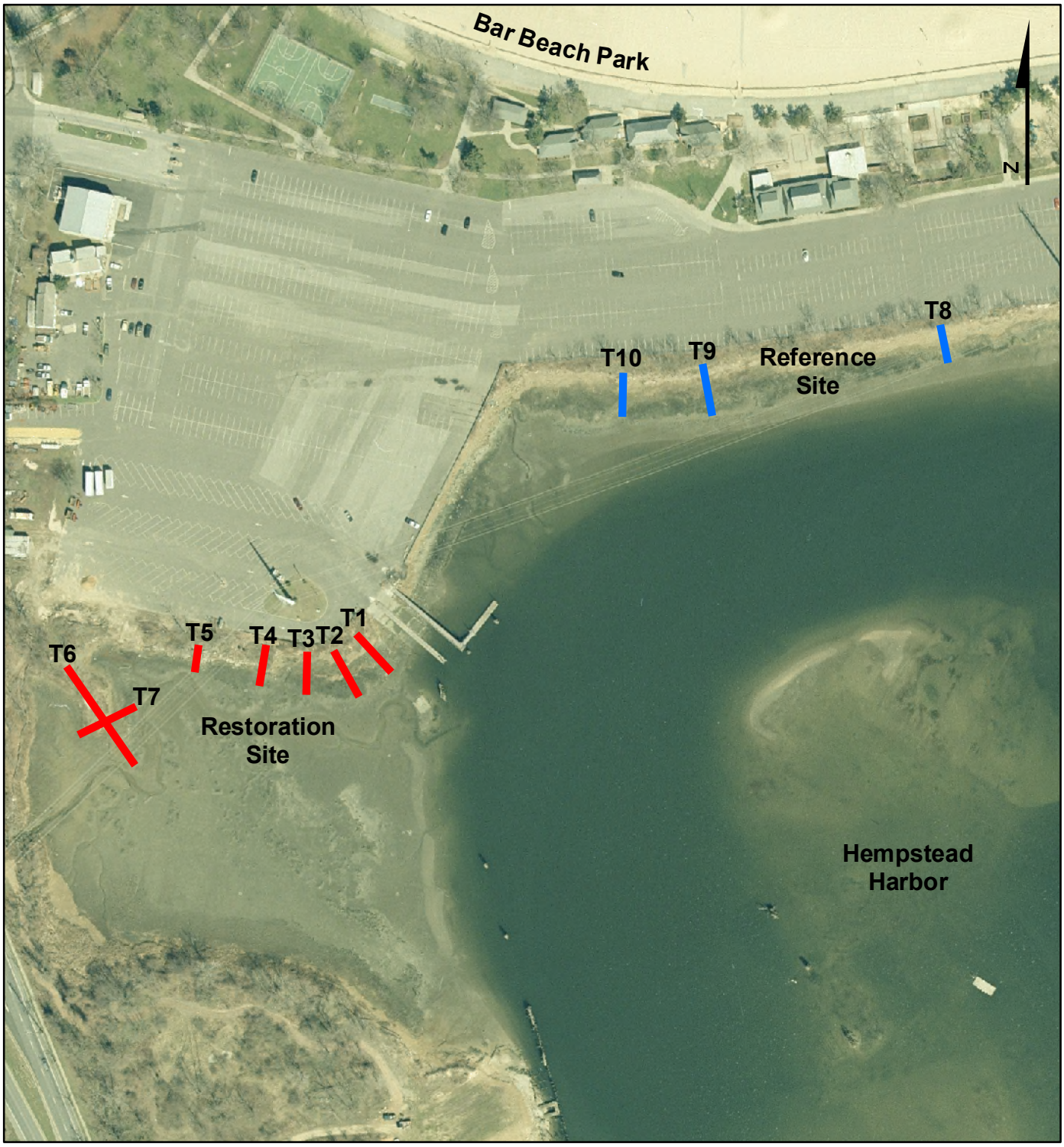
2.2 Results

A summary of vegetation observed within sampled quadrats at the restoration and reference sites is presented in Table 2. A total of 10 species were present within the sampled quadrats at the restoration site, six of which were planted and four which volunteered, including *Phragmites australis*. The coastal shoreline zone at the restoration site was primarily vegetated with the planted species *Iva frutescens*, *Panicum amarum*, *Solidago sempervirens*, and *Spartina patens*, while the marsh vegetation consisted almost entirely of *Spartina alterniflora*, *Spartina patens*, and *Distichlis spicata*. Sea lavender (*Limonium nashii*) and switchgrass (*Panicum virgatum*) are also present at the restoration site, but were not present within sampled quadrats. Only three species were present within the sampled quadrats at the reference site. Vegetation in the coastal shoreline zone of the reference site was dominated by *Phragmites australis*, while marsh vegetation consisted of *Spartina alterniflora* and *Phragmites australis*.

Table 2. Plant Species Observed in Sampled Quadrats.

Common Name	Scientific Name	Restoration Site	Reference Site
marsh orach	*Atriplex patula*	✓	
spike grass*	*Distichlis spicata*	✓	
high tide bush*	*Iva frutescens*	✓	✓
perennial ryegrass*	*Panicum amarum*	✓	
common reed	*Phragmites australis*	✓	✓
glasswort	*Salicornia europa*	✓	
seaside goldenrod*	*Solidago sempervirens*	✓	
smooth cordgrass*	*Spartina alterniflora*	✓	✓
salt meadow grass*	*Spartina patens*	✓	
sea blite	*Sueda linearis*	✓	

*Species planted or seeded at the restoration site



Legend

Vegetation Transects

- Restoration Site
- Reference Site

Feet

200 100 0 200

SOURCES:
Base Mapping: New York State DOQQs, Nassau County, 2000.

National Oceanic and Atmospheric Administration

Bar Beach Salt Marsh
Ecological Restoration Monitoring
Transect Location Map

Location: Hempstead Harbor, Long Island, NY

Date: Feb 2008 ID: JR 5110

The Louis Berger Group, Inc.
412 Mount Kemble Ave
Morristown, NJ 07960

Figure 2

Table 3 presents a summary of vegetative ground cover, including cover by *Phragmites australis*, for each transect in the restoration and reference sites, as well as the mean value for these parameters across all transects at each site. Quadrat sampling indicates that native vegetative cover of the restoration site was 90.6 percent, representing a slight increase over the 2006 observation of 87.8 percent native cover. *Phragmites australis* accounted for 0.6 percent of cover, representing a slight increase from the 2006 observation of 0.3 percent cover. Total native vegetative cover of quadrats at the reference site was 67 percent, with *Phragmites* australis covering 12.5 percent of ground.

Prior to restoration activities, the upper elevations of the restoration site were dominated by *Phragmites australis*, while lower elevations were either unvegetated, or contained some *Spartina alterniflora*. Sampling conducted by NOAA in 2002 before the restoration indicated that total plant cover of the restoration site was approximately 47 percent, with *Spartina alterniflora* covering 22.5 percent of sampled quadrats and *Phragmites* covering 14.5 percent of quadrats sampled. High tide bush, spikegrass, poison ivy (*Toxicodendron radicans*), mugwort (*Artemisia vulgaris*) sea lavender, and glasswort were also present, but accounted for relatively little cover.

Mean *Spartina alterniflora* height within quadrats at the restoration site was 115 cm, a very slight increase over the 114 cm average height in 2006. In 2002, prior to the restoration, NOAA staff measured *Spartina alterniflora* height at the restoration site, finding the mean height of the remnant plants in the lower tidal elevations to be 116 cm. The mean height of plants in quadrats at the reference site was 95 cm. After five growing seasons, plants at the restoration site have reached the average height of plants there prior to the restoration and have exceeded the height of plants at the reference site. At the restoration site, 57.7 percent of *Spartina alterniflora* measured were flowering, while at the reference site, 36.9 percent of plants sampled were flowering.

Table 3. Summary of Vegetative Ground Cover

Transect	Number of Quadrats	Mean Percent Vegetative Ground Cover for All Species Excluding *Phragmites australis*	Mean Percent Vegetative Ground Cover of *Phragmites australis*	Mean Total Percent Cover
Restoration Site				
1	5	93	0	93
2	5	96	2	98
3	5	98	0	98
4	5	73	0	73
5	5	90	3	93
6	10	90	0	90
7	5	96	0	96
Mean (all quadrats)		90.6	0.6	91.3
Reference Site				
8	3	87	3	90
9	4	46	29	75
10	3	75	0	75
Mean (all quadrats)		67	12.5	79.5

Plant field data documenting the ground cover estimates for the restoration and reference sites, as well as *Spartina alterniflora* height measurements and flowering status, are presented in Appendix B. Photographs taken along each transect at the restoration site appear in Appendix C. Appendix E contains NOAA pre-restoration monitoring of percent plant cover at the restoration site.

3.0 AVIAN MONITORING

3.1 Methodology

Avian monitoring was conducted by an ornithologist from the North Shore Audubon Society arranged by NOAA. Monitoring was conducted on forty-three occasions between May and December, 2007. The ornithologist spent 20 minutes at the restoration site and 20 minutes at the reference site, and noted the bird species present within each site, their numbers and activity, as well as the weather and tide conditions. Birds within 100 yards of the restoration and reference sites were also noted, but not included in the analysis, as they were generally flying through the area, or were between the sites in the parking lot or on the power lines or towers.

3.2 Results

Table 4 presents avian species abundance, composition, and diversity for the restoration and reference sites. Avian monitoring data are provided in Appendix D. Thirty-seven avian species were observed at the restoration site, while fifteen species were observed at the reference site. Mean avian abundance per observation at the restoration site was 8.5, which was considerably greater than the mean of 3.0 birds per observation at the reference site. Avian diversity, as measured by the Shannon-Weaver Diversity Index, was 1.232 at the restoration site, which was considerably higher than the reference site diversity index of 0.869.

Both songbirds and waterbirds were well represented at the restoration site, while the bird community at the reference site primarily consisted of waterbirds. The greater number of avian species and greater diversity of the restoration site as compared to the reference site and the difference in species composition are likely due to bordering habitat differences. The waters adjacent to the restoration site are less exposed to wind and waves than the reference site and the restoration site is nearly surrounded by densely forested habitat providing a close source of food and shelter for songbirds.

Diversity at the restoration site was particularly high during the fall migration, when a variety of sparrows and other songbirds were observed foraging at the site. Several species of sparrows were frequently heard or observed while foraging in the marsh grass and several warbler species were seen foraging in bayberry and other planted shrubs at the restoration site. No sparrows or warblers were observed at the reference site. The observed differences in species composition and abundance between the restoration site and reference site were similar to observations presented in previous monitoring reports. The avian monitor commented that the removal of trees and other construction disturbance at the western end of the restoration site for the Town marsh restoration project may have affected avian use of the site in 2007.

Thirteen species observed at the restoration site in 2007 had not been observed there in previous years. These new species include three waterbirds and ten songbirds, which appear in Table 4 in bold font. Eight species were previously seen at the restoration site, but were not observed in 2007, including the Little Blue Heron, Foster's Tern, Spotted Sandpiper, Killdeer, Goldfinch, Grackle, House Sparrow, and House Finch.

Table 4. Summary of Avian Monitoring Results.

Species		Restoration Site		Reference Site	
Common Name	**Scientific Name**	Number of Individuals	Mean Abundance	Number of Individuals	Mean Abundance
Canada Goose	*Branta canadensis*	86	2.0	21	0.5
Mute Swan	*Cygnus olor*	8	0.2	3	0.1
Mallard	*Anas platyrhynchos*	24	0.6	8	0.2
Common Merganser	***Mergus merganser***	4	0.1	0	0
Great Blue Heron	*Ardea herodias*	0	0	3	0.1
Great Egret	*Ardea alba*	21	0.5	13	0.3
Snowy Egret	*Egretta thula*	4	0.1	2	0.05
Black-crowned Night Heron	*Nycticorax nycticorax*	7	0.2	0	0
Belted Kingfisher	*Ceryle alcyon*	6	0.1	0	0
Greater Yellowlegs	***Tringa melanoleuca***	2	0.05	0	0
Double-crested Cormorant	*Phalacrocorax auritus*	1	0.0	4	0.1
Herring Gull	*Larus argentatus*	6	0.1	54	1.3
Great Black-backed Gull	*Larus marinus*	0	0	3	0.1
Ring-billed Gull	*Larus delawarensis*	10	0.2	3	0.1
Common Tern	***Sterna hirundo***	1	0.02	3	0.1
Robin	*Turdus migratorius*	3	0.1	0	0
Mourning Dove	*Zenaida macroura*	15	0.3	0	0
Rock Dove	*Columba livia*	0	0	4	0.1
Eastern Towhee	***Pipilo erythrophthalmus***	1	0.02	0	0
Red-winged Blackbird	*Agelaius phoeniceus*	3	0.1	0	0
Chipping Sparrow	***Spizella passerina***	3	0.1	0	0
Field Sparrow	***Spizella pusilla***	1	0.02	0	0
Savannah Sparrow	*Passerculus sandwichensis*	2	0.05	0	0
Song Sparrow	*Melospiza melodia*	31	0.7	0	0
Swamp Sparrow	*Melospiza georgiana*	16	0.4	0	0
Tree Sparrow	***Spizella arborea***	3	0.1	0	0
White-throated Sparrow	***Zonotrichia albicollis***	2	0.05	0	0
mixed sparrows	NA	48	1.1	0	0
Purple Finch	***Carpodacus purpureus***	3	0.1	0	0
Northern Mockingbird	*Mimus polyglottos*	18	0.4	0	0
Blue Jay	***Cyanocitta cristata***	1	0.02	0	0
flycatcher	*Empidonax* sp.	1	0.02	0	0
Eastern Phoebe	*Sayornis phoebe*	1	0.02	0	0
Starling	*Sturnus vulgaris*	13	0.3	3	0.1
Barn Swallow	*Hirundo rustica*	2	0.05	3	0.1
Yellow warbler	*Dendroica petechia*	3	0.1	0	0
Common Yellowthroat	***Geothlypis trichas***	2	0.05	0	0
Myrtle Warbler	*Dendroica coronata*	8	0.2	0	0
Palm Warbler	***Dendroica palmarum***	1	0.02	0	0
Crow	*Corvus* sp.	1	0.02	1	0.02
Osprey	*Pandion haliaetus*	3	0.1	0	0
	Abundance	365	8.5	128	3.0
	Number of Species	37		15	
	Diversity Index	1.232		0.869	

Species appearing in bold font have not been previously observed at the restoration site.

4.0 SUMMARY

After the fourth year of monitoring, the restoration site has met the 85 percent native species vegetative cover requirement and re-establishment of *Phragmites australis* and other undesirable invasive species has been limited to 10 percent or less of the total restored area, as set forth in the restoration plan. Quadrat sampling revealed that an average of 90.6 percent of the restoration site was covered with native vegetation. Ground cover by *Phragmites australis* was limited to 0.6 percent of the restoration site. Comparisons with NOAA pre-restoration monitoring indicate substantially greater coverage of the restoration site with native wetland vegetation, and limited recolonization of *Phragmites australis*. In 2002, prior to the restoration, only 47 percent of the site had vegetative cover, nearly a third of which consisted of *Phragmites australis*. Table 5 summarizes the monitoring results for all parameters investigated at the restoration and reference sites in 2006.

Table 5. Summary of 2007 Monitoring Results

Resource	Monitoring Result	Restoration Site	Reference Site	Restoration Site compared to Reference site
Vegetation	Percent Ground Cover (excluding *Phragmites*)	90.6	67	+
	Percent Cover by *Phragmites*	0.6	12.5	+
	Number of Species	10	3	+
Avian	Mean Abundance	8.5	3.0	+
	Number of Species	37	15	+
	Diversity Index	1.232	0.869	+

Avian abundance, number of species, and diversity at the restoration site are greater than that of the reference site. Differences in the composition of the avian communities at the restoration and reference site are probably due to differences in the surrounding habitats of each site.

Table 6 summarizes the parameters monitored at the restoration site in 2004, 2005, 2006 and 2007. The vegetative monitoring data are directly comparable across years. The nekton, benthic, and avian data are not directly comparable across years, as these parameters were monitored according to different schedules. The 2004 avian data only included the period from October to December of 2004, as opposed to the year-round data collected from 2005 through 2007. Additionally, the nekton data for 2004 were only collected in the fall, when the marsh vegetation is at its tallest, resulting in a greater amount of sheltered habitat and high catches of fish and shrimp during sampling. The 2006 nekton data includes sampling in May, when the marsh grass was still short, and few fish or shrimp were caught. Likewise, the benthic data for 2006 included spring and fall sampling, while the 2004 data only consisted of fall sampling. It should also be noted that the data include only species which were found within sampled quadrats.

The percent cover of native vegetation at the restoration site has increased every year since monitoring began in 2004. The average height of *Spartina alterniflora* has also increased every year since 2004. The coverage of *Phragmites* at the site is low, and has always been less than 1 percent since monitoring began. The nekton and benthic macroinvertebrate monitoring data indicate that restoration site supports diverse nektonic and benthic communities. Several species of snails and crabs not encountered by NOAA prior to restoration in 2002 are now common inhabitants (marsh snail, rough periwinkle, green crab, and Asian shore crab). Avian monitoring data also indicate that the restoration site supports a diverse avian community, with songbirds and waterbirds being well represented.

Table 6. Restoration Site Comparisons, 2004-2007

Resource	Monitoring Result	2004	2005	2006	2007
Vegetation	Percent Ground Cover (excluding *Phragmites*)	83	84	87.8	90.6
	Percent Cover by *Phragmites*	0.5	0.4	0.3	0.6
	Number of Species	12	11	11	10
	Mean *Spartina alterniflora* height	93	103	114	115
Nekton	Mean Abundance	21.6	NS	11.6*	NS
	Number of Species	3	NS	3*	NS
	Diversity Index	0.337	NS	0.367*	NS
Benthic Macroinvertebrates	Mean Abundance	76.8	NS	63.3*	NS
	Number of Species	6	NS	6*	NS
	Diversity Index	0.349	NS	0.35*	NS
Avian	Mean Abundance	4.9	3	3.7	8.5
	Number of Species	8	23	20	37
	Diversity Index	0.771	1.137	0.992	1.232

NS=not sampled
Values followed by an asterisk (*) are results of pooled spring and fall data

Management Recommendations

The fourth year monitoring results indicate that restoration efforts to date have been successful in establishing a diverse population of salt marsh plant and animal species. The planted salt marsh grasses and coastal shoreline zone vegetation have become well established. Based upon monitoring results, Berger does not recommend any planting at this time. *Phragmites australis* presence is minimal at the restoration site, however, there is a small stand of *Phragmites australis* along the shoreline near the boat ramp, as well as some mugwort, Queen Anne's Lace, and Japanese knotweed near the gazebo. It is recommended that the Town of North Hempstead, as owner of the property, make efforts to permanently remove these invasive plants under the supervision of a qualified botanist.

5.0 REFERENCES

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APPENDICES

APPENDIX A
VEGETATION MONITORING QUADRAT LOCATIONS

Bar Beach Vegetation Monitoring Quadrat Locations

Restoration site				
End	northing	easting	Quadrat	Distance from lower pipe (m)
T1up	240496.692	1079543.771	1	21.0
T1low	240443.858	1079592.021	2	18.3
T1 total length 22.07 m			3	13.8
			4	7.7
			5	0.9
T2up	240473.546	1079513.559	1	21.0
T2low	240411.422	1079547.602	2	18.4
T2 total length 21.95 m			3	15.8
			4	7.7
			5	0.5
T3up	240471.818	1079476.992	1	17.6
T3low	240413.046	1079475.841	2	15.2
T3 total length 17.95 m			3	9.8
			4	4.9
			5	0.6
T4up	240481.267	1079420.387	1	*15.1*
T4low	240425.061	1079411.027	2	12.6
T4 total length 17.50 m			3	7.8
			4	5.4
			5	0.5
T5up	240482.271	1079329.557	1	9.9
T5low	240444.181	1079324.130	2	7.7
T5 total length 12.1 m			3	5.3
			4	2.9
			5	0.7
T6up	240451.950	1079149.276	1	47.4
T6low	240317.391	1079242.701	2	46.8
T6 total length 50.1 m			3	42.4
			4	37.8
			5	30.8
			6	23.4
			7	17.4
			8	11.5
			9	5.8
			10	0.7
T7west	240359.023	1079164.397	1	26.7
T7east	240397.675	1079243.907	2	21.9
T7 total length 27.3 m			3	11.8
			4	6.7
			5	0.7

Reference Site				
End	northing	easting	Quadrat	Distance from lower pipe (m)
T8up	240917.997	1080339.707	1	14
T8low	240865.224	1080350.428	2	6.1
T8 total length 16.0 m			3	0.7
T9up	240863.950	1080015.822	1	18.5
T9low	240794.065	1080028.913	2	14.8
T9 total length 21.6 m			3	6.7
			4	0.5
T10up	240851.720	1079907.820	1	12.3
T10low	240792.253	1079905.867	2	5.6
T10 total length 19.0 m			3	0.6

*Transect lengths and quadrat locations as measured along a tape measure laid between the PVC end pipes.

APPENDIX B
VEGETATIVE FIELD DATA

2007 Bar Beach Vegetative Cover Data (September 20th, 2007)

Restoration Site	Transect 1					Transect 2					Transect 3					Transect 4					Transect 5					Transect 6										Transect 7				
Quadrat	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
Spartina alterniflora	+	10	90	100	70	0	5	100	100	100	0	45	100	100	90	0	10	70	85	10	0	50	100	80	90	0	0	85	90	100	95	80	80	95	100	100	90	95	100	95
Spartina patens	30	20	0	0	0	35	0	0	0	0	40	10	0	0	0	75	40	0	0	0	0	0	0	0	0	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0
Distichlis spicata	50	70	0	0	0	55	85	0	0	0	10	45	0	0	0	15	40	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salicornia europa	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	+	10	0	0	0	0	+	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex patula	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Sueda linearis	5	0	0	0	0	0	0	0	0	0	+	0	0	0	0	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baccharis halimifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iva frutescens	10	0	0	0	0	0	0	0	0	0	50	0	0	0	0	+	0	0	0	0	10	0	0	0	0	35	70	0	0	0	0	0	0	0	0	0	0	0	0	0
Phragmites australis	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panicum amarum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	55	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solidago semipervirens	0	0	0	0	0	0	0	0	0	0	+	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sagina procumbens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parthenocissus cinquefolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% dead vegetation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% open/mud/water	5	0	0	0	30	10	0	0	0	0	0	0	0	0	10	5	0	30	15	90	0	5	0	20	10	30	10	5	10	0	5	20	20	5	0	0	10	5	0	5
% vegetative ground cover	95	100	100	100	70	90	100	100	100	100	100	100	100	100	90	95	100	70	85	10	100	95	100	80	90	70	90	95	90	100	95	80	80	95	100	100	90	95	100	95

Reference Site	Transect 8			Transect 9				Transect 10		
Quadrat	1	2	3	1	2	3	4	1	2	3
Spartina alterniflora	0	100	90	0	10	100	60	60	85	80
Spartina patens	0	0	0	0	0	0	0	0	0	0
Distichlis spicata	0	0	0	0	0	0	0	0	0	0
Salicornia europa	0	0	0	0	0	0	0	0	0	0
Atriplex patula	0	0	0	15	0	0	0	0	0	0
Sueda linearis	0	0	0	0	0	0	0	0	0	0
Baccharis halimifolia	0	0	0	0	0	0	0	0	0	0
Iva frutescens	70	0	0	0	0	0	0	0	0	0
Phragmites australis	10	0	0	50	65	0	0	0	0	0
Panicum amarum	0	0	0	0	0	0	0	0	0	0
Solidago semipervirens	0	0	0	0	0	0	0	0	0	0
Sagina procumbens	0	0	0	0	0	0	0	0	0	0
Parthenocissus cinquefolia	0	0	0	0	0	0	0	0	0	0
% dead vegetation	0	0	0	0	0	0	0	0	0	0
% open/mud/water	20	0	10	35	25	0	40	40	15	20
% vegetative ground cover	80	100	90	65	75	100	60	60	85	80

+ = present, but covers less than 1 percent of quadrat

2007 Bar Beach *Spartina alterniflora* height (in centimeters) (September 20th, 2007)

Restoration Site

Quad	Transect 1					Transect 2					Transect 3					Transect 4					Transect 5					Transect 6										Transect 7				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5
		9	109	160	92		74	94	175	24		109	160	186	27		109	69	12	111		15	174	150	43			130	97	88	156	35	186	183	178	158	169	107	114	23
		92	104	194	91		72	99	143	25		133	157	165	42		113	105	165	56		95	96	54	32			129	138	102	89	41	156	148	193	151	177	118	134	72
		95	92	145	127		75	81	129	21		110	157	185	24		114	51	151	22		110	124	102	19			81	114	17	137	29	181	144	124	154	191	139	104	197
		100	99	176	125		80	102	104	59		104	108	170	18		72	54	168	11		89	127	29	107			99	127	116	170	109	28	168	144	171	161	79	96	173
		146	87	170	142		71	100	112	32		91	126	172	36		39	46	120	32		94	121	73	211			119	156	124	89	116	129	149	120	149	153	89	97	118
		155	85	175	157		127	99	177	27		126	132	126	29		14	10	127	24		117	107	74	68			67	139	129	70	128	221	223	98	174	175	70	102	140
		143	96	180	16		62	101	173	86		74	126	116	130		100	96	141	24		92	152	57	144			83	130	89	118	77	212	52	176	177	210	97	129	90
			81	176	25			98	181	156		105	174	108	151		61	101	169	40		106	76	72	47			120	132	104	73	55	213	43	123	180	181	32	123	106
			68	162	15			113	146	113		81	176	195	144		88	59	142	13		112	103	159	20			73	105	88	72	111	180	129	127	152	145	28	154	186
			76	159	134			89	175	178		82	126	160	167		78	121	150	70		104	113	96	141			95	120	87	107	104	202	137	169	190	191	127	126	118
			89	152	143			79	131	140		150	172	183	140		17	82	167	26		119	112	99	27			103	112	98	142	128	166	109	39	192	182	92	83	151
			88	177	137			80	154	170		116	187	33	148		108	87	154	24		103	168	145	42			59	116	85	86	104	209	184	54	190	189	114	79	168
			86	159	135			93	130	210		117	172	138	137		119	98	126	13		144	86	112	89			80	98	133	28	95	155	179	130	195	214	146	151	200
			103	199	195			91	117	158		127	164	205	70		95	124	147	23		110	90	70	164			104	141	97	60	97	179	61	173	194	132	105	95	186
			99	154	162			95	183	172		124	152	230	154		120	104	169	31		95	116	130	79			106	61	91	126	79	195	59	163	14	38	83	97	71
			92	155	140			73	180	141		106	163	174	161		36	127	146			105	139	53	115			110	35	130	135	63	82	155	172	12	126	33	75	102
			72	135	152			98	147	143		92	142	178	56		111	117	149			139	92	66	118			88	58	45	161	126	10	156	158	186	200	108	103	135
			96	90	168			89	149	106		104	137	207	121		84	55	136			75	119	69	173			71	66	64	160	112	186	104	49	42	81	145	142	163
			82	132	174			89	177	52		126	15	166	161		106	102	15			47	147	82	160			71	85	140	102	118	169	148	207	32	149	119	100	176
			87	153	121			111	176	173		66	9	193	149		110	87	56			8	167	123	9			114	94	140	104	127	207	12	153	180	182	68	144	26

Reference Site

Quad	Transect 8			Transect 9				Transect 10		
	1	2	3	1	2	3	4	1	2	3
		193	99		40	143	103	30	18	125
		133	34		33	130	146	9	87	73
		169	101		25	169	74	12	96	118
		181	87		50	158	138	42	90	74
		159	92		32	110	98	56	172	94
		161	89		29	131	118	16	175	87
		176	106		8	134	80	21	87	166
		20	142		9	19	80	51	76	41
		26	130		25	16	119	91	115	47
		183	122		57	8	123	131	86	33
		177	133		66	13	41	101	66	56
		170	174		61	6	90	85	94	116
		149	164		58	29	26	119	191	97
		165	165		51	151	35	70	119	43
		145	176		43	164	111	102	115	165
		172	17		45	109	82	53	131	73
		176	57		21	111	154	42	156	69
		135	39		51	80	142	27	155	67
		133	18		58	140	171	45	203	81
		167	112		40	155	139	43	194	95

Measurements in bold font represent flowering plants

APPENDIX C
SITE PHOTOGRAPHS

Restoration site-view of Transect 1 from upland end.

Restoration site-view of Transect 2 from upland end.

Restoration site-view of Transect 3 from upland end.

Restoration site-view of Transect 4 from upland end.

Restoration site-view of Transect 5 from upland end.

Restoration site-view of Transect 6 from upland end.

Restoration site-view of Transect 7 from west end.

Reference site-view of Transect 8.

Reference site-view of Transect 9.

Reference site-view of Transect 10.

High marsh zone near Transect 5.

Coastal zone vegetation at the restoration site.

Glasswort *Salicornia europa* along Transect 2.

Bare patch between the boat ramp and Transect 1.

Bare area on the outer peninsula.

Salt-burned *Phragmites* on Transect 5.

Mugwort *Artemisia vulgaris* near the gazebo.

***Phragmites* stand by the boat ramp, recently mowed.**

Patch of Japanese knotweed along the edge of the mowed lawn.

Queen Anne's Lace and mugwort along the edge of the mowed lawn.

APPENDIX D
AVIAN FIELD DATA

MONITORING INFORMATION

Date of Monitoring	May 8 2007
Time of Monitoring	Began: 8:30 am Concluded: 9 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
1 great white egret		shore	fishing	
2 greater yellowlegs		shore	fishing	
6 herring gull		shore	fishing	
1 mallard		shore	floating	
1 starling				flyover
2 robins		trees	perching	few minutes
1 [illegible]		[illegible]	[illegible]	

Notes: control area
1 cormorant fishing
2 swans floating

MONITORING INFORMATION

Date of Monitoring	May 15, 2007
Time of Monitoring	Began: 9:15 am Concluded: 9:45 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** ½ tide Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A. W. Cafarelli, North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
1 starling		in yellowood	perching	brief
2 morning doves				
1 mocking bird		in red cedar	perching	moving about
2 great white egrets		shore	standing	

Notes:

central area

none

vegetation:

apple blossoms

MONITORING INFORMATION

Date of Monitoring	May 21 2007
Time of Monitoring	Began: 8:45 am Concluded: 9:15 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** ½ tide Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
5 barn swallows			catching food	flyover
3 starling				flyover
2 canada geese		on low grass	walking	
5 mourning dove		on low grass	walking	
1 robin		western trees	darting about	
1 yellow warbler		comes out of western trees	darting about	brief
2 common yellowthroat		come out of western trees	darting about	brief
1 great white egret				flyover
1 great white egret		top of inlet	standing	s'
2 herring gull				flyover
2 mocking birds		in red cedars	darting about	
1 song sparrow		garbage can	perched	brief
1 crow		moves from pavement to low grass	eating starling	
1 redwing blackbird		in yellowwood	perched	
1 kingfisher	unusual	perched on dock, diving to wateredge	fishing	

Notes: central area 3 barn swallow flyover
1 crow on fence
5 herring gull
8 great white egret
1 snowy egret
3 mallard
} using dock to fish from } N.B. plenty of fish to support birds but habitat disruption limits nesting activity

vegetation

yellow wood in bloom
olive in bloom
} N.B. belt of trees along margin west + north is extremely important for shelter, perching, and food

MONITORING INFORMATION

Date of Monitoring	May 22, 2007
Time of Monitoring	Began: 10am Concluded: 11:30am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli Natr Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / ~~No~~

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
5 barn swallow				flyover
1 osprey			circling over lagoon	brief
2 starlings		in yellow wood		
2 morning dove		on ground		
1 mocking bird		in red cedar	darting about	

Notes: control area
1 herring gull
1 barn swallow
1 starling

MONITORING INFORMATION

Date of Monitoring	May 25, 2007
Time of Monitoring	Began: 10:00 am Concluded: 10:30 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** 1/3 tide Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 mallards		swimming up inlet		
1 red wing blackbird		on atlantnus tree	perched	brief
2 swans		swimming up inlet	drinking water	
2 barn swallows				flyover
2 mourning doves		on ground fly into yellowwood		
1 blackcrown nightheron		in highgrass by inlet hunting		
5 starling				flyover
2 herring gull				flyover
1 yellow warbler		flies into yellowwood		brief
6 canada geese		in tall grasses	walking	
1 robin				flyover
1 mocking bird		on red cedar	perched	
NB yellow tiger swallowtail butterfly				

Notes: central area:
herring gull flies over and drops shell on pavement to break it open to eat it

vegetation: yellow wood in bloom
black cherry in bloom
clover in bloom
NB- planting of more trees along northern margin will improve habitat for birds and also for butterflies. Eg: Tulip tree (liriodendron) & black cherry (prunus serotina) host the yellow swallowtail; sassafras hosts the spicebush swallowtail; dog wood (cornus florida) hosts the spring azure

MONITORING INFORMATION

Date of Monitoring	May 30, 2007
Time of Monitoring	Began: 5:20 Concluded: 5:45
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	53° clear
Monitor(s) (name, affiliation)	A. W. Cafarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station/codes)	Yes / No photo of 7 public toilets set on low grass in restored area
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 song sparrow		in black cherry		brief
near redwing blackbird				
near yellow warbler				
c				
nearby:				
swan		waleredge south of inlet	fishing	
cormorant		water edge south of inlet	fishing	
great blue heron		water edge south of inlet	fishing	
nde:				
peregrine falcon		eyrie at powerplant across bay		

Notes: control crew:
2 herring gull flyover

vegetation:
clover blossom

N.B. The mergent to restored area is being adversely + unnecessarily used as a place to store items that can easily be placed elsewhere onto acres of pavement instead of disrupting the restored habitat with human activity (place crewshells near the boathouses; public toilets do not need to be stored on the lawn grasses under the perching trees)

MONITORING INFORMATION

Date of Monitoring	June 4, 2007
Time of Monitoring	Began: 8:30 am Concluded: 9:00 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** 2/3 tide Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli Natr Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station/codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 song sparrows		in alcantrus	perch	
1 black crowned night heron		by inlet in tall grass	hunting	
1 common tern		flying in	hunting	brief
1 great white egret		by shore	hunting	
3 canada geese + 3 goslings		in tall grass	walking	
cormorant		by shore	hunting	
2 herring gull				flyover
1 mallard		in inlet		
nearby				
osprey on piling	across lagoon		perched	

Notes: Central Area
1 mallard

MONITORING INFORMATION

Date of Monitoring	June 7, 2007
Time of Monitoring	Began: 5:30 pm Concluded: 6:00 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
1 Song Sparrow		in yellowwood		brief
2 mockingbirds		in black cherry		brief
1 mallard		by shore	swimming	
3 starlings				flyover

Notes: central area:
black back gull on piling

MONITORING INFORMATION

Date of Monitoring:	June 8, 2007
Time of Monitoring:	Began: 6:45 pm Concluded: 6:55 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	74° clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
12 canada geese			swimming	
2 mallards			swimming	
hear yellow warbler				
hear redwing blackbird				
hear gold finch				
1 mockingbird		in trees + on ground	gathering nesting material	

Notes: control crew:
none

MONITORING INFORMATION

Date of Monitoring	June 12, 2007
Time of Monitoring	Began: 9:00 am Concluded: 9:30 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** 2/3 full Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	74° clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
1 yellow warbler		in woodenbelt of trees	darting about	brief
1 red wing blackbird		on yellowwood	perching	brief
2 starlings		on ground under yellowwood		
1 mockingbird		on ground low grass		

Notes: central area.
none

MONITORING INFORMATION

Date of Monitoring: June 12, 2007

Time of Monitoring: Began: 5:45 pm
Concluded: 6:15 pm

Tide
(please circle one)

High Tide / Ebbing / Low Tide / **Flooding** 3/4 full

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) unexpected drenching downpour during observation

Monitor(s)
(name, affiliation)

Type of Monitoring
(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?
(please indicate station codes)

Yes / No

Video Monitoring Conducted?
(please provide brief description)

Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 swans		in inlet	swimmy	
2 mallards		in inlet	swimmy	
1 redwing black bird				flyover
2 starling				flyover
2 song sparrows		yellow wood	squabbling	brief
5 black crown night herons (3 juvenile/young adult)		in inlet	hunting	
		birds heading to top of inlet, and flying into trees, anticipating the downpour. During the downpour fish seem to be jumping out of the water in inlet as water pours into inlet at high volume		
nearby				
20 canada geese		opposite side of lagoon	floating	
1 juvenile blue heron		on piling opposite side of lagoon	preening	

Notes: control area: none

Vegetation: clover, vetch

N.B. The restored area has become a very good place to watch birds, as they have become comfortable with the restored site. Pulling up some of the asphalt and widening the belt of trees on the north side of lagoon would enormously improve the habitat. This would be a good opportunity to add a few benches under trees. I sometimes bring elderly and disabled birdwatchers who always remark what a good place this would be to sit and watch birds. Here we have a good opportunity to serve this population group and the environment compatibly.

MONITORING INFORMATION

Date of Monitoring: June 15, 2007

Time of Monitoring: Began: 9:30 am
Concluded: 10:00 am

Tide
(please circle one)

High Tide / Ebbing / Low Tide / **Flooding** ½ tide

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) clear although high tide debris in parking lot (new moon)

Monitor(s)
(name, affiliation) A.W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?
(please indicate station codes) Yes / No

Video Monitoring Conducted?
(please provide brief description) Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 mourning doves		on ground low grass	feeding	
mockingbird		in red cedar	probably resting	
nearby				
2 great white egrets		opposite shore of lagoon	standing	

Notes: control area: more vegetation:

Tree belt is attractive to birds and can be enhanced by planting native trees: e.g. tulip tree (liriodendron), tupelo/blackgum (nyssa sylvatica), as well as the existing early succession trees (which are first colonizers in disturbed soil, but short lived) e.g. red cedar (juniperus virginiana) or black cherry (prunus serotina). Not all trees have to be native to this exact region - the yellowwood (cladastris) is well used as are the apple trees (malus/Europeancrisin) western side of lagoon

MONITORING INFORMATION

Date of Monitoring	June 22, 2007
Time of Monitoring	Began: 12:15 pm Concluded: 12:45 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	68° clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation — construction disturbance at site Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 muckleyhucks		in redcedar	probable rest	
herring gull				flyover
1 snowy egret		shoreline		
ready by				
2 peregrine falcon + 1 young on eyrie across bay			at power plant	

Notes: central area:
2 starlings
same snowy egret flew over from above site

MONITORING INFORMATION

Date of Monitoring:	June 30, 2007
Time of Monitoring:	Began: 6:30pm Concluded: 7:30pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	78° clear full moon
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

construction disturbances at site have disrupted use of lagoon by birds

MONITORING PARAMETERS: BIRD OBSERVATION

Species	Abundance	Location	Activity	Duration of Stay
2 mockingbirds + 1 young		in olive tree	perching	
4 barn swallow				flyover

Notes: central area: nap

vegetation: vetch

N.B The issue of invasive shrubbery is ambiguous. While vetch is often viewed as invasive, it is a nectar plant for butterflies, and not invasive here. Similarly, olives (Elaeagnus) have been planted to arrest shoreline erosion and attract birds in Jamaica Bay Wildlife Refuge and elsewhere, and while not invasive here, is no longer planted. However, the Japanese Knotweed here MUST be removed immediately.

MONITORING INFORMATION

Date of Monitoring July 5, 2007

Time of Monitoring
Began: 6:14 pm
Concluded: 6:45pm

Tide
(please circle one)
High Tide / Ebbing / Low Tide / **Flooding**

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) clear 80°

Monitor(s)
(name, affiliation) A.W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)
Pre-Construction

As-built (4-5 weeks) during new excavation and site renovation

Annual Post-Construction: Year 1 / 2 (3) / 4 / 5

Parameters Measured
(please circle all that apply)
Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?
(please indicate station codes)
Yes / No

Video Monitoring Conducted?
(please provide brief description)
Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 7/5/07

Species	Abundance	Location	Activity	Duration of Stay
2 swan + 2 cygnets		in freshwater channel	swimming	
2 barn swallow		around below yellowwood		

Notes: Control Area None.
N.B. No diamondback terrapin; ashore injure although anecdotal accounts report some swimming in the bay & shells on beaches several miles north of site
N.B. Construction project is undermining wildlife visitation.
Heaping huge mounds of excavated debris atop soil is unnecessary with acres of asphalt available. It suffocates the root zone of trees. No attention seems to have been paid to the issue of soil compaction caused by construction vehicles.
to the issue of soil compaction caused by construction vehicles. @ 12" of mulch covered by plywood sheets

MONITORING INFORMATION

Date of Monitoring July 12, 2007

Time of Monitoring
Began: 7:30pm
Concluded: 8 pm

Tide
(please circle one)
High Tide / Ebbing / Low Tide / **Flooding**

Predicted low and high tides: incoming tide almost full

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) clear 81°

Monitor(s)
(name, affiliation) A. W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)
Pre-Construction

As-built (4-5 weeks) during new excavation and site renovation

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)
Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?
(please indicate station codes)
Yes / No

Video Monitoring Conducted?
(please provide brief description)
Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 7/12/07

Species	Abundance	Location	Activity	Duration of Stay
4 starlings				flyover

Notes: central area: none

Vegetation: Queen Anne's Lace / Black Eyed Susan / Red clover / White Clover / Red cedar Berries

Misc: Rabbit eating clover next to cedar (mowed lawn grass area)
Fireflies abundant

Nearby: one osprey on piling near promontory eating very large fish (? bluefish)
the other is next to 2 chicks visible in nest.

MONITORING INFORMATION

Date of Monitoring: July 16, 2007

Time of Monitoring
Began: 6:00pm
Concluded: 6:30 pm

Tide
(please circle one)
High Tide / Ebbing / Low Tide / **Flooding**
tide almost completely low
Predicted low and high tides:
Time of tidal measurements:
Nearest tidal station:

Weather
(temperature, wind, precipitation) Clear 83°

Monitor(s)
(name, affiliation) A.W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)
Pre-Construction
As-built (4-5 weeks) during new excavation and site renovation,
Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)
Vegetation
Sediment
Benthic Invertebrates
Birds
Other (please describe):

Photo Monitoring Conducted? Yes / No
(please indicate station/codes)

Video Monitoring Conducted? Yes / No
(please provide brief description)

MONITORING PARAMETERS: BIRD OBSERVATION 7/16/07

Species	Abundance	Location	Activity	Duration of Stay
1 great white egret		at beach edge		

Notes: Central Area: 3 great white egrets on shoreline

Vegetation: Queen Anne's Lace / Black Eye Susan / Red Clover / White Clover / Phragmites / Apples farming on Trees / vetch / St. John's wart / fleabane

Misc: Monarch Butterflies on Queen Anne's Lace

Nearby: east-west sandbars (near primentary) very visible
2 swan w/ 2 cygnets, 3 great blue heron, 2 great white egret
osprey nest on pilings west of restoration has 2 adults and 2 young

MONITORING INFORMATION

Date of Monitoring:	July 26, 2007
Time of Monitoring:	Began: 6:15 pm Concluded: 6:45 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear 82°
Monitor(s) (name, affiliation)	A.W. Cafarelli, North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and silo renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 7/26/07

Species	Abundance	Location	Activity	Duration of Stay
1 mockingbird		territorial display on red cedar.		
2 song sparrows		fly from boat ramp into tall grasses		

Notes: Central Area: 1 juvenile herring gull drinking from puddled water on asphalt
black back gull on piling rear
Nearby: opposite side of lagoon:
2 swans and 2 cygnets / great white egret / 1 black back gull on piling
Eastern Sacred Bay: peregrine on Eyrie
N.B: Since construction began at west margin of lagoon, birds have avoided the restored area. The highway has become extremely visible and car lights and noise adversely impact the site. Increasing numbers and
[illegible] the freshwater inlet (e.g. night herons), but this trend is
[illegible] affected

MONITORING INFORMATION

Date of Monitoring	July 31 2007
Time of Monitoring	Began: 6:40 pm Concluded: 7:10
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear 83 o
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

Full moon tide very low

during new excavation and site restoration

MONITORING PARAMETERS: BIRD OBSERVATION 7/30/07

Species	Abundance	Location	Activity	Duration of Stay
1 morning dove		on low grass		
1 great white egret				flyover, west → east
1 song sparrow		in yellowwood		

Notes: Central Area: 3 herring gull flyover

Misc: rabbit feeding on low grass

Nearby: 4 osprey on pilings near promontory nest: one eating huge fish, two return to nest
2 osprey getting still in nest on pilings directly west of site.
On east-west sandbar near promontory: 4 blue heron / swan / snowy egret
On opposite shore of lagoon raccoon with 4 young proceeding eastward

Eastern Shore of Bay: peregrine on eyrie / 16 great white egrets / 2 swans + 3 cygnets

NB: There are 5 osprey nests in the region of the site (and one abandoned site)
3 osprey nests are visible from the observation site (one on promontory pilings, one on pilings directly west of site, one on blue sailboat across bay) plus two osprey nests, located north of parking lot/platform site along roadway was abandoned after several weeks

MONITORING INFORMATION

Date of Monitoring: August 5, 2007

Time of Monitoring: Began: 6:40 pm
Concluded: 7:20

Tide
(please circle one)

High Tide / Ebbing / Low Tide / **Flooding**

tide very low much last quarter

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) clear 82°

Monitor(s)
(name, affiliation) A. W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)

Pre-Construction

As-built (4-5 weeks) during new excavation and site renovation

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted? Yes / No
(please indicate station codes)

Video Monitoring Conducted? Yes / No
(please provide brief description)

MONITORING PARAMETERS: BIRD OBSERVATION 8/5/07

Species	Abundance	Location	Activity	Duration of Stay
1 morning dove		on low grass		
1 great white egret				flyover east → west

Notes: Control Area: none

Vegetation: Queen Anne's Lace / Black Eyed Susan / Goldenrod / Grasses in Bloom

Nearby: east-west sandbar near promontory 5 blue heron 15 great white egrets

MONITORING INFORMATION

Date of Monitoring: August 18, 2004

Time of Monitoring: Began: 7:30 pm
Concluded: 8:00

Tide
(please circle one)

High Tide / Ebbing / Low Tide / **Flooding**

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather
(temperature, wind, precipitation) clear 83°

Monitor(s)
(name, affiliation) A.W. Cafarelli North Shore Audubon Society

Type of Monitoring:
(please circle one)

Pre-Construction

As-built (4-5 weeks) during new excavation and site renovation

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted? Yes / No
(please indicate station codes)

Video Monitoring Conducted? Yes / No
(please provide brief description)

MONITORING PARAMETERS: BIRD OBSERVATION 8/13/07

Species	Abundance	Location	Activity	Duration of Stay
1 osprey				circling over lagoon
1 female mallard		swimming in inlet channel		

Birds: Central Area: 2 barn swallows flyovers north→south
2 herring gull flyovers south→north

Misc: many minnows (? silversides) jumping out of water

Nearby: 2 osprey on pilings by promontory rock; 3 osprey on 3 pilings east of site
east-west sandbar near promontory; 8 blue herons

MONITORING INFORMATION

Date of Monitoring	August 14, 2007
Time of Monitoring	Began: 6:00 pm Concluded: 6:30 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	81°
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 8/14/07

Species	Abundance	Location	Activity	Duration of Stay
2 mallards		startled out of site by boat noise		
1 osprey		circles over lagoon then flies into trees opposite lagoon		

Notes: Central area: 2 cormorants floating
1 black backed gull flies from piling to water

Nearby: east-west timber rear promontory: osprey / 15 great white egrets / 5 great blue heron
3 osprey on pilings rear promontory nest / 4 great white egrets opposite side of lagoon
2 osprey on pilings plus two young in nest on pilings directly east offsite.

N.B. It is important to leave all the old dock pilings as they provide roosting and resting sites, as well as fishing platforms for ospreys, kingfishers, herons, and egrets.

MONITORING INFORMATION

Date of Monitoring	August 21, 2007
Time of Monitoring	Began: 10:30 am Concluded: 11:30 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	all day rain
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe): N.B. site visit by federal and state biologists; consult their reports.
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 8/21/07

Species	Abundance	Location	Activity	Duration of Stay
14 great white herons		in middle of lagoon		

Notes: Central: Observed large number of asian crabs in seining nets
Also silversides and winter flounder in seining nets

Nearby: 2 peregrines huddled on powerplant stacks out of rain below eyrie.

N.B. Invasive plants (phragmites and japanese knotweed) and invasive animals (asian crabs devouring, exterminating native crabs) (raccoons devouring bird nests and young turtles). are interfering with the habitat. It would be desireable to start a box turtle restoration program here and in the Sand Pit area. Box turtle

MONITORING INFORMATION

Date of Monitoring	August 25, 2007
Time of Monitoring	Began: 2:30 pm Concluded: 8:00
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	82° clear very hot + humid
Monitor(s) (name, affiliation)	A.W. Cafarelli, Nah Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 6/25/15

Species	Abundance	Location	Activity	Duration of Stay
1 song sparrow				flyover
1 great white egret				flyover east → west
devoured robin on ground		low grass near Ailanthus		

Notes: Control: none

Vegetation: Ironweed / Fleabane / evening primrose / goldenrod / vetch / grasses blooming / apples dropping / red cedar berry / eleagenus (olive) berry / queen anne's lace / black eyed susan

N.B. Car headlights from the road are now extremely visible shining into the site; highway noise is also very noticeable. Both are adversely affecting wildlife in the site. Butterfly plants destroyed during the excavation and site restoration

MONITORING INFORMATION

Date of Monitoring	August 26, 2007
Time of Monitoring	Began: 6:30 Concluded: 7:00
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** ½ tide Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	A.W. Cotterell's North Shore Audubon Society
Monitor(s) (name, affiliation)	81° very hot and humid
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No photo of lagoon and opposite side of bay where peregrines roost
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 8/26/07

Species	Abundance	Location	Activity	Duration of Stay
1 great white egret				flyover east → west
3 herring gulls				flyover north → south
2 cormorants				flyover south → north
3 snowy egrets (land but fly off immediately disturbed by cyclists)				
1 great blue heron				flyover east → west
5 starlings			perched on overhead wires.	

Notes: Control: damselfly
1 great white egret fishing
5 herring gull flyovers north → south

N.B. rabbit on lawn grass near yellow wood.
osprey in trees on promontory opposite side of lagoon

MONITORING INFORMATION

Date of Monitoring	September 7, 2007
Time of Monitoring	Began: 6pm Concluded: 6:30pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	clear 82°
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during raw excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 9/7/07

Species	Abundance	Location	Activity	Duration of Stay
? reat white egret		hiding on grass/		

Notes: Central Area: None
Nearby: Peregrine falcon on eyrie
Vegetation: Goldenrod in bloom / Black eyed susan formed seedpods

MONITORING INFORMATION

Date of Monitoring	September 19, 2007
Time of Monitoring	Began: 4:30pm Concluded: 5:00
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: very very high tide up to asphalt paving Nearest tidal station: (only first quarter at noon)
Weather (temperature, wind, precipitation)	75° clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 9/19/02

Species	Abundance	Location	Activity	Duration of Stay
none				

Notes: Control area: none

nearby: cormorant and great blackback gull on empty osprey nest directly opposite to site
2 peregrines on eyrie

vegetation: Goldenrod/Fleabane/Queen Anne's Lace/Asters/Japanese knotweed in bloom
Fruit on olive (Elaeagnus)
Seed pods on Black eyed Susan/Queen Anne Lace/

MONITORING INFORMATION

Date of Monitoring	September 24, 2007
Time of Monitoring	Began: 6:10 pm Concluded: 6:40
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	72° clear
Monitor(s) (name, affiliation)	A. W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 9/24/07

Species	Abundance	Location	Activity	Duration of Stay
herring gull				Flyover s→n

Central Area: 2 cormorant flyover s→n

Notes: Nearby peregrine on eyrie.

N.B. Japanese knotweed located behind boathouse as well as alongside shore grasses. This invasive will overtake and undo the restoration if not eradicated. Knotweed was popularized by the landscape architect Frederick Law Olmsted when he designed Central Park. By now, it has choked waterways throughout the Metropolitan region, spread by seeds and underground runners. The plant is most visible now when the white seedpods are prominent. See the attached article on the necessary persistence in digging up the rhizomes. It can take ten years of removal efforts

MONITORING INFORMATION

Date of Monitoring	October 1, 2007
Time of Monitoring	Began: 8:40 am Concluded: 9:10
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	65° clear
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/4/07

Species	Abundance	Location	Activity	Duration of Stay
1 common tern				flyover n→s
4 song sparrows		foraging in shrubbery (in bayberry and eleagnus)		
2 swamp sparrows		taking dust bath at margin of low grass		
2 tree sparrows		low branches of trees		
other sparrows audible in tall grasses hidden from sight				

Notes: Control Area: 5 herring gulls flyover s→n
2 herring gulls on asphalt

Nearby: Peregrine on front tower across from eyrie

NB: 2 monarch butterflies e→w over tall grasses at site
Bumblebees active in goldenrod at site

MONITORING INFORMATION

Date of Monitoring	October 6, 2007
Time of Monitoring	Began: 4:40pm Concluded: 5:10
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	85° clear unseasonably hot weather this week
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/6/07

Species	Abundance	Location	Activity	Duration of Stay
1 starling		in yellowood tree		
2 herring gull				flyover s→n
2 savannah sparrow		foraging in tall grass/ one on goldenrod stem holding aster seed filaments in beak		
3 song sparrows		foraging on low grass		
1 mockingbird		preening in yellowood tree		
20+ mixed sparrows		foraging on low grass; fly off when startled		

Notes: Central Area 1 herring gull flyover e→w
1 herring gull flyover s→n

Nearby: peregrine flies n→s to eyrie

Vegetation: aster seeds open and dispersing in large quantities
goldenrod - some in bloom, some in seed
vetch: most in seed, some in bloom

N.B: Current fall migration season at the site is a reminder of the importance of the site's multi-tiered foraging habitats. In addition to the exposed tidal mudflat, freshwater inlet, and shallow diving in the lagoon to attract water birds, there are four separate vegetative layers attracting different species: low grass (mown edge), high grass and seed flowers (including aster and goldenrod), shrubs and low trees (including bayberry, olive, and red cedar), high trees (including crabapple & black cherry)

MONITORING INFORMATION

Date of Monitoring	October 9, 2009
Time of Monitoring	Began: 9:40 am Concluded: 11:40 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: 11:03 high tide Time of tidal measurements: Nearest tidal station: extremely high tide up to and over asphalt (two days before new moon)
Weather (temperature, wind, precipitation)	73° very low cloud cover, still breeze as cold front approaches
Monitor(s) (name, affiliation)	A.W. Cafarelli Nantucket Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No See attached photos of storm surge
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/9/07

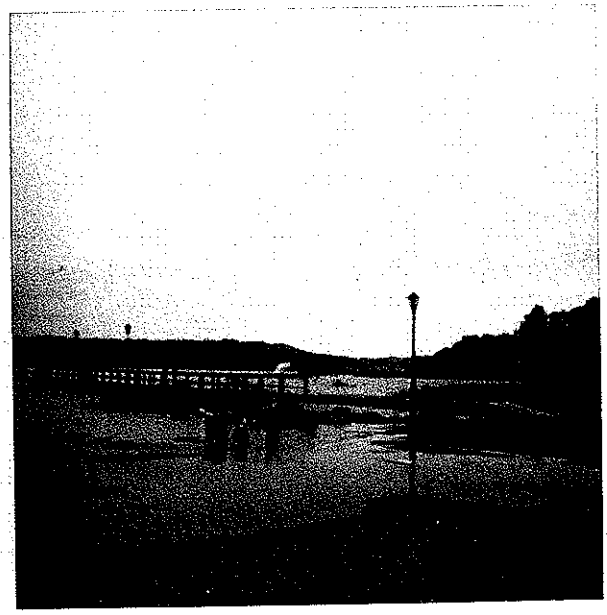
Species	Abundance	Location	Activity	Duration of Stay
1 common tern				flyover e→w
2 chipping sparrows		In Shrubbery		
3 common terns				flyover s→n and inland toward Sand Pit secondary growth forest
7 ringbill gulls		standing in storm surge on asphalt		

Notes: Central Area: 1 common tern flyover e→w (Ten over lagoon margin e→w). (following the vegetated zones is a popular flyover route from across the harbor)

Nearby: 44 ringbill gulls standing in storm surge on asphalt 11 cormorants on pilings opposite lagoon/next to vacated osprey nest

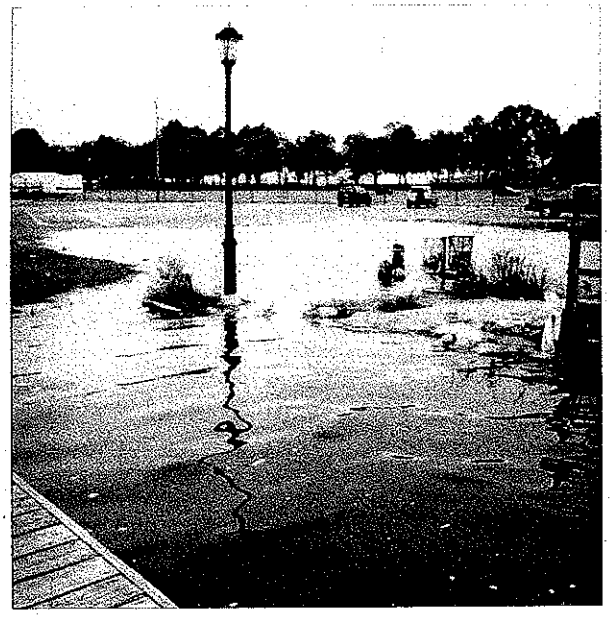
N.B. Tide was up to the asphalt at time of arrival. By 10:15 water was rising very rapidly over the asphalt, blocking access to the pier. Floating docks were above the level of the pavement. Storm surge extremely high even though it was not full or new moon. Since the two adjacent parks (Bar Beach/Hempstead Harbor) are being conjoined, parking lots are redundant surge area should be restored to a natural shoreline. Storm surge extremely high from central area the natural shoreline of the Bar Beach extension buffers the flood zone. The storm surge was 5' from the wooded curb but never over the asphalt. See photos.

Photos of Storm [illegible]



view of [illegible] pier at mouth of lagoon restored sit absorbing floodwaters (facing southeast)

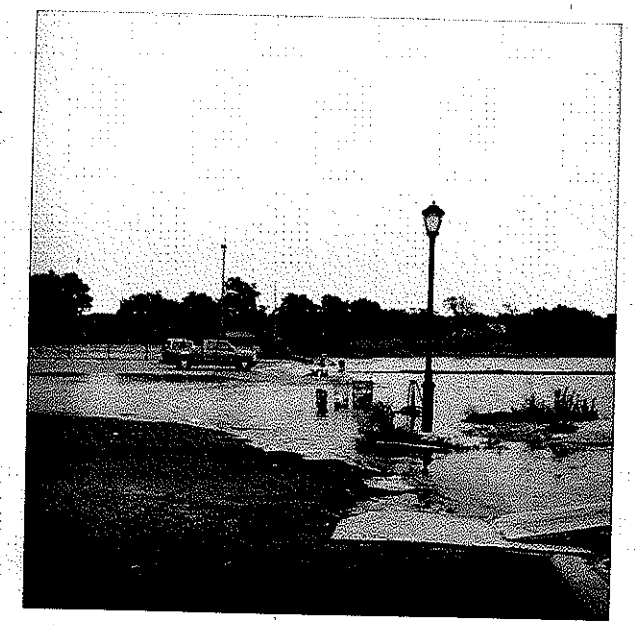
View of storm surge flooding along asphalt north of pier, showing restored east/west grassy shoreline along lagoon south of pier with no flooding, wooden perching posts later removed (facing southwest)



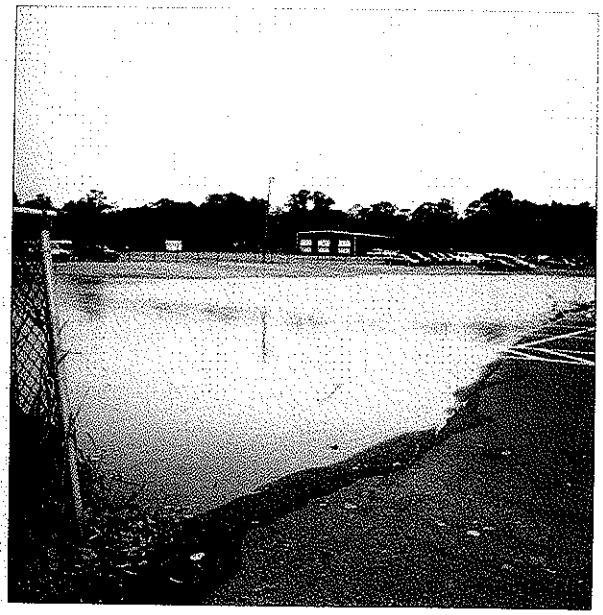
View of storm surge from pier at mouth of lagoon showing flooding (note blue truck for reference) (facing northwest)

View of storm surge from pier at mouth of lagoon showing restored grassy shoreline (natural foraging habitat) absorbing the storm surge. Even though stormwaters are within 6 feet of asphalt, the asphalt (rear boat ramp) is completely dry (facing west)

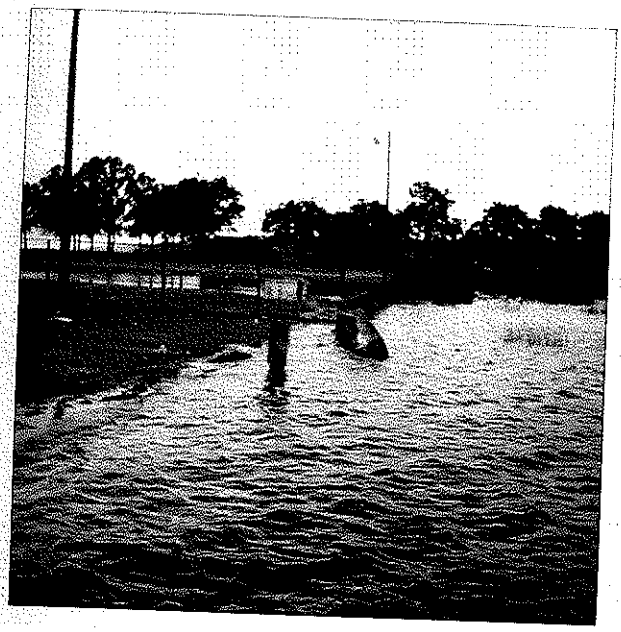
Photos of Storm Surge at High Tide 10/9/07 10:00-11:30am
(showing flooding over asphalt at base of central zone)



View of central area from mouth of lagoon showing storm surge flooding north and south of blue truck (facing north, from mouth of lagoon)



View of extent of storm surge westward into parking lot at base of central area at maximum flooding (facing south west, flood zone north of blue truck)



View of beginning of storm surge onto asphalt at base of central area (facing northwest from pier at mouth of lagoon)

View of storm surge as tide recedes at base of central area, showing preserve in background with flood waters indicating possible new perimeter for expanded restoration of grassy shoreline along surge zone to absorb floodwaters and provide natural foraging habitat instead of asphalt or concrete bulwarks (facing southeast)

MONITORING INFORMATION

Date of Monitoring	October 13, 2007
Time of Monitoring	Began: 5:15 pm Concluded: 5:45 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	62° Breezy
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/13/07

Species	Abundance	Location	Activity	Duration of Stay
10 Canada Geese				flyover n→s
2 starling		in ailanthus trees		
3 song sparrow		foraging in low grass		
1 tree sparrow		foraging in shrubbery		
2 swamp sparrow		foraging in shrubbery		
1 herring gull				flyover e→w
migration waning briskly as weather clears following huge rainstorm two days ago				

Notes: Control Area: 1 herring gull flyover e→w (then over lagoon marg in e→w)
1 swan in water
2 herring gulls on shore

Nearby: Peregrine aerie

Vegetation: in bloom: evening primrose/goldenrod

N.B. Man with extremely large dog parks SUV on grass by gazebo + releases dog to run free on nature trail. Signage stating "Nature Preserve" prohibiting dogs should be posted by gazebo facing parkinglot. Signage requiring pets on leashes should be posted near boat ramp. To discourage use of low grass foraging habitat as a dog waste area placing viewing benches facing lagoon would help convey the idea of a park

MONITORING INFORMATION

Date of Monitoring	October 15, 2007
Time of Monitoring	Began: 10:30 am Concluded: 11:30
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: about ½ tide Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	59° low cloud cover but clearing
Monitor(s) (name, affiliation)	A.W. CaFarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/15/07

Species	Abundance	Location	Activity	Duration of Stay
1 chipping sparrow		in shrubbery		
1 female towhee		low shrubbery,	chased off by sparrows	
28+ mixed sparrows		foraging in low and high grasses		
2 kingfishers		(are on each side of lagoon diving into water,		
		for fish from	pilings; very noisy contact calls;	
		when tide exposed pilings, one	perched on low	
		piling in center of lagoon to fish)		
3 purple finch		in bayberry bush		
4 song sparrows		high grass and low tree branches		
2 swamp sparrows		high grass and low tree branches		
hear bluejay		belt of trees west of lagoon		

N.B. grey squirrel foraging on ground under trees along tall grasses

Notes: Central Area: None

Nearby: on pilings opposite site (near vacated osprey nest) } 1 great blue heron, 1 great black backed gull, 1 cormorant

Vegetation: visible seeds: asters/goldenrod/black eyed susan/queen Anne's Lace

N.B: If there are birds making use of this area during migration season expanding the belt of trees and removing asphalt from the storm surge area to expand the natural foraging shoreline will increase migratory and resident bird use. Anecdotal evidence from fishermen report abundant peanut bunkers (eaten by birds) but few blue fish, very small red snappers only and striped bass almost absent; blue crabs under floating docks. Users anecdotally voice concern over removal of pilings and piers, and rumor that they will be replaced by a concrete seawall (adverse to fishermen, kayakers, and nature users) so asphalt surge zone can continue to be rented to car dealers.

MONITORING INFORMATION

Date of Monitoring October 24, 2007

Time of Monitoring
Began: 9:10 am
Concluded: 9:40

Tide
(please circle one)
High Tide / Ebbing / Low Tide / **Flooding**

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

very high tide (2 days before full moon) water up to asphalt.

Weather
(temperature, wind, precipitation) 60° Light rain / cold front caused a 10° drop in air temperature since 8 a.m; extremely windy all day yesterday as front approached

Monitor(s)
(name, affiliation) A.W. Cafarelli North Shore Audubon Society

Type of Monitoring
(please circle one)
Pre-Construction

As-built (4-5 weeks) during new excavation and site renovation

Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5

Parameters Measured
(please circle all that apply)
Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?
(please indicate station codes)
Yes / No

Video Monitoring Conducted?
(please provide brief description)
Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/24/07

Species	Abundance	Location	Activity	Duration of Stay
3 song sparrows		foraging in low grasses		
4 swamp sparows		foraging in low grasses and atop goldenrod stems		
2 white throated sparrows		low tree branches		
many other sparrows audible in tall grasses				
5 barn swallows				fly over w→e
1 phoebe		in low tree branches, chased away by sparrows		

Notes: Central area: 38 herring gulls resting near storm surge area on asphalt

Nearby: peregrine on central tower across from eyrie

2 great blue heron } on pilings where vacated osprey nest
1 black crowned night heron } is located on promontory

N.B: the site restoration of the summer remains incomplete. Severe soil compaction and residual gravel remain where construction materials were piled near the boathouse atop low grasses. This could have been a good migrating sparrow foraging area. Light pollution (from stoplight, "Walk/Don't Walk sign and vehicular lights) remains uncorrected. Still need to restore vegetative screen destroyed by construction vehicles during this summer's site restoration work.

MONITORING INFORMATION

Date of Monitoring	October 26, 2007
Time of Monitoring	Began: 5:30 pm Concluded: 4:30
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: full moon Nearest tidal station:
Weather (temperature, wind, precipitation)	57° breezy from northeast; complete cloud cover and misty but intervals without rain (ed Barres out to forage after the previous storm this a.m. and before the next predicted storm this p.m.
Monitor(s) (name, affiliation)	A.W. CaFarelli Ne
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and s.b. removal Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 10/26/09

Species	Abundance	Location	Activity	Duration of Stay
1 kingfisher		perched on piling by pier northern rim of site (later flew to wire over central area)		
2 myrtle warblers		in red cedar and phragmites		
2 song sparrows		foraging in low grass		
1 swamp sparrow		foraging in low grass		
Sparrows and other birds	audible	in tall grasses, keeping low due to storm		

Notes: Central Area juvenile great blue heron, great white egret 5 fishing from floating pier
2 herring gulls, sparrows and other birds audible in tall grasses

Nearby: peregrine eating prey on scaffolding between the towers (below eyrie)
11 cormorants on pilings opposite site (vacated osprey nest)
1 great black back gull on piling
6 great blue heron on E-W sandbar off promontory

N.B. Birds took cover here during storm to forage during migration. This is a very favorable indication that planned and volunteer plant material are providing an attractive habitat. There is plenty of food (fish, seed, berries) to support birdlife but the habitat disruption limits nesting. More seclusion (wider belt of trees, less asphalt and car activity) would encourage nesting.

MONITORING INFORMATION

Date of Monitoring	November 1, 2007
Time of Monitoring	Began: 10:00 am Concluded: 10:30
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	low cloud cover 63° light breeze from northeast (favorable to late migration activity
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 11/1/07

Species	Abundance	Location	Activity	Duration of Stay
several dozen sparrows (mixed species)		audible	in tall grasses and shrubbery	
1 blue jay		lands on split rail fence near gazebo, making red hawk mimic call, causing sparrows to fly from low grass into shrubbery		
1 flycatcher (species)*				
6 myrtle warblers			in bayberries and low shrubbery	
1 palm warbler			in high shrubbery	
1 song sparrow			in tall grasses	
1 mockingbird	perches atop red cedar in territorial display when blue jay arrives, but ignores presence of sparrows and warblers.			
1 field sparrow				

*It is possible this flycatcher may have been the vagrant western Kingbird that was lingering across the harbor by the Glen Cove inlet, but no verification possible.

Lagoon serves as protected terminus of est. W flyover route across Hempstead Harbor along central area. In considering habitat restoration, human approach closer than 50 yards to foraging area of grass and shrubbery frightens birds away. Optimal shoreline restoration would include pulling back the asphalt a minimum of 20 yards, planting more buffering vegetation and placing observation benches at that distance to regulate pedestrian and vehicular traffic.

1 cormorant diving

Notes: control area 1 great blue heron standing in shallow water

1 ring-bill gull standing on shore

Nearby: peregrine flies n→s from scaffolding below eyrie to join peregrine south end of power plant

N.B. Late migrants making impressive use of shoreline's restored natural foraging habitat. Bayberries are a good attractant for warblers. Addition of other kinds of early (serviceberries, cherries) mid (dogwood, spicebush, hercules club) and late (bayberry, crabapple, viburnum) fruiting trees and shrubs will help attract resting and possibly overwintering species to the area. This has been a mast year for acorns, so possibly oaks will sprout nearby. (pollinating insects attract birds, and acorn eating rodents attract hawks and owls).

MONITORING INFORMATION

Date of Monitoring	November 10, 2007
Time of Monitoring	Began: 1:40 pm Concluded: 2:00
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	57° light wind from SE
Monitor(s) (name, affiliation)	A. W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during row excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 11/10/07

Species	Abundance	Location	Activity	Duration of Stay
great blue heron				fly over w→e

Notes: Central Area great blue heron flies over restoration site w→e along shoreline, lands in shallow water adjacent floating pier near central area and preens.

MONITORING INFORMATION

Date of Monitoring	November 16, 2007
Time of Monitoring	Began: 4:30 pm Concluded: 4:50
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	43° very gusty winds sunset
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during row excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 11/16/07

Species	Abundance	Location	Activity	Duration of Stay
none				

Notes: Central Area 2 starlings flyover to flock listed below

Nearby thousands of starlings on lawn at entrance to parking lot

peregrine on scaffolding below eyrie

MONITORING INFORMATION

Date of Monitoring	November 26, 2007
Time of Monitoring	Began: 2:15 pm Concluded: 2:45
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	47° foggy (rain overnight, unusually foggy for midday)
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during row excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No see attached
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 11/26/07

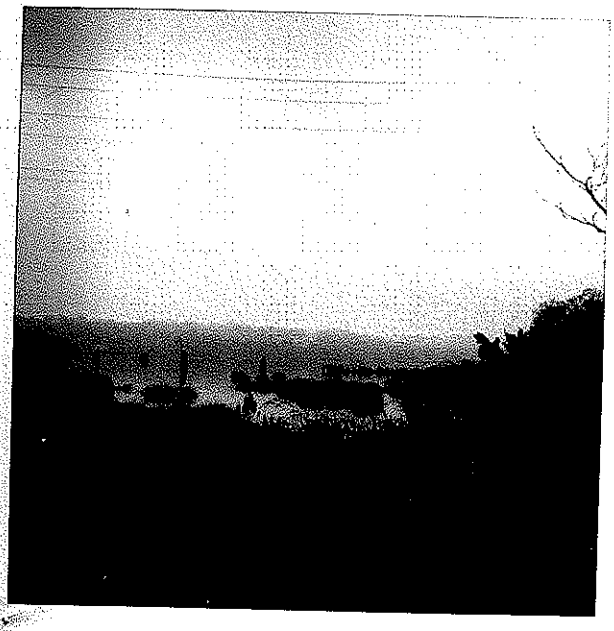
Species	Abundance	Location	Activity	Duration of Stay
flock of several dozen	starling		perched	on high tension wires

Notes: Central area: the 3 common terns circle area

Nearby: 2 song sparrows } eating bittersweet berries at entrance to parking lot
4 morning doves }
small flock (approximately a half dozen) juncos take flight (startled by car at entrance to parking lot.

Vegetation - crabapples are ripe, excellent flavor, although still uneaten by birds. First hard frost two days ago resulted in most of autumn leaves finally falling (about two-three weeks late)

Photos of lagoon in fog following migration season 11/26/07 2:30 pm
(showing habitat included restored shoreline grasses, resting and perching pilings, natural foraging areas, and narrow belt of trees inadequately screening road)



view from base of lagoon showing pilings used for resting and perching. Osprey rests located on second piling from left and at the extreme right of the closely spaced line of pilings leading to preserve promontory. Kingfisher's fishing perches located on center front piling in middle of lagoon and on piling with metal dowels just to left outside photo. Freshwater inlet is at base of lagoon beyond photo to right (facing east)

view from pier at mouth of lagoon showing restored grassy shoreline at right. Roadway and streetlight visible in background behind narrow belt of trees. Planting of American holly, native pines, and red cedar along road would provide more noise and light buffer. Freshwater inlet is at base of lagoon to right of electrical pole (facing east)

view from mouth of lagoon showing line of pilings leading to promontory of preserve and restored grassy shoreline (facing south)

View of central area, unrestored shoreline and crumbling asphalt due to storm surge flooding (facing north)

MONITORING INFORMATION

Date of Monitoring	December 5 2007
Time of Monitoring	Began: 12:15 Concluded: 12:30
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	35° low clouds (2 days after first snow)
Monitor(s) (name, affiliation)	A.W. Cafarelli North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION 12/1/07

Species	Abundance	Location	Activity	Duration of Stay
3 ringbill gulls			circling low	over lagoon
3				

Notes: control area 21 Canada geese

MONITORING INFORMATION

Date of Monitoring:	December 17, 2007
Time of Monitoring:	Began: 9:45 am Concluded: 10:15 am
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: very low tide (day after new moon) Time of tidal measurements: Nearest tidal station: north-south sandbar across from lagoon, perpendicular to central area very exposed
Weather (temperature, wind, precipitation)	30° clear very strong gusts from west (20 to 40mph) following severe ice storm overnight
Monitor(s) (name, affiliation)	A. W. Cafarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during new excavation and sole restoration * Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

*NB: crane offshore east of pier seems to indicate additional dredging project

MONITORING PARAMETERS: BIRD OBSERVATION 12/17/07

Species	Abundance	Location	Activity	Duration of Stay
12 mallards			stelling along margin of water at edge of lagoon, facing west but heads tucked back by wings	
48 canada geese				
5 canada geese			drinking water from inlet	
a few sparrows (species) audible in tall grasses				

N.B.: one set of deer tracks in snow moving E → W. (one set of deer tracks seen in the sand pits last June raised)

Notes:
control area: 4 mallards, 2 ring bill gulls } swimming along shore toward lagoon where other birds are sheltering

N.B. Bird activity in this area today provided insight into how this habitat is being used by birds. Despite expectation of seeing no activity, instead the presence of many birds using the site for its value as a windbreak as the high gusts blew over the high westward ridge (sand pits left from recessional moraine). Were there more visible shelter from the road (very exposed during winter) and were the floodlights surrounding the boathouse extinguished at night, the site might attract some of the more unusual ducks. Plantings of red cedar along the road would be a big help.

MONITORING INFORMATION

Date of Monitoring	December 24 2007
Time of Monitoring	Began: 8:30 Concluded: 8:50
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	40° w/last night gusty (40 mph winds) cold front caused temperature drop from yesterdays 58° weather
Monitor(s) (name, affiliation)	A.W. Cabarelli North Shore Audubon Society
Type of Monitoring: (please circle one)	Pre-Construction As-built (4-5 weeks) during row excavation and site restoration Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

*N.B. crane off-shore east of pier seems to indicate additional dredging project

MONITORING PARAMETERS: BIRD OBSERVATION 12/24/07

Species	Abundance	Location	Activity	Duration of Stay
Kingfisher		perched on iron rod projecting from pilings, preening and diving into lagoon area		
4 common merganser		diving along shoreline		
2 canada geese		drinking water from inlet		

Notes: N.B. squirrel eating red crabapples.
somewhat surprising not to see more birds foraging in crabapple as the flavor is exceptional and there have been enough very hard frosts to render crabapples elsewhere palatable to robins, woodpeckers, cedar waxwings, and other birds. Possibly attributable to insufficient shelter from roadways during winter. Near lagoon roadway curves in too close; more southerly parts of preserve are sheltered by a wider belt of trees. Situation can be ameliorated by planting evergreens (such as American holly, native pines and red cedar)

Nearby: Peregrine on eyrie
1 great black back gull on piling at mouth of lagoon
Control: empty

MONITORING INFORMATION

Date of Monitoring	December 31, 2007
Time of Monitoring	Began: 12:00 noon Concluded: 12:20 pm
Tide (please circle one)	High Tide / Ebbing / Low Tide / **Flooding** Predicted low and high tides: Time of tidal measurements: Nearest tidal station:
Weather (temperature, wind, precipitation)	46° clear sky, windy from west 20mph gusts
Monitor(s) (name, affiliation)	A.W. Cafarelli, North Shore Audubon Society
Type of Monitoring (please circle one)	Pre-Construction As-built (4-5 weeks) during raw excavation and site renovation Annual Post-Construction: Year 1 / 2 / (3) / 4 / 5
Parameters Measured (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):
Photo Monitoring Conducted? (please indicate station codes)	Yes / No
Video Monitoring Conducted? (please provide brief description)	Yes / No

NITORING PARAMETERS: BIRD OBSERVATION 12/31/07

Species	Abundance	Location	Activity	Duration of Stay
5 Canada geese		walking from asphalt down boat		ramp to mouth of lagoon
Kingfisher		on metal dowel on piling at mouth of lagoon		

Notes: Nearby: peregrine hunting from eyrie flushes flush of pigeons, catches none and returns to nest after flying south and then north of perch.

Control area: 4 pigeons flushed by peregrine fly e→w across control area and land on asphalt.

N.B no crabapples, bayberries, or juniper berries left.

APPENDIX E
NOAA PRE-RESTORATION MONITORING DATA

NOAA 2002 Pre-Restoration Monitoring Data

Restoration Site

Vegetative Cover (percent)

Species																																														Average
	Transect 1						Transect 2							Transect 3					Transect 4								Transect 5						Transect 6							Transect 7						
Plants	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q1	Q2	Q3	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q1	Q2	Q3	Q4	Q5	Q6	(square meter)
Spartina alterniflora	0	0	1	90	90	40	0	0	0	35	18	0	0.5	0	85	20	0	0	0	0	0	0	0	0	0	60	0	0	65	45	55	40	0	0	0	85	80	3.5	25	0	0	80	60	35	0.5	22.5%
Phragmites australis	37	7	0	0	0	0	45	0	1	0	0	0	0	7	0	0	0	0	15	20	30	20	25	5	37	0	5	100	0	0	0	0	100	100	70	0	0	0	0	15	15	0	0	0	0	14.5%
Iva frutescens	0	65	0	0	0	0	0	60	50	0	0	0	0	0	0	0	0	0	40	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.1%
Distichlis spicata	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	60	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.1%
Artemesia vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Limonium sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	47	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2%
Toxicodendron radicans	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.7%
Salicornia europa	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
																																													Total Plant Cover	46.6%

Invertebrates	Macroinvertebrate density (individuals per square meter)																																													(1/4 square meter)
Geukensia demissa	0	0	0	200	600	1500	0	0	0	0	180	140	10	0	0	120	15	69	0	0	0	0	0	0	1	150	0	0	54	67	40	78	0	0	0	5	67	42	92	0	0	0	39	105	1	19.9
Uca pugnax (burrows)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Nassarius obsoletus	0	0	0	0	0	0	0	0	0	0	90	240	410	0	0	240	130	312	0	0	0	0	0	0	0	0	0	0	87	400	100	420	0	0	0	15	120	31	60	0	0	0	218	352	128	18.6

NOTE: These transects are not the same as those used in the 5 year post-construction monitoring program.

Reference Site

Vegetative Cover (percent)

Species	Reference 1													Average
Plants	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	(square meter)
Spartina alterniflora	88	25	95	32	55	85	100	100	90	100	50	45	12	67.5%
Invertebrates	Macroinvertebrate density (individuals per square meter)													(1/4 square meter)
Geukensia demissa	320	19	600	38	0	0	1400	1180	1310	1620	177	0	5	128.3
Nassarius obsoletus	0	30	0	0	1300	0	0	1000	1860	0	172	0	0	83.9

The reference site is not the same as the reference site used in the 5 year post-construction monitoring program.

Spartina alterniflora height (first number is feet, second number is inches)

Restoration Site

T1	T1	T2	T2	T3	T3	T4	T5	T5	T5	T5	T6	T6	T6	T7	T7	T7	T7
Q4	Q5	Q4	Q5	Q2	Q3	Q8	Q3	Q4	Q5	Q6	Q4	Q5	Q7	Q3	Q4	Q5	Q6
4.5	4	4.8	5.10	6	2.5	3	2.1	5	4.6	2	4	4	3.3	5.4	6	5.3	2.3
4	3	3.11	5.9	4.5	3.25	3.5	2.5	6	2.5	1.5	3.1	2.65	2	4.9	5	4.3	4.4
4	2.5	6.4	4.11	2	1.5	6	2.2	4.6	2	3	4.2	6	3	5.3	5.3	6	
2	3	6	6.4	4.25	2.5	4	4	3	2.1	2.2	4.6	2.6	3.1	4.6	5.10	4.6	
3	3	6.1	6.6	5.5	3	6	3	2	3	2	4.5	6	2.5	4.7	5.5	4.11	
4.5	4	4.6	4.4	5	3	4.5	2.5	2.2	4.5	3	6	3	3	4.10	5.8	5.6	
5	4.5	3.10	3.8	5.5	3.25	5.75	2.3	2.4	3.1	3.1	6	1.5	3.5	4.7	5.10	5.6	
4	3.5	4.6	2.10	2.5	2.5	4	4.8	2.5	3	3.5	3.2	4.6	1	5.2	6.3	4.8	
5.5	3.5	3.9	5.4	6.1	2.25	6.25	5	3	3	4	4.3	4	3.2	4.5	6.3	5.4	
3	5	4.5	6.1	5	1.75	3.5	3.2	1.6	2.1	3.7	5	4.2	1.5	4.2	5.5	5.3	
4.5	5	4.5	1.8	6.25	2.75	5.5	6	3	3.5	3.8	3.1	4	1.8	4.8	5.7	5.4	
4	4.5	4.6	1.5	5.2	2	5	5.2	5.5	3.8	3.6	4.6	3.5	1.6	4.5	4.10	4.10	
4	3	3.11	1.6	5.75	2.5	5	5	3	3.2	4	6	4.6	1.8	5.5	5.2	4.9	
4	4	3.7	3.7	6.5	2	3.25	5.5	3	2.2	4.1	5.8	4.2	1.9	5.4	4.6	4.9	
3	4	3.3	2.2	5.5	1.5	5.75	6.1	6	3	4.2	4.2	4.1	2	6.10	5.3	5	
4.5	4	3.2	0.83	4.5	2.5	5.5							2.8	5.15	5.4	4.9	
4.5	5	3.2	1.4	6.5	1.75	3.5							3	5.1	5	4.10	
4	3.5	2.4	0.91	6.25	2.25	3.75							1.7	5.15	5	4.7	
5	3	3.2	0.83	6	3	4							6	5.15	5	4.7	
4.5	3	4	4.9	5.25	2.5	5.5							1.7	5.1	4.10	4.9	

Reference Site

R1	R1	R1	R1	R1	R1
Q1	Q3	Q5	Q7	Q9	Q11
4.3	4	4.4	4.1	6	4.5
5.8	4	3.10	5	6.7	4
4	4.2	4.3	6.7	5.6	5.5
3.6	4.7	3	5.1	6.3	5
4.11	4	4.1	6.3	5	4.4
3	3.11	4.4	5.6	6.5	5.5
2.5	3.6	4.6	6.3	4.1	4
5	4.5	4	6	6.4	4.7
3.7	3.10	3.10	6	6.1	4.9
4.6	4.5	6.1	5.10	3.7	4.2
4.5	4.5	3	5.4	6	4.10
3.4	4.2	4.1	5	5.3	4.10
3.4	4.4	4.6	4.8	4.7	3.5
4.7	3.10	3.4	5.3	5.11	6
3.6	3.2	4.8	4.6	5.1	4.11
3.10	3.5	3.7	3.6	4.7	5.1
4.10	4.11	3	6.2	6.2	4.4
4.5	3.7	4.8	5.3	5	5.5
4.3	4.4	4.3	4.2	6.4	4.11
	4.10	4.1	5.6	5.9	5.5

The reference site is not the same as the reference site used in the 5 year post-construction monitoring program.
Heights in bold font are flowering plants.