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COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

ENVIRONMENTAL ASSESSMENT FOR THE SEABROOK DUNE IMPROVEMENT PROJECT

Seabrook, New Hampshire

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Prepared For

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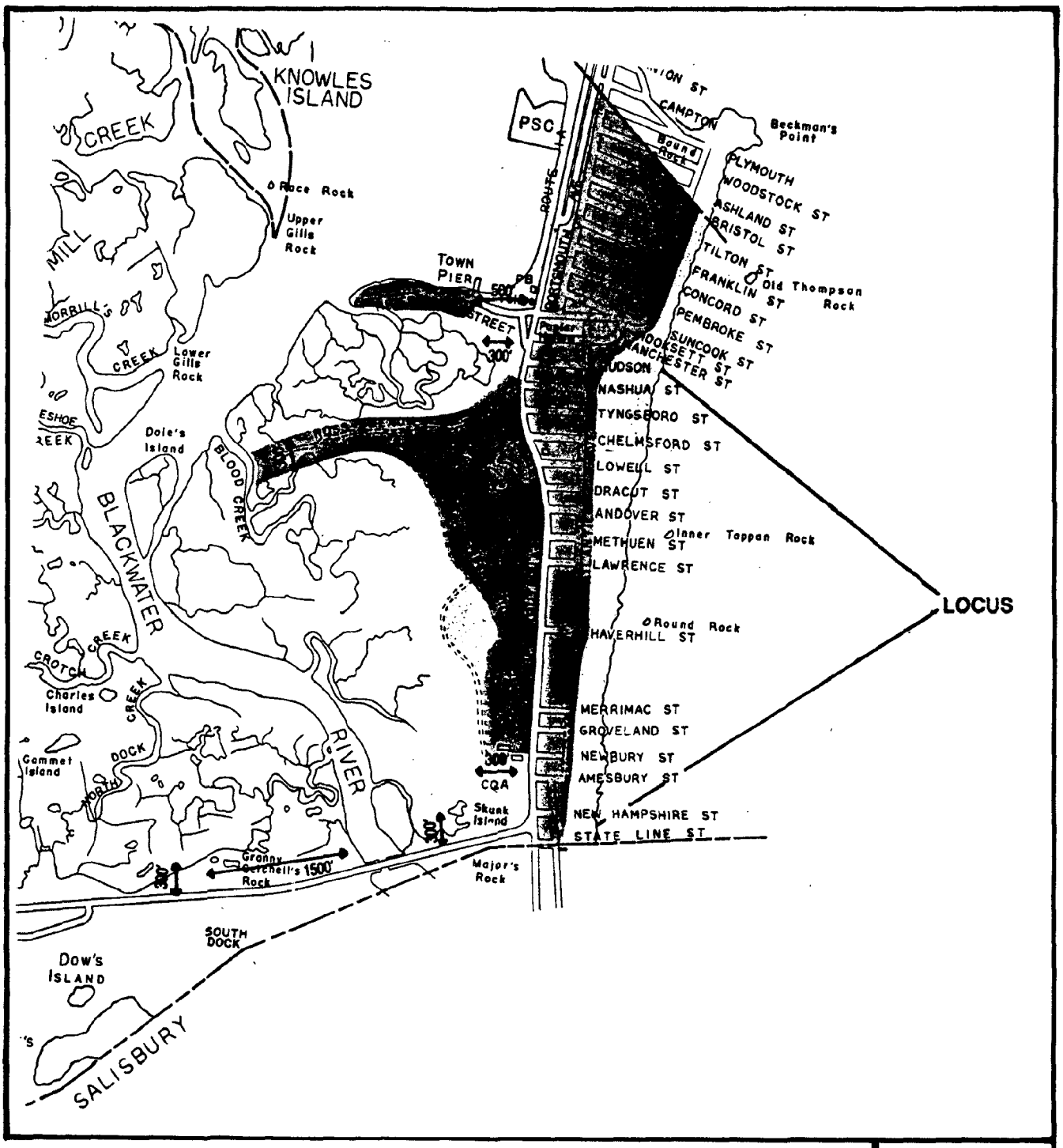

LOCUS MAP

SOURCE:TOWN ZONING MAP ,SEABROOK, NEW HAMPSHIRE

SCALE IN FEET

0 2000 4000 6000

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1.0 Introduction

1.1 Background

The Seabrook foredunes are one of three discreet sand dune areas remaining on the New Hampshire coast. These dunes are located within an approximate 5,400 ft. reach between State Line Street and Hooksett Street (Locus Map). Due to a meandering tidal inlet at Hampton Harbor to the north and varying sand supplies, these dunes have formed since the early 1900's as part of an accretional barrier spit system. The vertical and horizontal growth of the dunes provides for flood control and storm damage prevention which protects private and public property located further landward. Because these dunes have been badly eroded and degraded, their natural function capacity has been severely limited. Erosion and vegetation loss have been caused primarily by encroachment of adjacent beach users, and by pedestrian movement through these dunes at public access points leading to the beach.

1.2 Purpose

The purpose of this project is to identify measures to improve and restore the dunes where they have been eroded, damaged or not allowed to grow; to identify the availability, volume, and cost of materials; and, to develop a pedestrian circulation plan which includes specifications for walkway construction through the dunes. All measures, materials, and plans will be used or designed to be used for recreation purposes, as required by zoning.

The primary effort is focused on improving the beach access routes extending seaward from 14 public streetends. Improvement and restoration of degraded dunes between these extended street accessways is also part of the project. Dune form, volume, and vegetation are the primary characteristics necessary to protect the natural functional capacity of the foredunes.

1.3 Approach

A three-phase work plan was implemented to provide the Town with 1) planning and conceptual design, 2) preliminary engineering and environmental assessment and 3) final design. Meetings were conducted with the Conservation Commission and the Town Administrative Assistant. Field measurements and observations, ground photos, and discussions with beachgoers occurred during the summer of 1988. Existing aerial photos and topographic information were combined to provide four base maps at a scale of 1" = 50'. Construction materials, sources, and costs for access routes, dune protection, waste disposal, and signage are documented in the environmental assessment narrative and, to the extent necessary, provided on the project plans. Construction priorities (i.e., high, moderate, and low) are proposed to allow the Town flexibility in completing the project within its financial ability.

2.0 Existing Conditions

2.1 General Description

The Seabrook foredunes are located seaward of and parallel to U.S. Route 1A (between State Line Street and Haverhill Street) and Atlantic Avenue (between Haverhill Street and Hudson Street). Private ownership seaward of the street-ends off Route 1A and Atlantic Avenue is limited to a zone of single house lots approximately 100' deep. A total of over 60 lots define this zone as developed with residential dwellings, pools, garages, and

landscaping features which have modified the dune environment. It is the area between these properties and the beach which is owned by the Town of Seabrook and is in need of improvements. In general, the land between the privately-owned properties that provides an entry to the dunes from the street-ends no longer exhibit the surficial characteristics (e.g., sediment and vegetation) of the natural dune. The predicted 100-year storm elevations for this stretch of dunes is 14' NGVD as mapped by the Federal Emergency Management Agency in August 1985.

In general the dunes north of State Line Street become wider, higher, more stable, and less used for beach access. The dunes are generally composed of a single swale and ridge system. Nearby residents have paid for construction and have placed different access structures along the public access ways; however, these are temporary and deterioration of the dunes continues.

The dominant vegetative species throughout the foredune swale and ridge system is American beachgrass (Ammophila brevigulata, dom.). Other species observed in the swales include beach heather (Hudsonia tomentosa) and seaside golden rod (Solidago sempervirens). Beach pea (Lathyrns maritimus), poison ivy (Rhus radicans), daisy miller (Artemisia stelleriana), and salt-spray rose (Rosa rugosa) were observed within the dune ridge. No wildlife was observed in the dune system during four, summer, daytime site visits. Within the northern most 2200 feet of dune from Lawrence to Hooksett Streets, dune toe areas ranging from 30 ft to 65 feet exhibit newly established stands of American beachgrass.

The predominant cause of dune destruction is pedestrian traffic accessing the beach. In addition, numerous recreational and aesthetic uses conflict with proper dune management. These include artificial cuts for views of the ocean from dwellings, cleared and flattened pathways and areas for boat storage, volleyball courts, sitting and lying areas protected from the wind and cookout areas.

2.2 Street-end Accessways

Public access to the beach in Seabrook is provided in areas extending seaward from some 14 public streets (see Locus Map) listed as follows:

1. New Hampshire
2. Amesbury
3. Newbury
4. Groveland
5. Haverhill
6. Lawrence
7. Methuen
8. Andover
9. Dracut
10. Lowell
11. Chelmsford
12. Tyngsboro
13. Nashua
14. Hudson

Hooksett Street, located north of Hudson Street is an additional public access, but was not included in this project. In addition to pedestrian use, vehicular use is allowed by deed only at Haverhill Street. New Hampshire Street is currently used by town-owned vehicles for beach trash pick-up in lieu of State Line Street. Evidence of small off-road vehicles was also observed at several other streetends.

Specific measurements (i.e., profiles) of the existing topography along the street-end accessways were taken in June 1988. Distances and elevational changes were recorded starting at the street-ends and finishing at the low-tide water line (Table 1). Four distinct

zones along each profile were determined (i.e., entry, dune swale, dune ridge, and beach) in order to differentiate between potential walkway treatments.

The dune swale and ridge system ranges between 200 ft. from street-ends to the beach and 525 ft. in width at Newbury and Nashua Streets, respectively. The crests of these dunes range between 4.1 ft. and 8.3 ft. above the street elevations with extremes of 1.5 ft. and 10.8 ft. at Haverhill and Andover Streets, respectively (Table 2). The distances from the dune crest to the summer berm varied from 150 ft. to 275 ft.

Each profile is graphically represented in Appendix A to show the variation in topography from the entry to the beach. Superimposed on the profile in a lighter-weight line is the adjacent grade to demonstrate how much of a cut presently exists in the dune. This information was used to calculate the amount of fill necessary to improve the integrity (e.g., form and volume) of the dune.

3.0 Proposed Project

3.1 General Description

Improvements to the Seabrook dunes are necessary to address a number of related concerns including access and dune protection. These include the introduction of sand to be used as fill material, salt-tolerant vegetation, walkway structures, fencing, signage, and the potential of ancillary features to provide additional dune protection and pedestrian comfort. The locations of accessways and areas proposed for fill and vegetation are shown on plans developed by Wright-Pierce Engineers. Fill and vegetation areas are differentiated between those associated with public access and those impacted from private intervention. Typical details, cross-sections, and plan views are also included on the plans. A general description of each improvement measure/feature is provided below.

Sand:

Sand to be used as fill material is the singlemost important feature of any dune improvement program. The form and volume of a foredune is critical for flood control and sediment supply for eroding beaches and should be restored so that equal protection is provided across the entire foredune ridge. Although the existing foredune is composed of fine wind-blown sand, a medium-sized sand is present in and around the accessway cuts through the ridge. For fill purposes, the sand should be washed (e.g., clean of silt and clay fractions) and can vary between the fine- and medium-sized fractions. Volumes calculated for each street accessway are tabulated (Table 3) and totals approximately 13,000 cubic yards. An additional 10,000 cubic yards is required for cuts located between the street accessways (Table 5).

Potential sources for sand fill were identified outside of the project area. Existing beach and dune sand is not recommended for use in this project. Sand and gravel companies can provide fill material and provide it by truck. The sand could be off loaded in the entry of each street and smaller loaders or trucks would place the sand starting at the dune toe and finishing in the dune swale. The cost for sand is approximately $5.00 per cubic yard, delivered, resulting in a total project cost of approximately $115,000.

Another source of sand could be dredged material from Hampton Harbor. Possible disposal methods could include direct hydraulic pumping to the dunes, creating a spoil area on land and trucking it to the site or carrying the sand to the vicinity by barge and off loading it to

the beach for additional handling by trucks/loaders. A Corps of Engineer 404 Permit (#11-78-557) was issued in 1978 and subsequently used in the spring of 1979 and 1987 for the dredging of approximately 75,000 cubic yards, of which 25,000 cubic yards were satisfactory for beach nourishment. The Conservation Commission would be the most likely agent for pursuing this alternative.

Vegetation

Salt-tolerant vegetation is critical to a dune improvement program for the purposes of stabilization and increased sand-trapping. American beachgrass is the most common species used for replanting dunes and is commercially available. Typically, there are three stems to a culm and 100 culms in a bundle. Approximately 66,800 culms (Table 4) and 22,000 culms (Table 5) have been calculated for the street accessways and areas in between, respectively. The total project need is approximately 888 bundles. At a rate of $20.00 per bundle the total cost would be $17,760 for materials.

Planting methods for the beachgrass culms consist of the following:

1. Space the culms 12-24 inches apart (18 inches is preferable).
2. Plant at a depth of 6-8 inches.
3. Plant between November 15 and April 15.
4. Fertilize with granular 10-10-10 or preferably three parts nitrogen to one part phosphorus.
5. Apply 80 pounds of nitrogen and 25 pounds of phosphorus per acre in the early spring. A first-year application is adequate.

Alternatives to purchasing beachgrass would be transplanting existing grasses from the dune toe to ridge and swale areas or harvesting seeds from existing plants and sidecasting them. Each alternative would be more labor intensive and the rate of success for growth from seeds is unknown.

Access Structures

Various construction materials and designs for walkways from the street-ends to the beach are proposed. To be consistent with existing efforts, concrete patio blocks are proposed in the entry sections of the street accessways (see plan detail). These areas have firm, gravelly soils and are not subject to wind erosion.

At grade pressure-treated wood walkways connected by galvanized cable, similar to that at State Line Street and preferred by the Conservation Commission, are proposed for a majority of the accessways through the swale and ridge environments. The weight of these walkways will prevent them from shifting throughout the year, yet they can be lifted to adjust to any changing form of the dune. They may be constructed in place but must be installed after the fill has been provided. They are four feet wide for pedestrian use and eight feet wide for vehicles at Haverhill Street.

Elevated wood access is proposed at two locations (Amesbury and Lawrence Streets) for the purpose of allowing possible construction over existing vegetation and providing a view of the beach and dune environment. Elevated observation decks are also proposed for these sites and for Tyngsboro Street to provide resting and viewing use. Two to three feet of separation between the walkway or deck and the grade must be allowed to permit growth of dune vegetation.

At-grade wooden planks are proposed for the dune toe areas north of Lawrence Street which may be prone to damage from winter storms. These lighter structures also connected by galvanized cables could be removed during the winter at the same time trash cans are now removed. While cutting of the dune is not a problem in these areas at the present time, it may be in the future if dune growth continues. In addition, a complete access link from the dune ridge to the beach is maintained.

Fencing

Protection of newly planted grasses, establishment of pedestrian circulation patterns, and potential dune sand accumulation are the primary reasons for proposed sand fencing. Approximately 2,000 linear feet of fencing is proposed seaward of the dune ridge in conjunction with the planting and walkway schemes. Proposed materials consist of wood-slat-and-wire and metal fence posts. The estimated cost is $1,030.00 for 2,000 linear feet.

An alternative material for the sand fence is a high modulus polymer "Tensar" structure. Some advantages over the wood-slat-and-wire are: it will not rust, rot, or corrode; has five times the service life; has one-fourth the weight; have one-fifth the rolled diameter; and won't be broken up for firewood. The estimated cost is slightly higher than the other wood-slat fence.

Ancillary Features

Several features are proposed to further protect the dunes and provide comfort to the beachgoer. Signs to identify beach access points for the handicapped and to keep off the dunes will be provided at appropriate locations. Existing trash cans will be placed on removable at-grade wooden platforms. Additional features at the entry to each accessway which may be appropriate and include split-rail fencing to confine the entrance for pedestrians only, as well as, park benches and shade trees for relief on sunny days after long walks to and from the beach. (Table 7).

3.2 Street-end Accessways

Specific recommendations and measurements for access features are listed by street in Table 6. This information was used to project the cost of materials for each access and the project total including sand fill, grass, and fencing (Table 9). A list of vendors is included in Appendix B as sources for materials outlined in this report.

Based on field data and observations, a priority list for dune improvements was compiled for the streets within the project area (Table 8). Factors considered include: 1) the overall distance to the beach, noting a higher need for sand fill and planting to protect facilities in close proximity to the ocean; 2) dune length, noting a need to protect narrow dune swale and ridge areas; and, 3) dune height, noting a need to protect low ridge or extreme cuts in the dune. Beach use was considered to a limited extent (i.e., no specific counts were made) so that walkway priorities could also be suggested. It was determined that construction priorities for the walkways would be consistent with the final ratings for dune improvements.

A three-year program of dune improvement and walkway construction conducted on a street-by-street basis would result in the following:

	Street		Material Cost
Year 1	New Hampshire		$4,054.00
	Newbury		2,544.26
	Groveland		3,198.01
	Lawrence		5,586.50
		Subtotal	$15,382.77
Year 2	Amesbury		$ 6,882.00
	Haverhill		31,922.54
	Methuen		3,755.25
	Andover		5,398.34
	Lowell		6,997.61
		Subtotal	$54,955.74
Year 3	Dracut		$ 4,676.06
	Chelmsford		12,215.86
	Tyngsboro		12,468.77
	Nashua		13,049.88
	Hudson		9,479.75
		Subtotal	$51,890.32

Another strategy would be to first restore and improve the dune stability and integrity and then construct walkway structures. By separating the project in this manner, costs would break down into those for dune improvements and for walkway structures.

4.0 Impact Assessment

Anticipated impacts of the proposed project were evaluated on the basis of various public interest factors used by the U.S. Army Corps of Engineers. The following checklist summarizes the anticipated impacts of the proposed project. On weighing the various factors, the net environmental effects are considered to be positive.

4.1 Effects on Public Interest Factors:

CODE: **+ (Beneficial)** **- (Adverse)** **(0 Negligible Effect)**

0	Water Quality	0	Drainage
+	Flooding	+	Circulation Patterns
0	Economics	+	Erosion/Accretion
-	Aesthetics	0	Land Use Classification
0	Wildlife	0	Energy Needs
0	Finfish/Plankton	0	Air Quality
0	Food and Fiber Production	0	Noise
+	Floodplain Values	0	Safety

- 0 General Environmental Concerns
- 0 Property Ownership
- 0 Needs and Welfare of the People
- 0 Benthic Flora & Fauna
- 0 Water Supply and Conservation
- 0 Historical
- 0 Wetlands
- 0 Navigation
- + Recreation
- 0 Mineral Needs
- 0 Other

4.2 Evaluation of Affected Public Interest Factors

Factor	Anticipated Effect (Beneficial +; Adverse -)	Comment
Flooding	+	Dune form, volume, and vegetative stability will improve the flood control function.
Aesthetics	-	Existing and created waterviews will be lost for certain landowners.
Floodplain Values	+	Physical improvements as well as educational signs to keep off dunes will enhance natural values.
Circulation Patterns	+	Pedestrian and vehicular traffic will be controlled and enhanced with wooden structures.
Erosion/Accretion	+	Additional sand fill and grasses will increase the ability of the dune to provide sediment to eroding beaches.

5.0 Permit Requirements

The New Hampshire Coastal Program under the New Hampshire Department of Environmental Services and the New Hampshire Office of State Planning have jurisdictional control over activities in the Seabrook Sand Dunes. Any activity, even improvements, must be permitted prior to the commencement of work. (RSA: 483-A).

A sample Dredge and Fill Permit Application with appropriate enclosures is included in Appendix C. This application should be fully completed and sent to:

Delbert Downing, Chairman
New Hampshire Wetland Board
P. O. Box 2008
Concord, New Hampshire 03303-2008

Office of State Planning
2 1/2 Beacon Street
Concord, New Hampshire 03301

Table 1

APPROXIMATE LENGTHS (IN FEET) OF ACCESS SEGMENTS

	Street	Entry	Dune Swale	Dune Ridge	Upper Beach	Total
1.	New Hampshire	100	---	150	50	300
2.	Amesbury	75	50	175	25	325
3.	Newbury	---	25	150	25	200
4.	Groveland	---	50	150	25	225
5.	Haverhill	100	75	150	25	350
6.	Lawrence	100	25	100	50	275
7.	Methuen	125	50	150	25	350
8.	Andover	125	50	200	25	400
9.	Dracut	150	75	175	25	425
10.	Lowell	100	100	200	25	425
11.	Chelmsford	125	125	225	---	475
12.	Tyngsboro	100	150	250	---	500
13.	Nashua	100	100	275	50	525
14.	Hudson	50	150	200	25	425

Table 2

FLOOD CONTROL CHARACTERISTICS OF EXISTING AND PROPOSED DUNES

Street	Dune Height (ft) Existing	Dune Height (ft) Proposed	Distance (ft) from Crest to Berm Existing	Distance (ft) from Crest to Berm Proposed
1. New Hampshire	3.9	7.4	150	175
2. Amesbury	7.1	10.9	150	150
3. Newbury	5.9	7.7	200	175
4. Groveland	8.8	12.1	200	200
5. Haverhill	1.5	16.5	150	175
6. Lawrence	3.3	7.8	200	175
7. Methuen	7.9	11.2	150	125
8. Andover	10.8	13.1	150	150
9. Dracut	8.8	11.2	175	150
10. Lowell	5.1	8.9	217	142
11. Chelmsford	5.7	10.0	200	175
12. Tyngsboro	6.5	10.4	150	150
13. Nashua	7.8	9.7	275	225
14. Hudson	7.4	11.8	225	150

SUMMARY

Crest/ Berm	#	Dune Heights Avg. Existing	Dune Heights Avg. Proposed	Change
<150	(2)	6.5	10.2	+3.7
150	(5)	7.5	11.5	+4
175	(5)	4.1	9.9	+5.8
>200	(2)	8.3	10.9	+2.6

Table 3

APPROXIMATE FILL VOLUMES

	Street	Swale Fill (ft^3)	Dune Fill (ft^3)	Total Fill (ft^3)	Cubic Yards
1.	New Hampshire	---	10,255	10,255	380
2.	Amesbury	---	18,823	18,823	697
3.	Newbury	---	2,645	2,645	98
4.	Groveland	---	3,882	3,882	144
5.	Haverhill	---	132,937	132,937	4,924
6.	Lawrence	---	4,775	4,775	177
7.	Methuen	---	2,028	2,028	75
8.	Andover	---	9,693	9,693	359
9.	Dracut	---	3,909	3,909	145
10.	Lowell	---	10,077	10,077	373
11.	Chelmsford	17,872	18,021	35,893	1,329
12.	Tyngsboro	19,921	16,428	36,349	1,346
13.	Nashua	32,065	3,611	39,676	1,469
14.	Hudson	23,555	16,291	39,846	1,476

Total Yards = 12,992 x $5/yard = $64,961

Table 4

APPROXIMATE AREA PROPOSED FOR REVEGETATION ALONG EACH STREET ACCESS INCLUDING ADJACENT DUNE TOE AREAS

	Street	Acreage	Square Feet	x(.45) = Culms
1.	New Hampshire	.1806	7,867	3,540
2.	Amesbury	.2784	12,127	5,640
3.	Newbury	.0756	3,293	1,480
4.	Groveland	.1573	6,852	3,080
5.	Haverhill	.4813	20,965	9,430
6.	Lawrence	.1503	6,547	2,950
7.	Methuen	.1337	5,824	2,620
8.	Andover	.1346	5,863	2,640
9.	Dracut	.2310	10,062	4,530
10.	Lowell	.2955	12,872	5,790
11.	Chelmsford	.4341	18,909	8,510
12.	Tyngsboro	.3327	14,492	6,520
13.	Nashua	.2990	13,024	5,860
14.	Hudson	.2242	9,766	4,395
	Total	3.4083	148,465	66,810

Table 5

APPROXIMATE FILL VOLUMES AND REVEGETATION AREAS FOR BEACHES AT PRIVATELY CREATED ACCESS POINTS

Location*	Sand Fill (Cu. Yards)	Grass Plantings (Sq. Feet)	No. Culms X(.45)
A	1,389	2,500	1,125
B	1,259	4,250	1,913
C	185	1,000	450
D	163	1,100	495
E	-----	1,000	450
F	148	800	360
G	-----	2,250	1,013
H	90	696	313
I	84	760	342
J	41	368	166
K	1,778	6,000	2,700
L	41	-----	-----
M	-----	1,800	810
N	856	7,700	3,465
O	1,926	6,500	2,925
P	1,102	4,250	1,913
Q	267	1,800	810
R	-----	1,300	585
S	100	900	405
T	600	3,240	1,458
U	-----	600	270
TOTAL:	**10,029**	**48,814**	**21,968**

*See plans for exact location relative to street accessways.

Table 6

ACCURATE MEASUREMENTS IN FEET AND RECOMMENDED ACCESS FEATURES

	Street	Entry		Dune Swale/Ridge		Dune Toe		
1.	New Hampshire	90	E	150	B*		X	
2.	Amesbury	88	E	192	EW, OD		X	
3.	Newbury	---	---	156	B		X	
4.	Groveland	19	PB	176	B		X	
5.	Haverhill	---	---	274	B*		X	
6.	Lawrence	90	PB	200	EW, OD	28	WP,	X
7.	Methuen	90	PB	225	B	56	WP,	X
8.	Andover	126	PB	234	B	28	WP,	X
9.	Dracut	167	PB	196	B	50	WP,	X
10.	Lowell	100	PB	291	B	50	WP,	X
11.	Chelmsford	100	PB	316	B, OD	60	WP,	X
12.	Tyngsboro	100	PB	362	B	58	WP,	X
13.	Nashua	62	PB	438	B	60	WP,	X
14.	Hudson	---	---	100	B	62	WP,	X

B = Boardwalk
EW = Elevated Walkway
OD = Observation Deck
* = 8 feet wide
-- = not in existence

E = Existing Gravel
PB = Patio Block
WP = Wooden Planks
x = platform for trashcan

Table 7

ANCILLARY ACCESS TREATMENT FOR ADDED DUNE PROTECTION AND PEDESTRIAN COMFORT

	Split Rail Fence	Shade Trees	Park Bench
New Hampshire	X		
Amesbury	X		
Newbury	X		
Groveland	X		
Lawrence	X		
Methuen		X	X
Andover			X
Dracut	X	X	X
Chelmsford	X	X	X
Tyngsboro	X	X	X
Nashua	X	X	X

Table 8

RESTORATION PRIORITIES BASED ON THREE CRITERIA

	Street	Overall Distance	Dune Length	Dune Height	Veg. Cover*	Final Rating
1.	New Hampshire	H	H	H	M	H
2.	Amesbury	H	M	M	H	M
3.	Newbury	H	H	H	L	H
4.	Groveland	H	H	L	L	H
5.	Haverhill	M	M	H	H	M
6.	Lawrence	H	H	H	L	H
7.	Methuen	M	H	L	L	M
8.	Andover	M	M	L	L	M
9.	Dracut	L	M	L	H	L
10.	Lowell	L	M	H	H	M
11.	Chelmsford	L	L	H	H	L
12.	Tyngsboro	L	L	M	H	L
13.	Nashua	L	L	L	H	L
14.	Hudson	L	L	M	M	L

H = High **M = Moderate** **L = Low**

*Excluded from final rating

Table 9

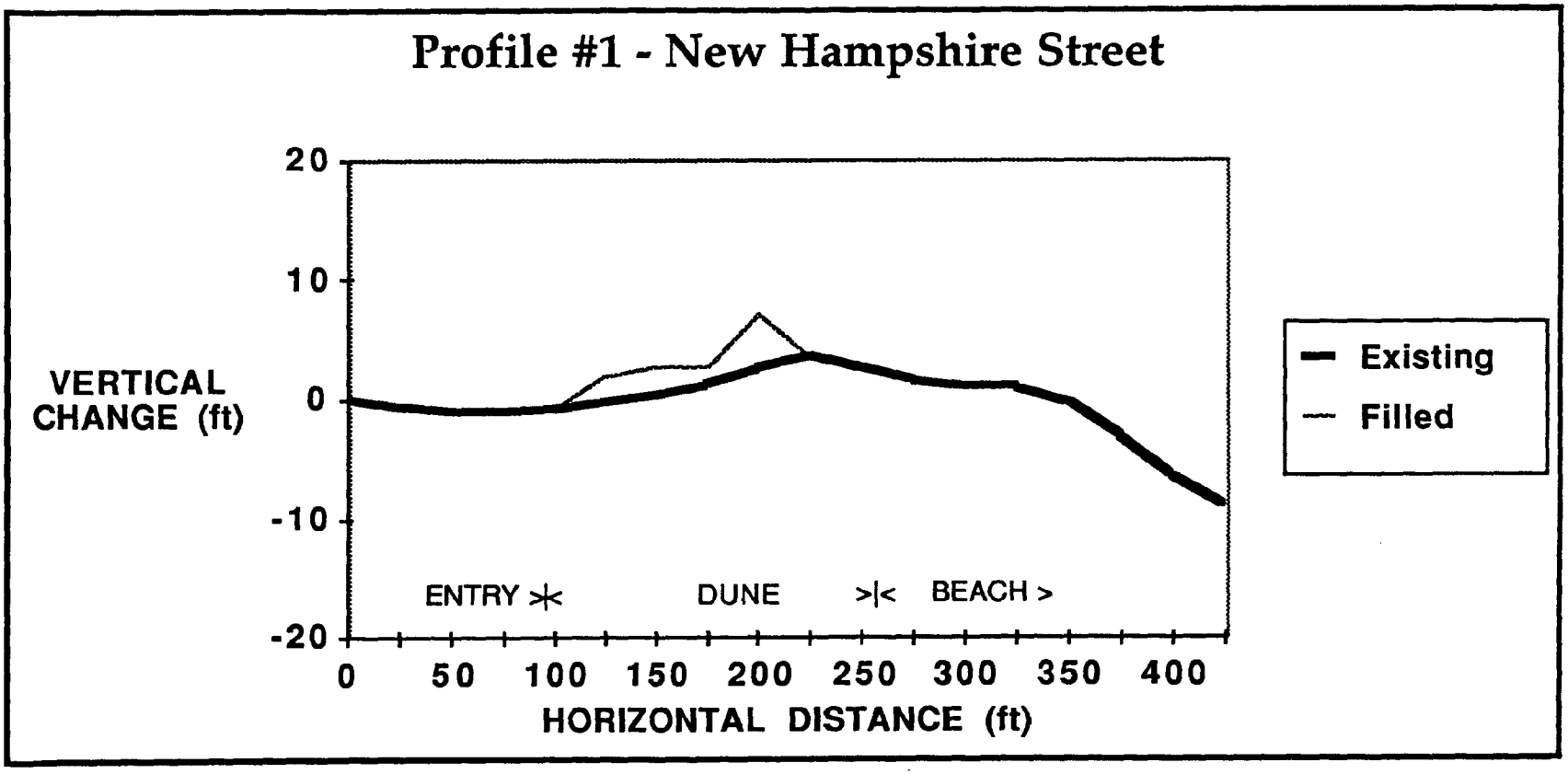
ESTIMATED COSTS OF MATERIALS FOR EACH STREET-END ACCESSWAY

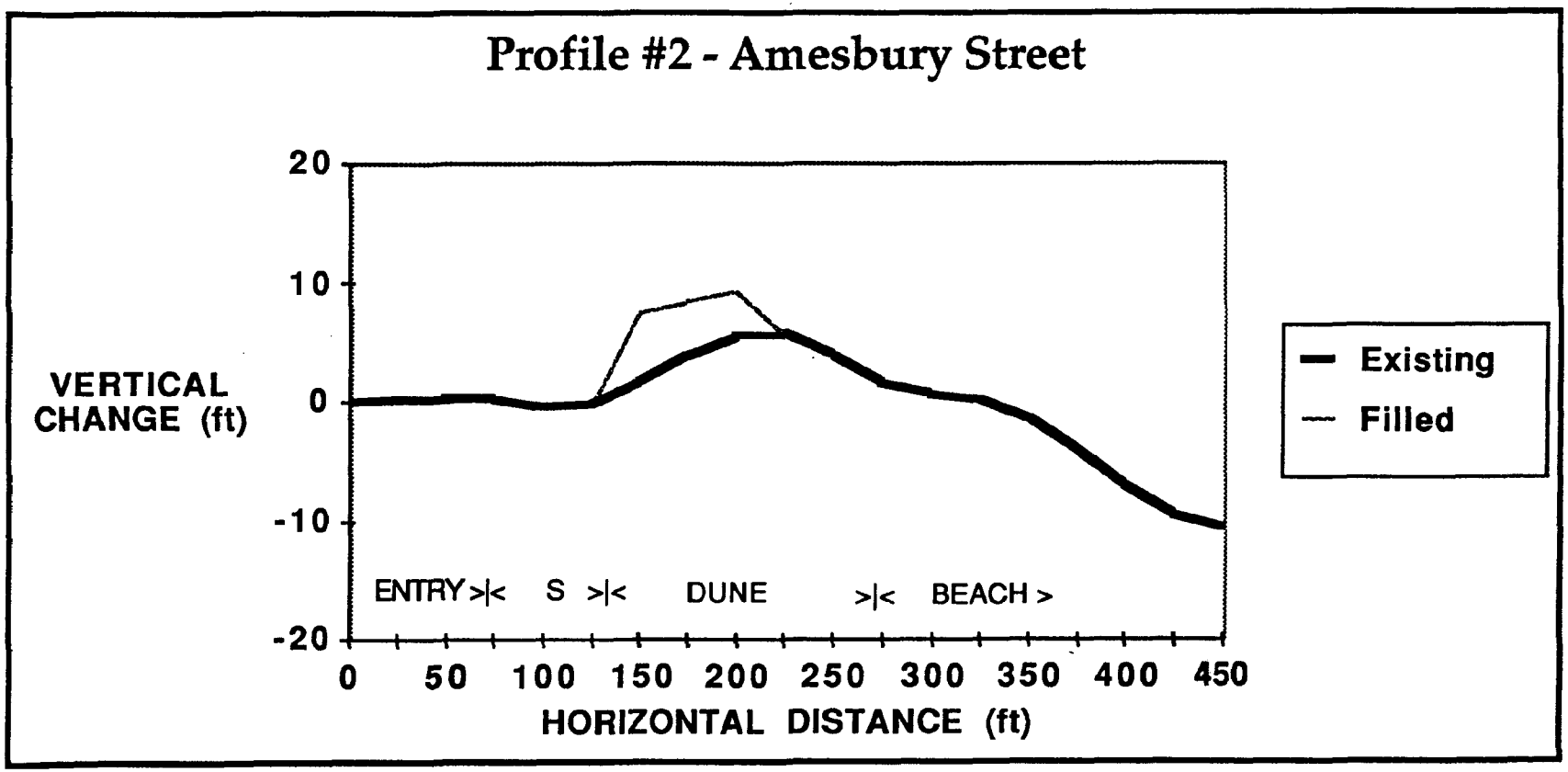
Street	Sand	Grass	Entry	Swale/Ridge	Toe	Total
New Hampshire	1,900	885	------	1,269	---	4,054
Amesbury	3,485	1,477	------	1,920	---	6,882
Newbury	490	735	------	1,320	---	2,545
Groveland	720	871	118	1,489	---	3,198
Haverhill	24,620	4,985	-----	2,318	---	31,923
Lawrence	885	2,073	558	2,000	70	5,586
Methuen	375	779	558	1,904	140	3,756
Andover	1,795	772	781	1,980	70	5,398
Dracut	725	1,133	1,036	1,658	125	4,677
Lowell	1,865	1,926	620	2,462	150	7,023
Chelmsford	6,645	2,128	620	2,673	150	12,216
Tyngsboro	6,730	1,911	620	2,673	150	12,084
Nashua	7,345	1,465	384	3,706	150	13,050
Hudson	7,380	1,099	--------	846	155	9,480
TOTAL	**$64,960**	**$22,239**	**$5,295**	**$28,218**	**$1,160**	**$123,175***

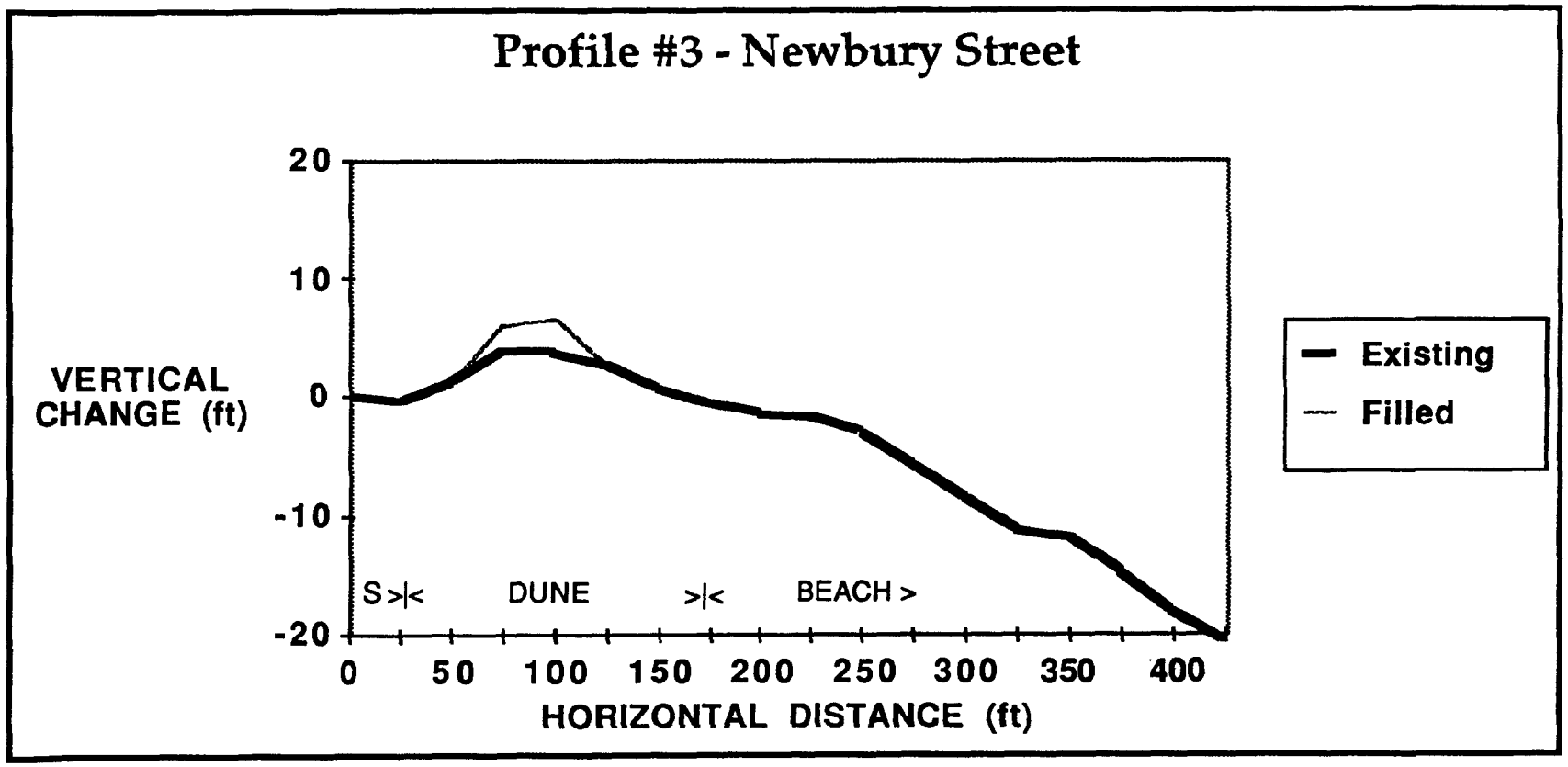
***Includes $273 for observation decks and $1,030 for sand fencing. Add $50,000 to include 10,000 cubic yards of sand per Table 5.**

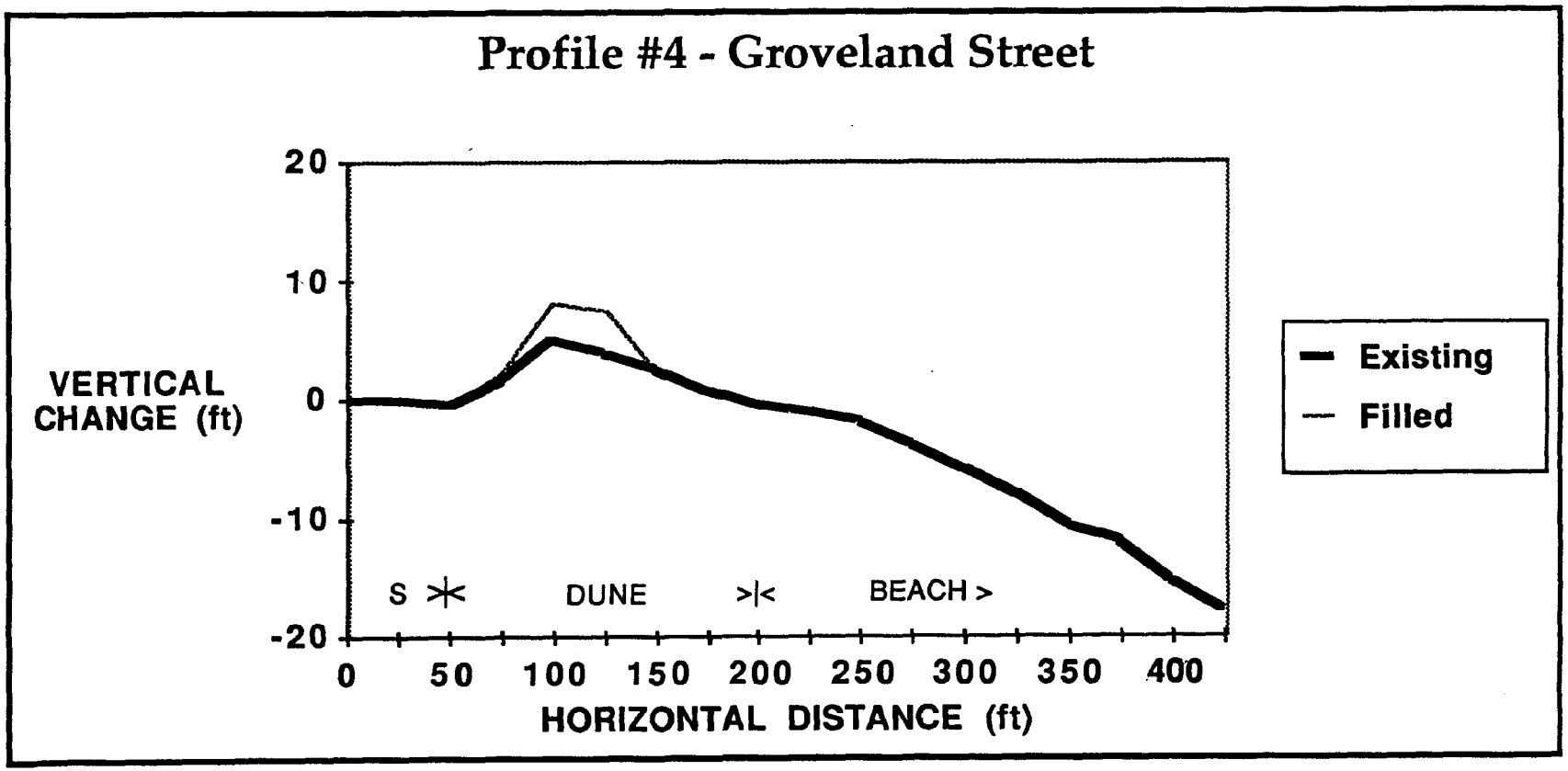
Appendix A

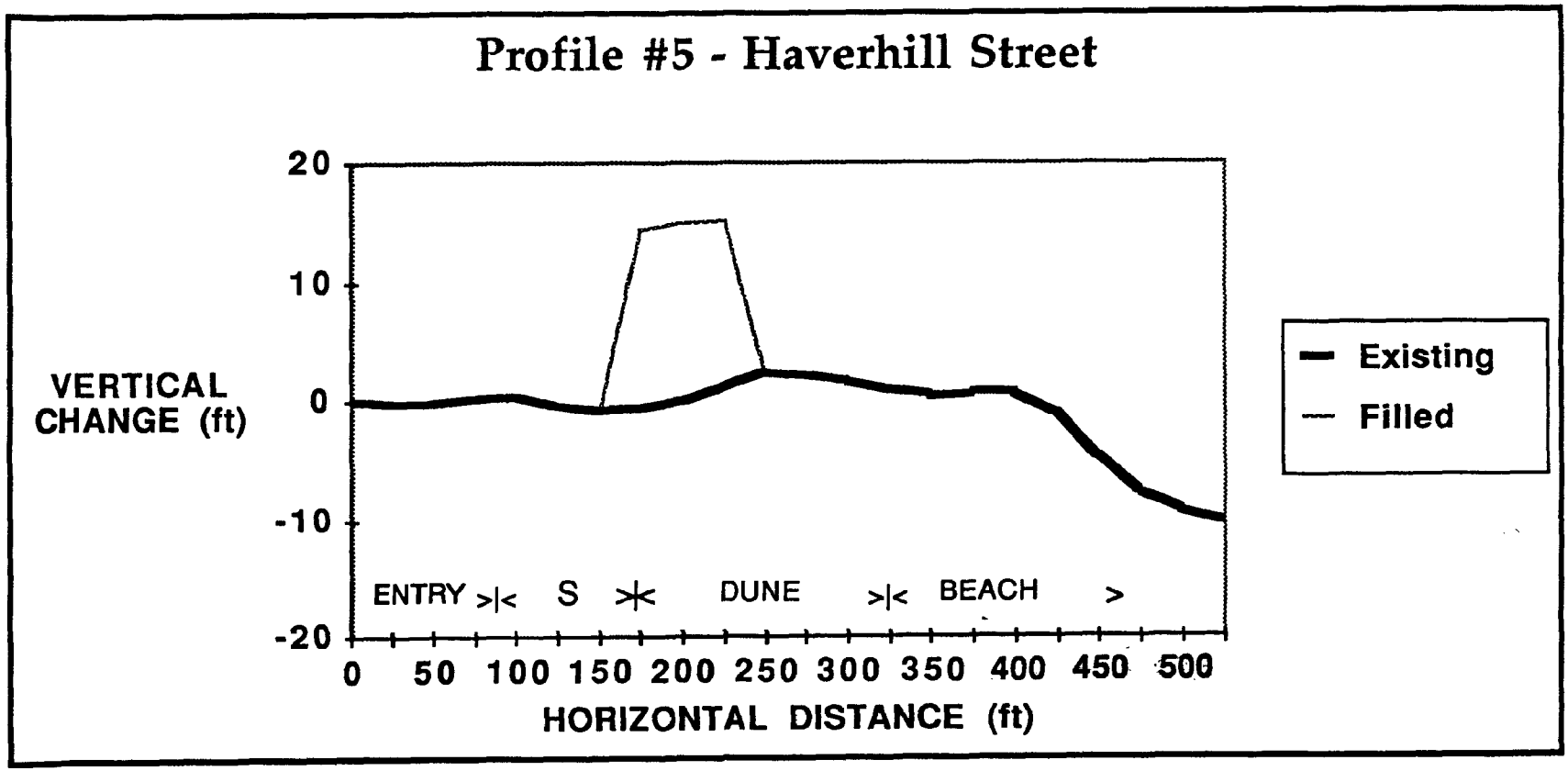
Sand Dune Profiles

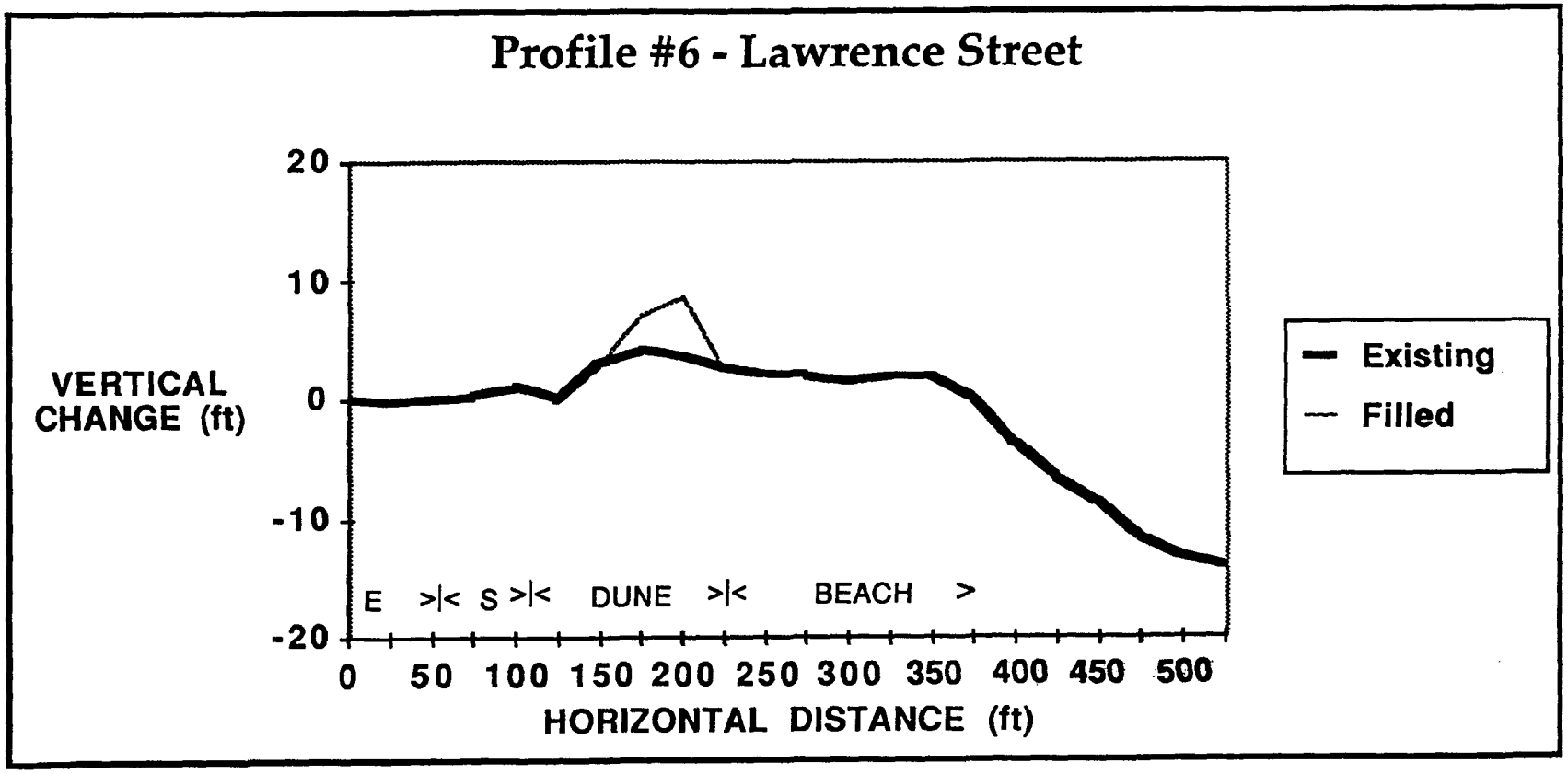

Profile #1 - New Hampshire Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
DUNE
BEACH
0
50
100
150
200
250
300
350
400
HORIZONTAL DISTANCE (ft)
Existing
Filled

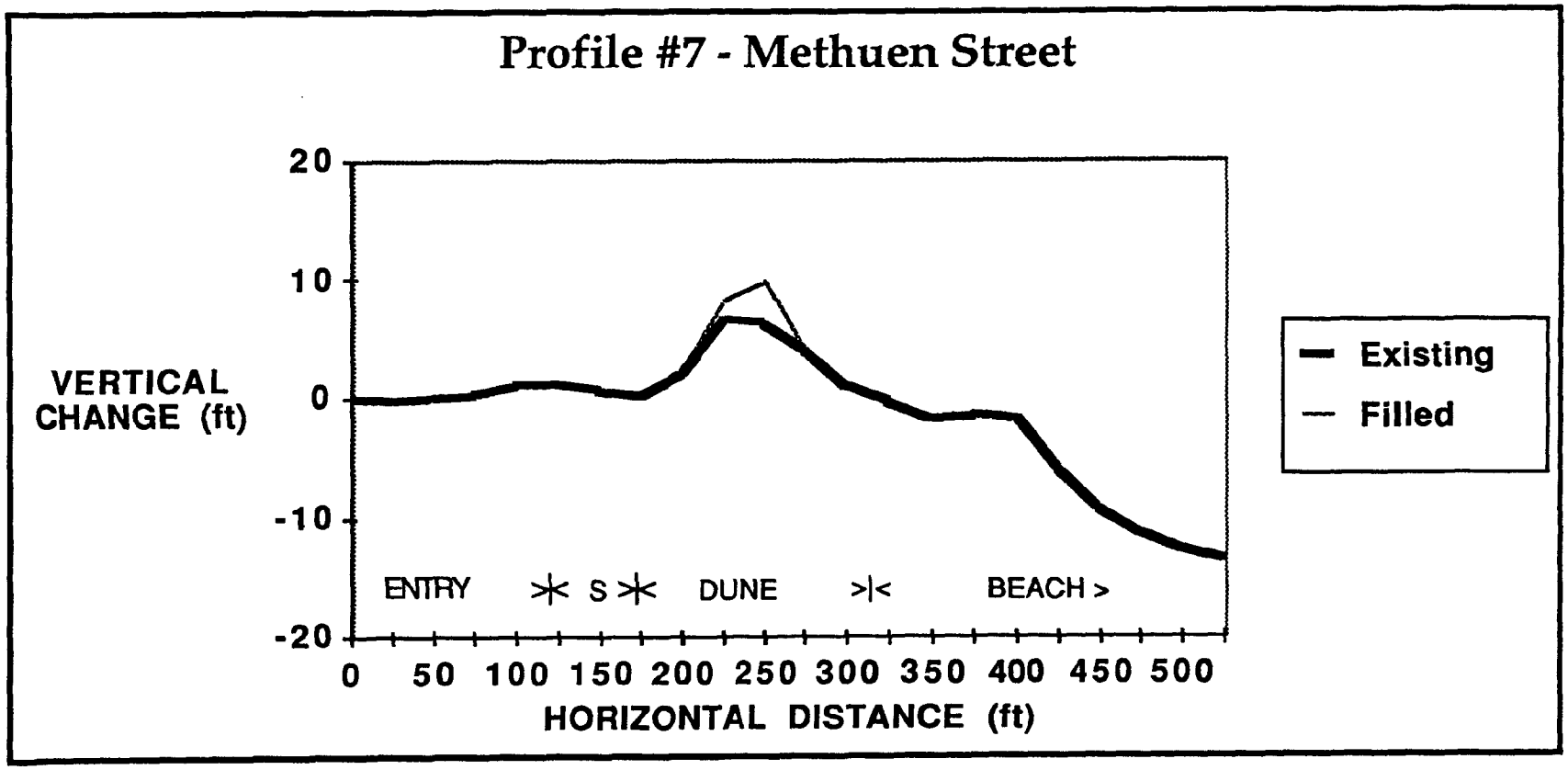

Profile #2 - Amesbury Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY >|< S >|< DUNE >|< BEACH >
0 50 100 150 200 250 300 350 400 450
HORIZONTAL DISTANCE (ft)
Existing
Filled

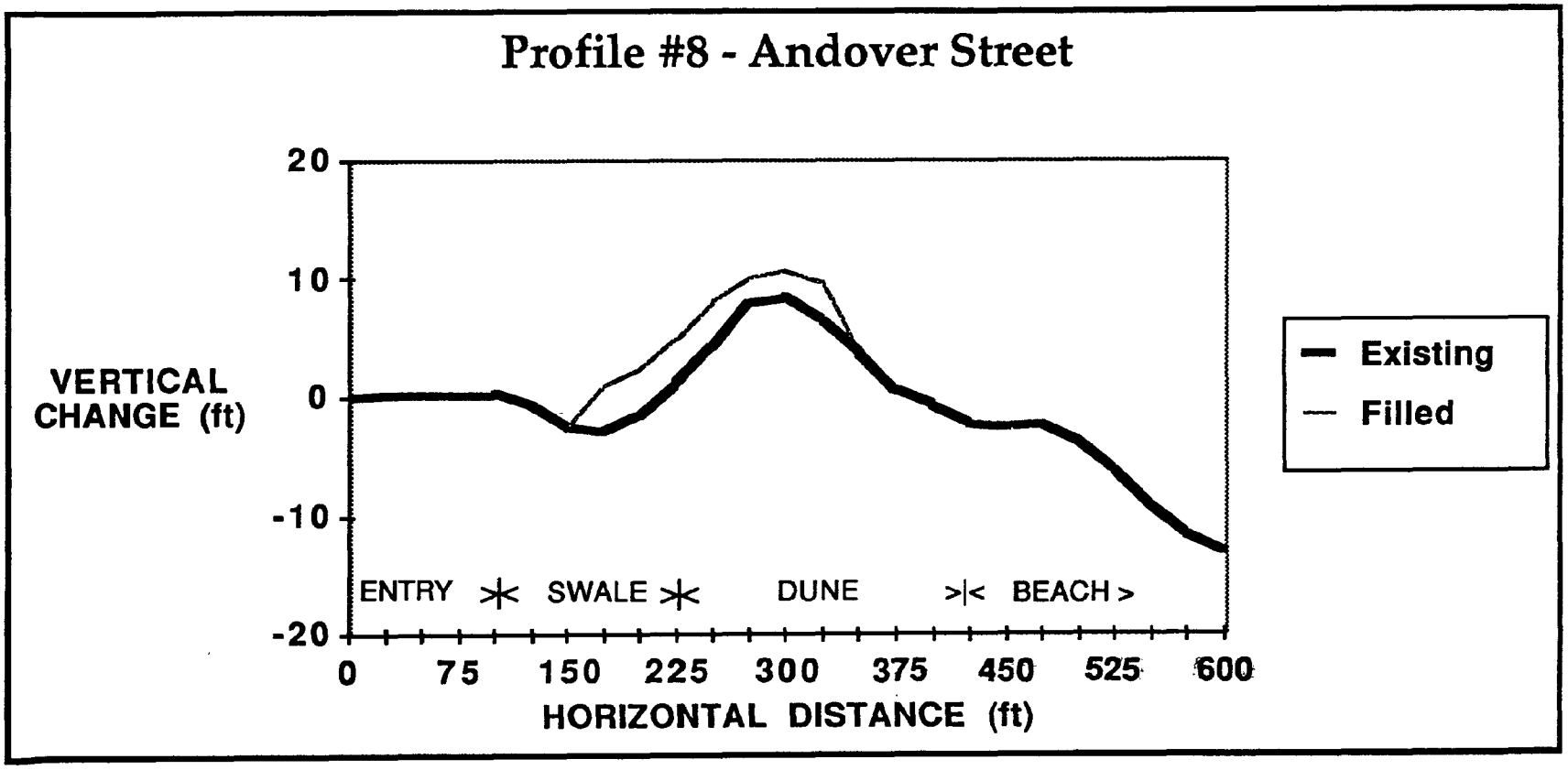

Profile #3 - Newbury Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
S >|<
DUNE
>|<
BEACH >
0
50
100
150
200
250
300
350
400
HORIZONTAL DISTANCE (ft)
Existing
Filled

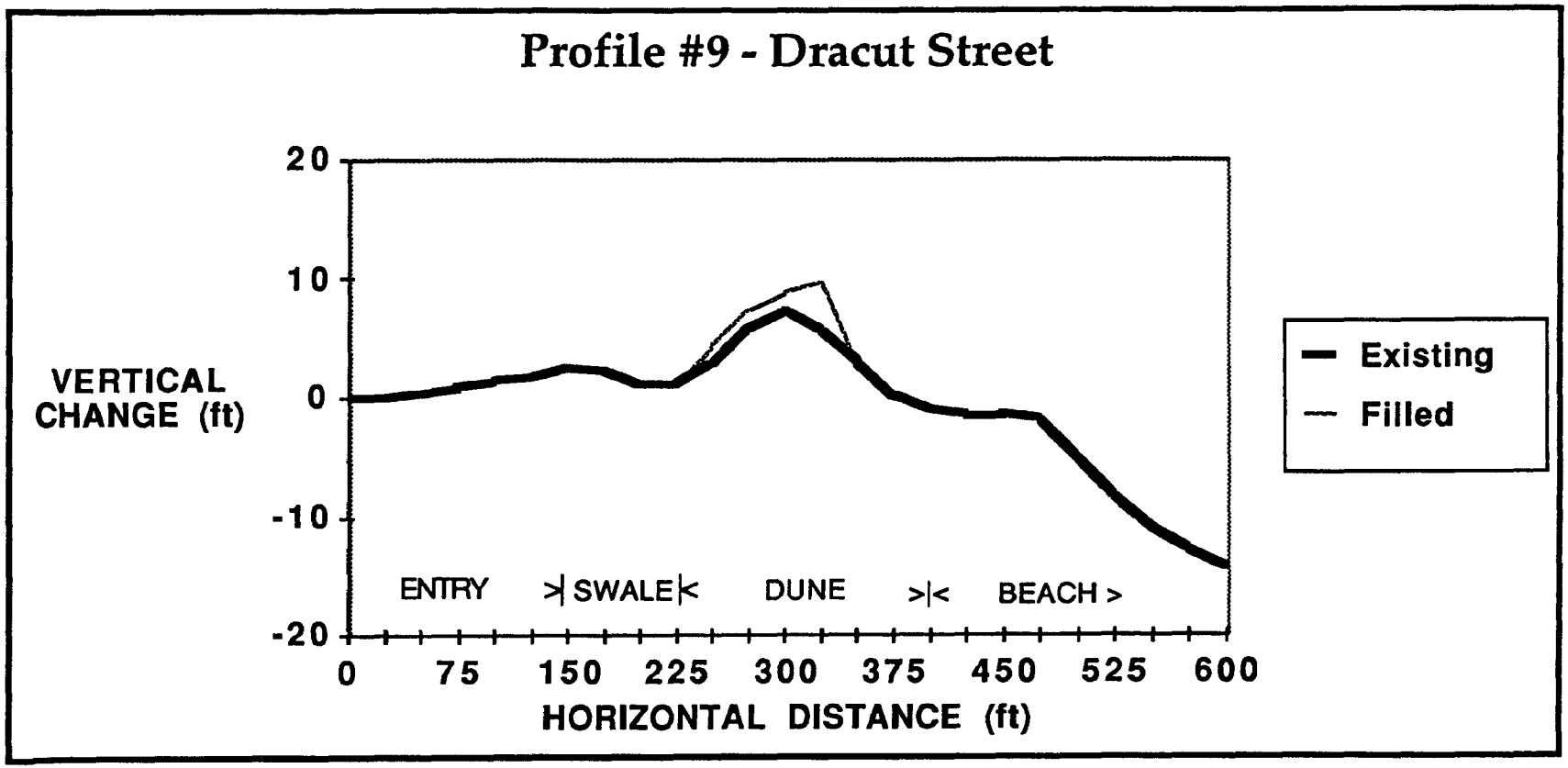

Profile #4 - Groveland Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
S
DUNE
BEACH
0
50
100
150
200
250
300
350
400
HORIZONTAL DISTANCE (ft)
Existing
Filled

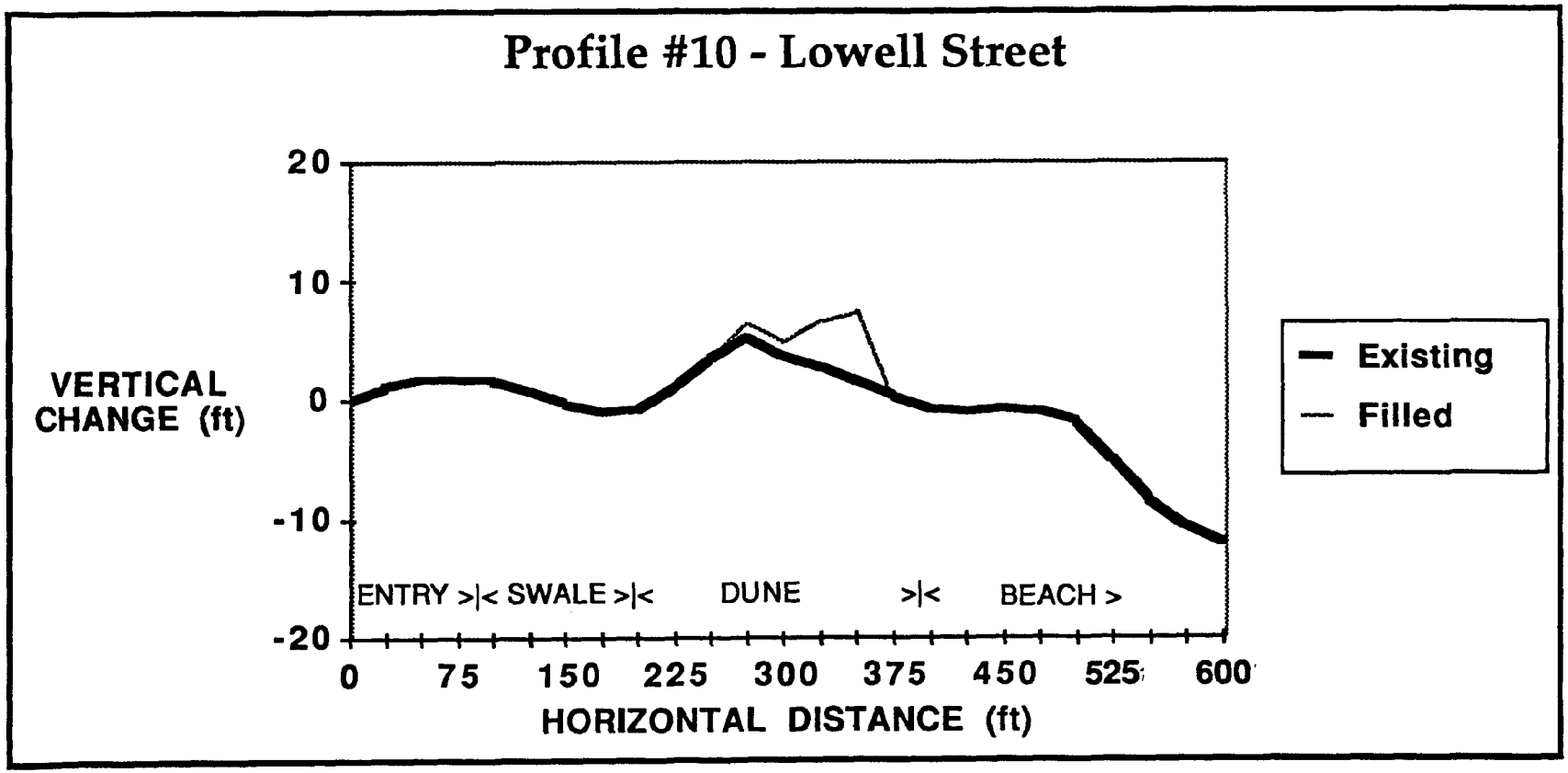

Profile #5 - Haverhill Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
S
DUNE
BEACH
0
50
100
150
200
250
300
350
400
450
500
HORIZONTAL DISTANCE (ft)
Existing
Filled

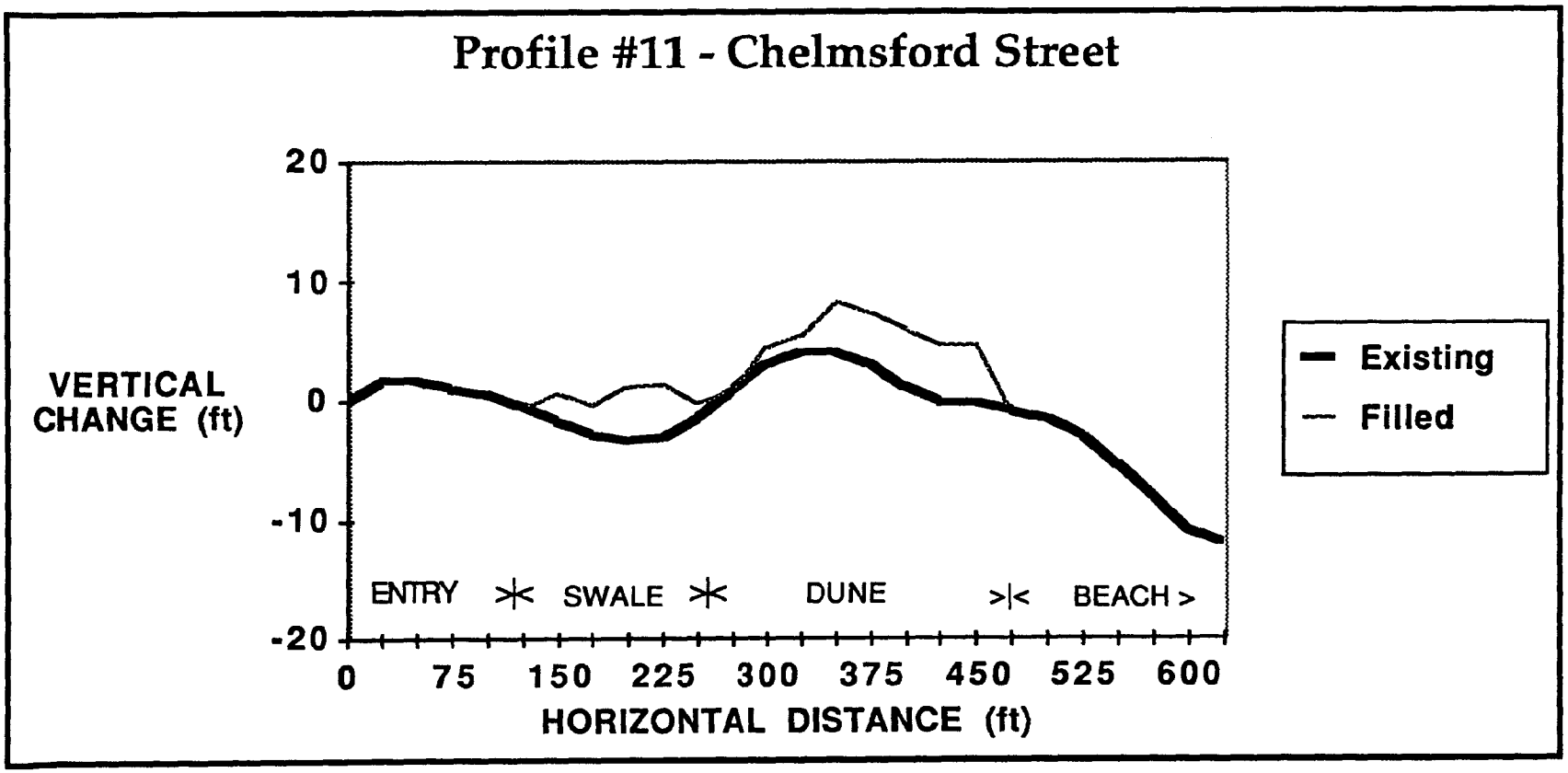

Profile #6 - Lawrence Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
E >|< S >|< DUNE >|< BEACH >
0 50 100 150 200 250 300 350 400 450 500
HORIZONTAL DISTANCE (ft)
Existing
Filled

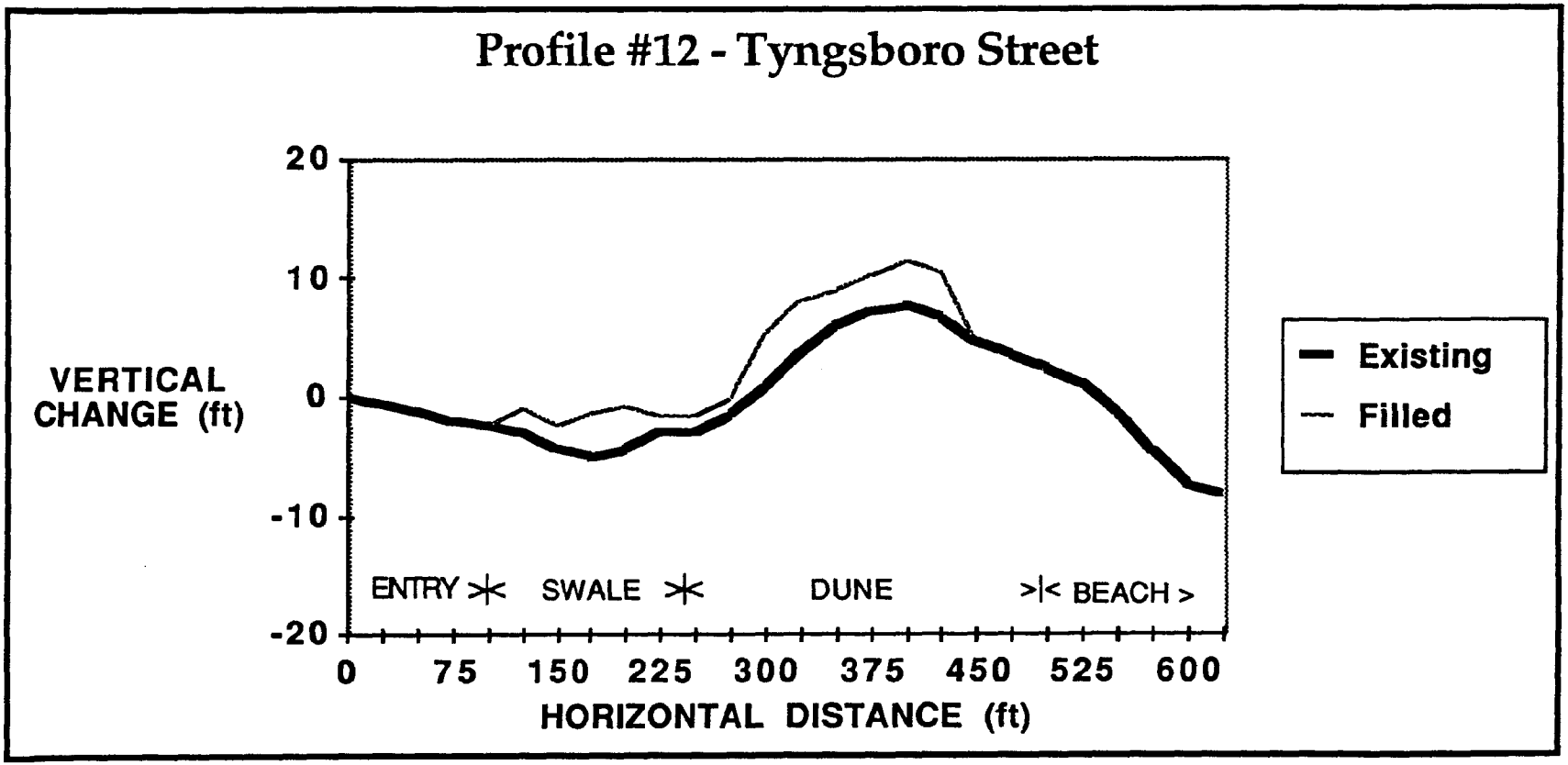

Profile #7 - Methuen Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
S
DUNE
BEACH
0 50 100 150 200 250 300 350 400 450 500
HORIZONTAL DISTANCE (ft)
Existing
Filled

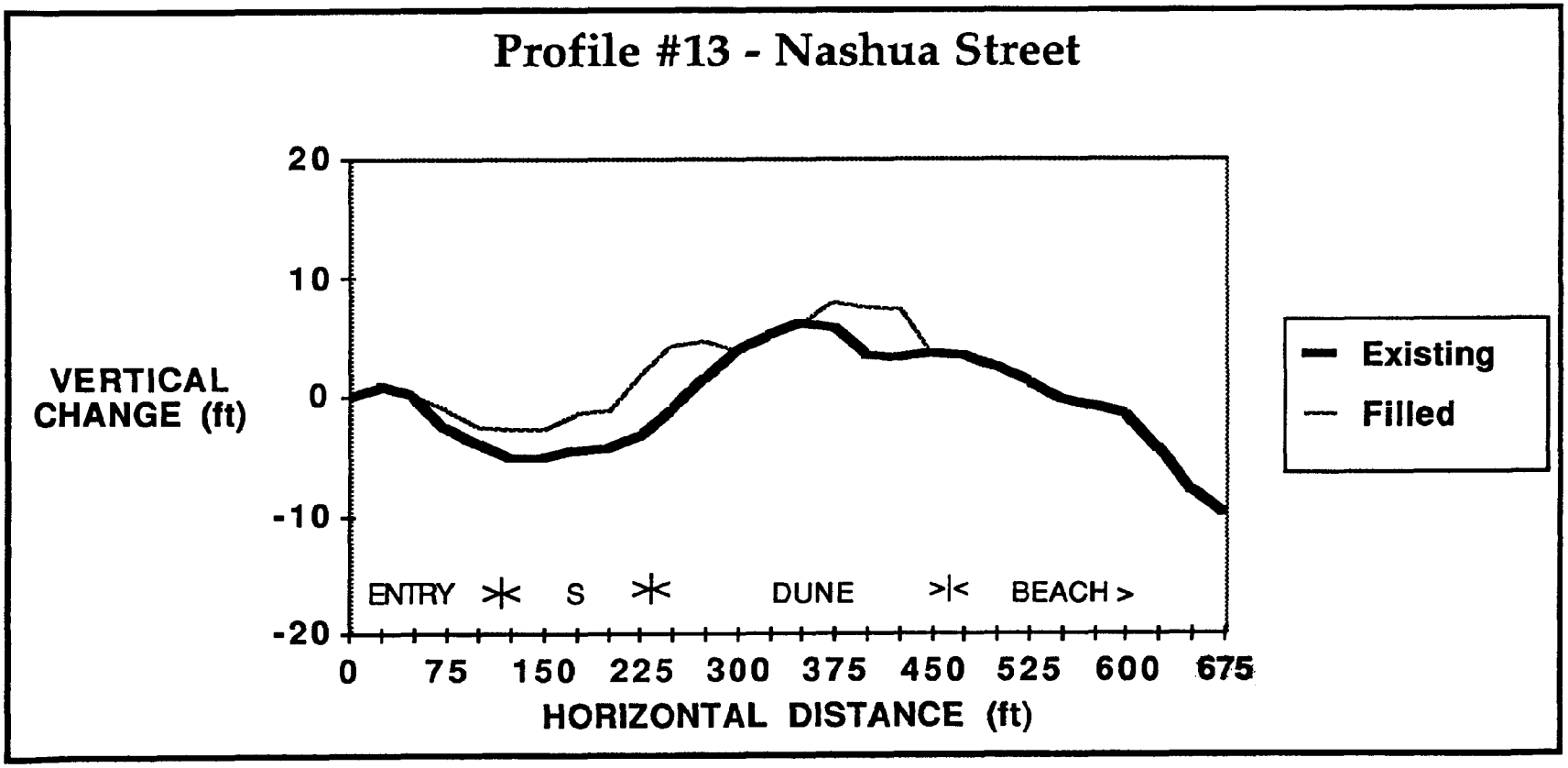

Profile #8 - Andover Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
SWALE
DUNE
BEACH
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled

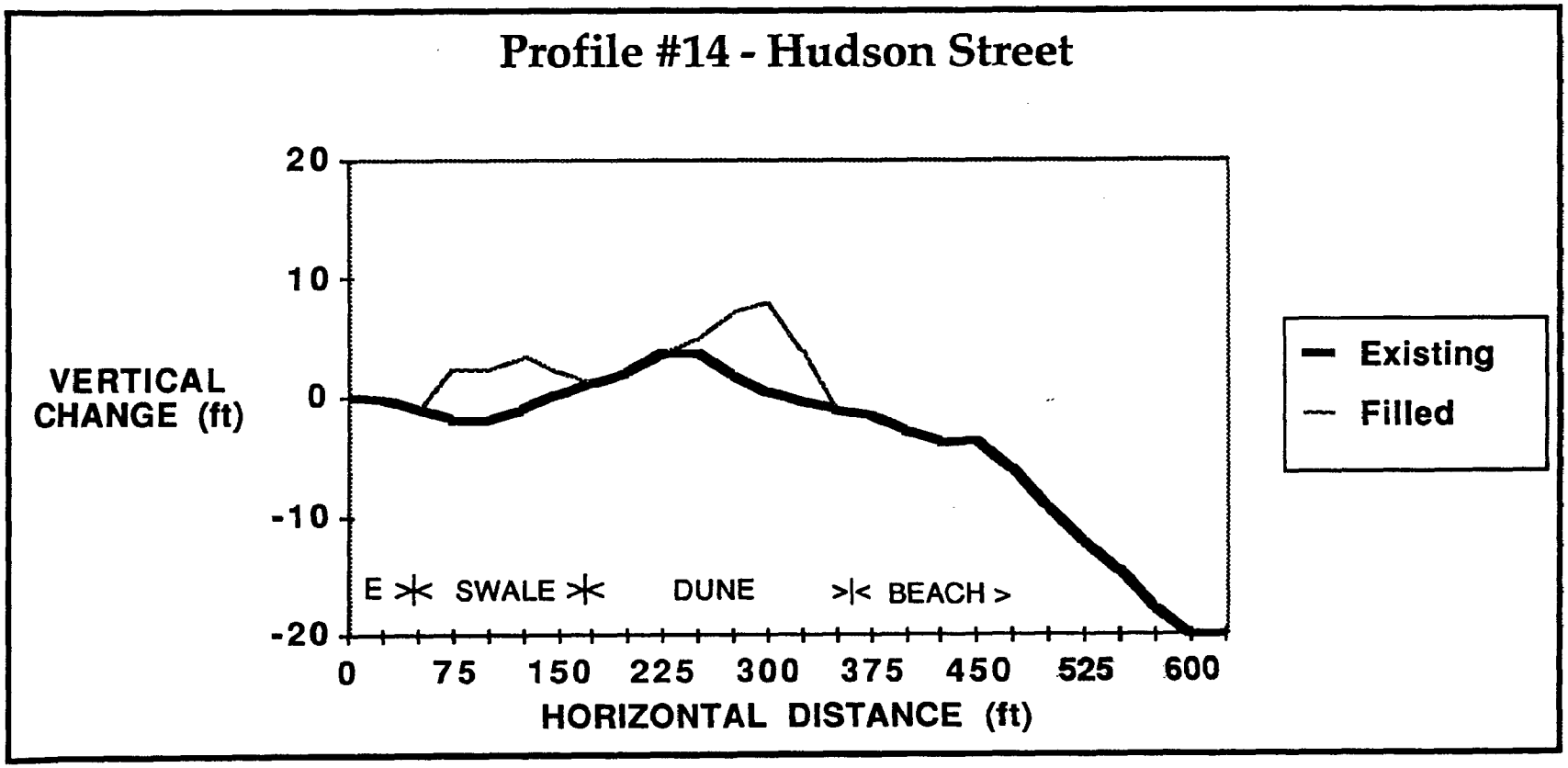

Profile #9 - Dracut Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
SWALE
DUNE
BEACH
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled


Profile #10 - Lowell Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY >|< SWALE >|< DUNE >|< BEACH >
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled


Profile #11 - Chelmsford Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
SWALE
DUNE
BEACH
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled


Profile #12 - Tyngsboro Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
SWALE
DUNE
BEACH
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled


Profile #13 - Nashua Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
ENTRY
S
DUNE
BEACH
0
75
150
225
300
375
450
525
600
675
HORIZONTAL DISTANCE (ft)
Existing
Filled


Profile #14 - Hudson Street
VERTICAL CHANGE (ft)
20
10
0
-10
-20
E
SWALE
DUNE
BEACH
0
75
150
225
300
375
450
525
600
HORIZONTAL DISTANCE (ft)
Existing
Filled

Appendix B

Vendor List for Selected Materials

Vendors List

Vendor	Item	Price (08-88)
Galloway Trucking P. O. Box 809 Plaistow, NH 03865 Contact: John Galloway Phone: (603) 382-7982	Sand	$5.25 / ton (delivered) (0.88 yds / ton)
Newmarket Sand and Gravel Route 125 Newmarket, NH 03857 Contact: Bob Spinney Phone: (603) 659-3566	Sand	$4.75 / ton (delivered)
Evergreen Nursery 146 Great Western Road So. Dennis, MA 02660 Phone: (508) 398-1743	Beach Grass (Ammophila breviligulata)	$.20 / plant
Springer Environmental Services 245 Keene Road Acushnet, MA 02743 Phone: (508) 763-2152	Beach Grass	$.15 / plant
Sylvan Nurseries 1028 Hasseneck Road Westport, MA 02790 Phone: (508) 636-4773	Beach Grass	$.30 / plant
	Pressure Treated Lumber	
Ridgewood Lumber Sales P. O. Box 717 Kingston, NH 03848 Phone: (603) 642-5588	4" x 6" x 8' 4" x 4" x 8' 1" x 6" x 8' 2" x 6" x 8'	$8.31 $4.69 $3.52 $4.20
Timber Mart 240 Lafayette Road Seabrook, NH Phone: (603) 474-9551	4" x 6" x 8' 4" x 4" x 8' 1" x 6" x 8' 2" x 6" x 8'	$11.07 $5.58 $5.18 $4.71
Ricci Supply 105 Bartlett Street Portsmouth, NH 03801 Phone: (603) 964-9590	4" x 6" x 8' 4" x 4" x 8' 1" x 6" x 8' 2" x 6" x 8'	$13.37 $6.00 $5.76 $4.67

Vendor	Item	Price
Ricci Supply 105 Bartlett Street Portsmouth, NH 03801 Phone: (603) 964-9590	Snow Fencing 4' x 4' x 50'	$25.76 / roll
TRI-City Masonry Route 16 Somersworth, NH Phone: (603) 692-5030	Patio Blocks (Steel reinforce. 2' x 2' x 2")	$6.20 / each
Jackson Hardward Marine RR #2 Box 170 Kittery, Maine 03904 Phone: (207) 439-1133	Galvanized Steel Cable (7x 7- 3/8")	$.35 / ft.

Appendix C

Sample Dredge and Fill Permit Application

"Sample only

PIP No.: _____
(For Office Use Only)

New Hampshire Department of Environmental Services

Wetlands Board
P.O. Box 2008
Concord, NH 03301-2008

Application for Filling, Dredging or Construction of Structures under RSA Chapters 483-A and 149:8a.

PROJECT CLASS	FEE
MINIMUM IMPACT	$ 10.00
MINOR	$ 25.00
MAJOR	$100.00

FOR WETLANDS BOARD OFFICE USE ONLY

FEE RECEIVED _____
Check No. Amount Init.

FILE NUMBER _____

FILING FEE (CHECK OR MONEY ORDER MADE PAYABLE TO NH WETLANDS BOARD) IS REQUIRED TO ACCOMPANY THIS APPLICATION FORM TO THE WETLANDS BOARD OFFICE.

Four (4) copies of this application are required. Three of the copies are filed with the town/city.

1. NAME OF OWNER Town of Seabrook TELEPHONE NUMBER 474-3311
(Please print clearly or type)

MAILING ADDRESS P.O. Box 456, Seabrook, NH 03874

2. LOCATION OF PROPOSED CONSTRUCTION Seabrook Beach Sand Dunes
(Street, road, highway) (Town, City)

tax map _____ lot _____ (latitude _____ longitude _____)
(Major projects only)

3. Complete the location map on reverse side on all copies or attach a map to each copy.

4. Adjacent to, or in (salt) (fresh) water Atlantic Ocean
(Name of water body)

5. Type of project (✓) Fill ( ) Dredge ( ) Pier (✓) Other walkway
(Specify)

6. Reason(s) for proposed construction Provide public access across sand dune and improve ability of dunes to provide protective barrier from ocean storms.

7. Proposed starting date Unkown Completion date —

8. Contractor or Agent "to be announced" Telephone _____

9. Description of construction:

(a) Type of Material: Dredge _____ Fill Beach Sand

(b) Estimated area to be dredged (square feet) _____

(c) Estimated area to be filled (~~square feet~~) 23,021 cu. yds.

(d) Final disposition of dredged material _____

(e) If any channel is to be constructed, the distance the flow of water is to be rerouted. _____

(f) If waterfront structure, indicate length of frontage. _____

10. I hereby certify that the applicant has filed three copies of said application with a detailed plan with the town/city of Seabrook as required by Chapter 483-A:1 as amended 1985.

DATE _____ SIGNATURE _____

11. Complete list of all abutting property owners, their addresses and phone numbers. This certifies that they have been notified in writing of the work proposed.

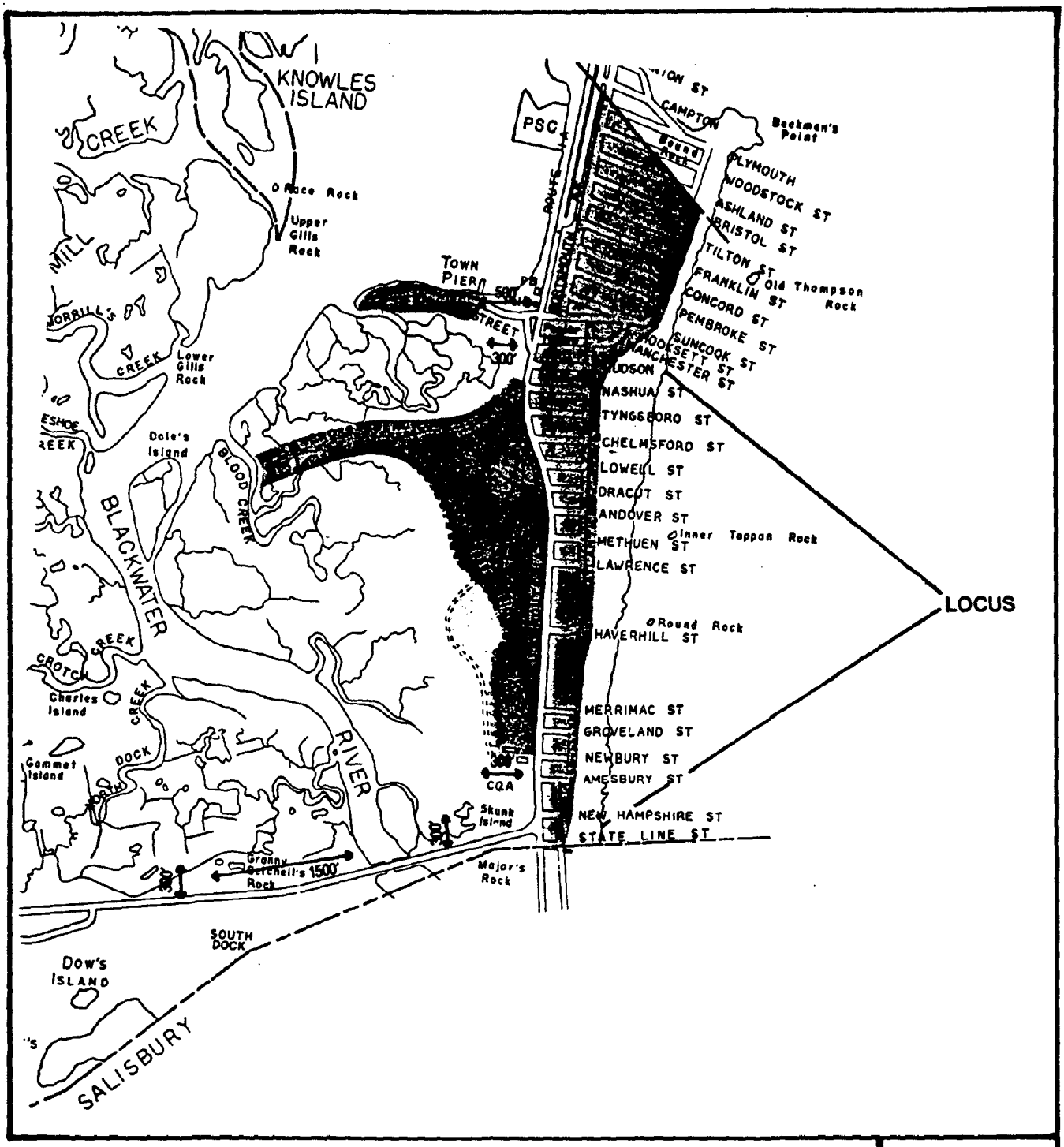
"Attached"

SIGNATURE OF OWNER OR AUTHORIZED AGENT _____ DATE _____

MAP OF LOCATION OF PROJECT

"See Attached"

SUFFICIENT DETAIL SO THAT INSPECTOR CAN LOCATE PROJECT SITE



LOCUS MAP

SOURCE:TOWN ZONING MAP ,SEABROOK, NEW HAMPSHIRE

SCALE IN FEET

0 2000 4000 6000

IEP inc.

Office of the Selectman
Seabrook Town Hall
P. O. box 456
Seabrook, NH 03874

Dear Abutter:

Pursuant to RSA:483-A, the Town of Seabrook is informing all abutters that a New Hampshire Wetlands Board Dredge and Fill application has been submitted for improvements to the Sand Dunes lying parallel to Seabrook Beach (see attached locus map). The purpose of the proposed project is to provide public access across the dunes while at the same time improving the ability of the dunes to provide a natural protective barrier from ocean storms.

Public access will be improved through the construction of wooden walkways at fourteen street locations. Dune improvements will be achieved through selective additions of sand and dune grass plantings as well as erection of sand fences at specific locations. A copy of the proposal and plan are on file at the Town Hall for your review.

Any questions, concerns or recommendations should be sent in writing to the Selectman's Office and Chairman of the New Hampshire Wetlands Board by writing:

Delbert Downing, Chairman
N. H. Wetlands Board
P. O. Box 2008
Concord, New Hampshire 03301-2008

Sincerely,

Town Manager

Seabrook Abutters List
September, 1988

NAME	MAP LOT	BOOK	PAGE
Chertavian, Levon & Joyce A. Clark Road Lowell, MA 01800	21-013-001	2307	1111
Giuffrida, Frank J. Hill Top Steak House Saugus, MA 01906	21-014-002		
Boyle, Thomas E. Jr. & Maura A. 150 Westview Road Lowell, MA 01851	22-013-014		
Archambault, Dewey G. Gagnon, Paul A. 170 Merrimack Street Lowell, MA 01852	22-015-000		
Shionis, Charles & Nancy 36 Wildrose Drive North Andover, MA 01845	22-015-016		
Cavan, David J. & Mildred D. 71 Newton Street West Boylston, MA 01583	22--016-017		
Kinlock, Marion B. Robataille, Jane K. Stasiak, Michael A. 383 Atlantic Avenue Seabrook, NH 03874	22-017-018	2727	765
Deshler, Howard G. & Dorothy 67 Ocean Drive Seabrook, NH 03874	20-027-000		
Miragliotta, Joseph A. & Constance Niceford, John R. & Rosalee 170 Common Street Lawrence, MA 01840	20-026-000		

NAME	MAP LOT	BOOK	PAGE
Roppel, John G. & Mary 75 Ocean Drive Seabrook, NH 03874	20-025-000		
Nader, Richard J. & Lydia B. 77 Ocean Drive Seabrook, NH 03874	20-024-000	2342	33
Trust Seabrook Domenic Realty 98 Puritan Avenue Worcester, MA 01604	20-023-000	2500	61
Pechinski, Dorothy M. & Benjamin M. 46 Avon Street Lawrence, MA 01841	20-022-000		
Graham, William F., Jr. & Eleanor B. 149 Golden Hill Road Haverhill, MA 01830	20-021-000		
Welsh, Richard & Muriel 13 North Road Kensington, NH 03833	20-019-20		
Gulezian, Gladys C. 30 Brentwood Circle North Andover, MA 01845	20-018-000	2507	277
Saba, Stanley & Lorraine 70 Lovejoy Road P. O. Box 1268 Andover, MA 01810	20-017-000	2488	1753
Faneros, Arthur J. & Christine 18 Moun Joy Drive Tewksbury, MA 01876	20-016-000	2651	918
D'Ursa, Edna Campeone, Felicia Lubetz, Kyle I. P. O. Box 1028 Seabrook, NH 03874	20-014-015		
Trust M. A. P. Realty Piscitello, Ignatius R.J. 123 Ocean Drive Seabrook, NH 03874	20-012-013	2697	1075

NAME	MAP LOT	BOOK	PAGE
Walsh, James N. & Alice A. 131 Ocean Drive Seabrook, NH 03874	20-011-000	2313	659
Gnecco, John L. & Frances Y. 135 Ocean Drive Seabrook, NH 03874	20-010-000		
Manzi, Thomas & Suzanne P. 139 Ocean Drive Seabrook, NH 03874	20-008-009		
Shaub, Catherine; O'Hara, Elizabeth 11 Aberdeen Avenue Peabody, MA 01960	21-007-003	2359	331
O'Hara, Elizabeth Janet 11 Aberdeen Avenue Peabody, MA 01960	21-006-006		
Piwinski, Gerald J. & Phyllis 155 Ocean Drive Seabrook, NH 03874	21-005-003	2443	1203
Aragelian, Nancy A. 4 Seven Star Road Groveland, MA 01830	21-004-001	2433	1059
Trust Ocean Drive Realty Baker, Susan - Trustee 10 West Road Rye, NH 03870	21-003-000	2618	358
Morrison, Sherman & Judith 855 Turnpike Street Apt. 137 North Andover, MA 01845	22-002-002	2551	147
Burns, Robert E. & Phyllis K. 4919 Blackford Drive East South Bend, IN 46614	21-001-000		
April, Arthur & Joan 7 Manchester Street Seabrook, NH 03874	21-500-007		

NAME	MAP LOT	BOOK	PAGE
Gardella, Robert A. & Patricia 24 Mountwood Road Swampscott, MA 01907	21-006-001		
Thompson, Marjorie 4 Mancester Street Seabrook, NH 03874	21-500-004		
Caffrey, Andrew A. & Evelyn F. 47 Woodland Road Andover, MA 01801	21-032-001		
Winter, Roland H. & Paula F. 226 Bristol Street Seabrook, NH 03874	21-032-000	2728	1135
Volpe, Peter J. & Armita A. 11 Coolidge Parkway Wakefield, MA 01880	21-030-031 21-029-000		
Trust K. T. B. Realty Broderick, Thomas G. 1401 Bridge Street Dracut, MA 01826	22-010-002	2493	1451
Samia, Leonard & Robert J. C/O Samia Companies Leo Birmingham Parkway Brighton, MA 02135	22-009-001	2570	2924
Connelly, Daniel J. Coady, Margaret 89 Lisa Lane North Andover, MA 01845	22-008-000		
Fouher, Francis P. O. Box 2183 Seabrook, NH 03874	22-007-001		
Hart, Mary M. C/O William E. Hart 203 High Street Andover, MA 01810	22-006-003	2469	916
Trust R. House Bisceglia, Corinne Trust 203 Atlantic Avenue Seabrook, NH 03874	22-022-001	2292	104

NAME	MAP LOT	BOOK	PAGE
Laganas, Peter P. O. Box 413 Hampton, NH 03842	22-023-024		
Laganas, Peter P. O. Box 413 Hampton, NH 03842	22-025-001		
Daher, Joyce M. & John R. 89 Swan Street Methuen, MA 01844	22-026-000	2419	1262
Dineen, John J. & Eileen L. P. O. Box 895 Seabrook, NH 03874	22-027-000		
Rogers, Irving E., Jr. Jacqueline H. Rogers 100 Turnpike Street North Andover, MA 01845	22-028-001	2528	1297
Daley, Leo F. & Helen 40 Morton Street Andover, MA 01810	22-029-000		
Humphrey, Gertrude B. 239 Atlantic Avenue Seabrook, NH 03874	22-030-031		
Phinney, Joyce D. 93 Spring Grove Road Andover, MA 01810	22-032-000	2473	668
Rogers, Irving Jr. jacqueline Rogers 100 Turnpike Street North Andover, MA 01845	22-033-001		
Caveney, T. John & Marjorie Villas of Snaibel 2915 W. Gulf Drive, B 302 Sanibel, FL 33957	22-034-000	2443	1103
Steinert, Dorothy 429 High Street Lawrence, MA 01841	22-035-000		

NAME	MAP LOT	BOOK	PAGE
Hamblet, Theodore C., Jr. 20 Havehill Street Seabrook, NH 03874	22-024-000	2329	1254
Hamblet, Katherine G. 506 Lowell Street Lawrence, MA 01841	22-025-000		
Patten, Lucile 166 Ocean Blvd Seabrook, NH 03874	22-026-001	2338	954
McCarthy, Helen M. 65 Green Street North Andover, MA 01845	22-027-001		
Riley, John 154 Ocean Blvd Seabrook, NH 03874	22-028-000		
Riley, John J., Jr. 154 Ocean Blvd Seabrook, NH 03874	22-029-001		
DeGeorge, Helen P. Flynn, Geraidine 71 Richland Road Norwood, MA 02062	22-030-000	2732	1945
Vaughn, James F., Jr. 136 Ocean Blvd P. O. Box 189 Seabrook, NH 03874	22-031-032		
Richards, Joseph & Mary 33 Ocean Blvd Seabrook, NH 03874	22-033-000		
Hacker, William & Gertrude 122 Ocean Blvd Seabrook, NH 03874	22-034-002		
LaPorte, Roland & Lea Marie 538 Andover Street P. O. Box 1078 Lowell, MA 01852	22-005-003		

NAME	MAP LOT	BOOK	PAGE
Daly, Florence E. 253 Middleton Road Boxford, MA 01921	22-006-000		
Bower, Arthur J. 42 Cliftwood Street Haverhill, MA 01830	22-008-009		
Catalano, Nicholas 77 Brown Street Methuen, MA 01844	22-010-001		
Bougeois, Barbara 20 Newbury Street Seabrook, NH 03874	22-007-000		
West, Warren & Marie 18 Newbury Street Seabrook, NH 03874	22-008-001		
Pennisi, Maurice A. & Constance J. 35 Wood Meadow Drive Salem, NH 03079	22-011-001	2461	1964
Linnehan, James & Katherine C. 45 Clark Road Lowell, MA 01852	21-009-001	2309	599
Green, Barbara J. 55 Harvard Street Lowell, MA 01800	21-010-001		
D'Alessandro, Elmo & Rita 195 Atlantic Avenue Seabrook, NH 03874	21-011-012	2285	1150
Lane, Thomas J. & Jane R. 92 Abbott Street Lawrence, MA 01842	21-009-000	2696	2638
Wrobleski, Patricia A. 94 Concord Street Nashua, NH 03060	21-010-003	2413	1284
Dufour, Louis C. & Rene E. P. O. Box 815 Seabrook, NH 03874	21-011-120		

NAME	MAP LOT	BOOK	PAGE
Giuffrida , Frank J. Hilltop Steak House Saugus, MA 01906	21-015-000		
Penta, P. Anthony 20 Porter Street Melrose, MA 02176	21-011-002		
Swett, Charles Jr. & Doris 3 Samoset Drive Salem, NH 03079	21-013-004	2315	1716
Bateman, Nathaniel 35 Milton Street North Andover, MA 01845	21-014-000		
McCarthy, Charles A. & Mona K. Justin F. O'Neill 12 Swan Street Lawrence, MA 0184	21-015-002	2466	188
Sharpe, Shirley M. McCarthy, Mary P. O. Box 937 Seabrook, NH 03874	21-016-002	2466	189
Kady, Thomas S. & Larece R. P. O. Box 1646 Seabrook, NH 03874	21-019-001		
Hugo, Mary R. 75 Atlantic Avenue Seabrook, NH 03874	21-018-002	2444	1897
Goldman, Ruth V. A. & Harry 28 Belmont Avenue Brattleboro, VY 05301	21-014-003		
Hamblet, Ann D. & Paul C. 87 Atlantic Avenue Seabrook, NH 03874	21-015-017	2494	350
Gallahue, Robert E. & Joan K. 95 Atlantic Ave Seabrook, NH 03874	21-016-017		

NAME	MAP LOT	BOOK	PAGE
Buchika, George & Gertrude 640 Primrose Street Haverhill, MA 01830	21-013-000		
Scalise, Domenic & Kathleen 195 French Farm Road North Andover, MA 01845	21-014-004	2328	1640
Tully, B. J. 12 Mountview Drive Dracut, MA 01826	21-015-004		
Seaver, Robert & Pauline A. 80 Milk Street Methuen, MA 01844	21-016-001	2543	2390
Manzi, Ann L. 440 Great Pond Road North Andover, MA 01845	21-012-002		

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