

APPENDIX A

WELLFLEET INNER HARBOR: 1989-1992

A SUMMARY OF WORK

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## List of Symbols

<u>Symbol</u>	<u>Description</u>
$\rho$	Water density
$f$	Darcy-Weisbach friction factor
$\tau_b$	Bottom shear stress
$u$	Axial velocity
$G$	Greenwich phase tidal constituent
Kappa	Meridian-corrected phase of tidal constituent
Zeta	Local phase of tidal constituent
rms	Root-Mean-Square statistical calculation

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## INTRODUCTION

In the winter and early spring of 1989, the Wellfleet Natural Resources Advisory Board held several meetings with representatives of the Department of Geology and Geophysics at the Woods Hole Oceanographic Institution to explore the possibility of a study to elucidate the processes of circulation and sedimentation in Duck Creek, Wellfleet's inner harbor.

At those meetings, board members conveyed the concern that had been expressed by many members of the community that rapid shoaling, particularly in dredged portions of the inner harbor, was hindering navigation and use of harbor facilities. This shoaling, together with the harbor dredging operations that it necessitated, was imposing an increasing financial burden on the community. The board members raised questions concerning the cause of this rapid sedimentation, the possible association between it and recent harbor engineering projects including - in addition to dredging - changes affecting water circulation within the system, and what - if anything - might be done to alleviate the condition.

The authors of this report responded by proposing to implement an existing shallow water numerical model (Speer and Aubrey, 1985) to produce a tidal model of Duck Creek to analyze the system's circulation and sedimentation characteristics. Once existing characteristics had been analyzed, the model could then be used to investigate how those characteristics would respond to changes in the physical form of the system such as dike construction or channel dredging.

The board agreed that such a study should be carried out, but requested that it be implemented in phases to accommodate the Town's funding schedule. Therefore, the first phase of this study, designed to determine the tidal characteristics of the inner harbor, was carried out between 31 August, 1989, and 20 February, 1990. The study's second phase, which began 1 September, 1990, and ended 28 February, 1991, produced a bathymetric map of the inner harbor.

The study's third phase - development, testing and application of the numerical tidal model - was divided into two tasks. Task one consisted of developing the tidal model using the tidal forcing data and bathymetric data obtained as the product of phases one and two. This task was carried out between 1 March and 30 September, 1992. Task two of the third phase entailed (1) testing and adjustment of the numerical model through comparison with newly acquired tidal data, (2) application of the model to investigate the effects of changes in the physical form of the system on its circulation and associated sedimentation patterns, and (3) preparation of a report presenting the results of the study. This final task began on 15 July, 1992, and was completed on 31 August, 1993, when a draft report was submitted and discussed at a public meeting held at the Wellfleet Public Library. The present final report incorporates into the text of the August, 1993, draft report several clarifications requested by the Wellfleet Natural Resources Advisory Board.

## METHODS

### Tide Data

Three tide recorders (TDR's) were deployed during the period from October 1989 to December 1992. The first deployment involved one TDR installed at the town pier (located on the south side of the pier near the harbor master's office). This deployment extended from 20 October 1989 to 1 December 1989. The second deployment extended from 1 December 1989 to 4 January 1990 and was at the same location as the first deployment. The third deployment was from 14 August 1992 to 2 September 1992 and employed one TDR and two pressure-temperature loggers (PTL's). All data were referenced to the National Geodetic Vertical Datum (NGVD) with the exception of data collected during deployment three, the objective of which was to measure the tidal distortion only.

During deployments one and two the TDR's were attached to a piling at the town pier with 3/8 inch manila line. Data recovery was 100 per cent and the 29-day least-squares and inferenced analysis (Boon and Kiley, 1978; Schureman, 1971) was performed for each set. The results are tabulated in Appendices B and C.

The third deployment was carried out in cooperation with the Mini-Bays program of the Cape Cod Commission. One of the recorders was placed on a piling under the Commercial Dock in a manner similar to deployments one and two, and one was placed on a piling at a boat slip in the Inner Basin. The placement of these instruments are illustrated on figure 1. After retrieving the instruments and reviewing the data for the two week deployment, it was discovered that the innermost recorder was out of the water at low tide. A series of patches were applied to these truncated portions of the tide record to fit a manually interpreted trace of the tidal signal. Because only 9 vertical inches of the tide was truncated, the manual addition was deemed appropriate. A 15-day least-squares analysis was then performed for each signal. The results are tabulated in Appendices D and E.

### Bathymetric Data

Bathymetry data were acquired along electronically guided tracks predefined for Wellfleet Inner Harbor. These data are presented in smooth sheet form and as a contour map. The data are also archived on 3.5 inch computer floppy disks. The survey involved 32 transects and included the harbor area from the jetty to Uncle Tim's bridge. Maximum ship's speed along the survey lines was about 5 miles/hour. The survey was conducted from the 24 foot long aluminum WHOI Research Vessel *Mytilus*.

A listing of all major equipment is provided in Appendix A and Table A1. All equipment was selected based on its demonstrated high accuracy and reliability. The survey system operated within specifications and expectations during the Wellfleet survey. The fathometer used in the survey was an Odom model DF-3200 (manufactured by Odom Hydrographic, Baton Rouge,

Louisiana). The Odom model DF-3200 has dual frequency capabilities, high precision, digital based construction, and has demonstrated high reliability. The model DF-3200 has a 24/200 kHz transducer with a narrow beam (3 db at 19/9 degrees beam width respectively) propagation pattern. One frequency only (user selectable) can be output serially to the survey management system. The Odom DF-3200 has a resolution of 0.39 inches. The survey bathymetry data accuracy is dependent on a number of factors such as tidal corrections to fathometer data, sea state, and in-situ calibration of fathometer. The Wellfleet survey bathymetry data is accurate to about six inches.

The Del Norte model 540 transponder navigation system was used for navigation and has a specified accuracy of 1 meter over a maximum transmission range of 80 kilometers. The Del Norte system interrogates as many as four shore-located transponders at a maximum rate of 10 Hz and outputs distance measurements to the survey management computer. For the Wellfleet survey, three transponders were mounted at various points around the harbor and were interrogated at 1 Hertz. The location of the transponders varied with changes in the survey boat operations area. These locations were chosen to ensure line of sight and medium angle specification so that the boat system would receive the signals and calculate accurate positions using standard geometry relations. Consequently transponders had to be moved often as the boat completed the survey. The survey management computer uses the transponder distance and location data to calculate and record state plane coordinates, latitude, and longitude of the boat every one second.

The survey management system is an integrated navigation and data acquisition system (INDAS) purchased from Science Applications International Corporation (Newport, R.I.). INDAS comprises a Hewlett Packard (HP) 9000 series model 220 processor with an HP 9153C disk drive (10 MB hard drive and a 800 KB, 3.5 inch floppy drive), necessary peripheral components (plotters, printers, monochrome monitor, and keyboard), and survey management software. Data are directed to the floppy drive during the survey. The survey management system provides accurate guidance to the helmsman, reliable data logging and clear annotation to peripherals.

All data were analyzed at Woods Hole. Tidal correction of bathymetry data was performed using data taken from the town-maintained tide staff at the town pier and corrected to National Geodetic Tidal Datum (NGVD). Editing for vertical wild points was accomplished automatically and checked manually. Editing for horizontal wild points was accomplished manually. Plots and calculations were checked on hard copy before final output. The output included:

1. printing of depths (smooth sheets) versus position on state plane charts
2. hard copies of contours on state plane charts
3. archival of all digital bathymetric data

## Model

A diagnostic numerical model is a simplified representation of some real process that enables us to investigate the response of a system to given modifications of its defining parameters. The current study was well suited to modeling since the goal was to investigate the effect of altered geometric characteristics in Wellfleet Inner Harbor on flushing and sedimentation processes. We used a one-dimensional link-node model (Speer and Aubrey, 1985) that has been used extensively (Friedrichs and Aubrey, 1988) to investigate tidal flow in estuaries.

The first task in applying the model was devising a grid network over which the mathematical formulations are solved. The length of this system is roughly 9000 feet from the jetty to the head in Duck Creek along the channel axis. To include in the model the abrupt changes in cross-sectional geometry along the axis, an increment between nodes of 200 feet was chosen. Since the model allows for a branched network of grids which more or less follow the different branches of the system, the branching shown in figure 1 was devised to cover the major channels in the system. The Cove was not chosen as its own channel because there is no distinguishable channel defining it. It includes a wide intertidal area, however, that is incorporated in the hydrodynamics of Branch 1.

Calibration was performed by varying a factor in the friction term of the hydrodynamic equations. By matching the model harmonic amplitude and phase data with the field records (Appendices B-E), the model was calibrated. Once done, the model became a tool to view changes in flux and sea surface given changes in geometry that we incorporated from the proposed modifications.

## RESULTS

### TDR Records

Appendices B to E summarize the harmonic constituent information derived from the tidal data taken in Wellfleet Inner Harbor. Appendices B and C are more complete because the data duration was more than 29-days, a minimum time to resolve some of the longer-period constituents that are determined from inference formulae (Schureman, 1971). These harmonic constituents of the tide are the individual sinusoidal forms that, when added together, create the observed tidal record. Each of these sinusoids has a predetermined period since they are caused by the motion of astronomical bodies directly or indirectly. The major lunar constituent along the East Coast is the  $M_2$  tide, which is semi-diurnal. From this tide come the overtides, or harmonics, such as  $M_4$  and  $M_6$ . The major solar constituent is the  $S_2$  semi-diurnal tide. Of course, it has a period of 12 hours. The lunar  $M_2$  tide has a period of 12.42 hours. Since these two tides interact, they create a *forced* constituent named the  $MS_f$  tide, which has a period of 14.7 days. This constituent shows up in the Spring/Neap cycle of amplitude modulation seen in the field, and thus is important.

Another significant contributor to the harmonic tide at Wellfleet is the  $N_2$  constituent. This lunar term is required because the characteristics of the  $M_2$  tide, the principal lunar semidiurnal constituent, are based on the simplifying assumption that the moon orbits the earth at its mean speed and mean earth-moon distance. In fact, however, the moon moves in an elliptical path, which causes its actual speed and distance to change continually.  $N_2$ , the larger lunar elliptic semidiurnal constituent, is the largest of several additional terms that modify the harmonic tide for these lunar variations.

Referring to Appendices B to E, each constituent is accompanied by five columns of information determined from the least-squares analysis and the inferred equations. First, the amplitude of the constituent is listed in meters. The next column gives the phase of the sinusoid. The designation, G, indicates that it is the Greenwich phase, the one that is most often used in predictions of future tidal response. Theoretically, it is consistent for any set of tidal data taken at the same site. The last column shows the amplitude percentage of each constituent to the total tidal energy.

An important reason for performing this analysis is to determine the ratios between certain constituents. The overtide  $M_4$  is a result of frictional damping as the water moves about in the system at the  $M_2$  period. The more friction, the higher the amplitude of the  $M_4$  constituent. Thus, the  $M_4:M_2$  ratio is a direct measure of this frictional activity. Another important feature is the relative phase between the  $M_2$  and  $M_4$  sinusoids. Depending on this relation, the tide can have a short flood cycle and a long ebb cycle, or visa verse. A short flood means velocities must be higher coming in than they are ebbing. This flood dominance has impact on the flushing and sedimentation tendencies of a system, due to the frictional activity reflected through the overall bathymetry.

### Bathymetry

The bathymetric study in 1990 gave a good idea not only of the physical parameters governing fluid flow, but identified sedimentation "hot spots". We received copies of surveys carried out by the Massachusetts Division of Natural Resources and Army Corps of Engineer from 1955 to the present before and after dredging work. This information gave an opportunity to consider the equilibrium depths that we think the system is moving toward. The color maps of bathymetry from 1955 and 1990 (figures 3,4) outline the differences between what is natural and what is man-made. Discussion of the differences is given later.

### Model

Figures 5a-d show velocity plots at different locations within the system, highlighting some basic processes at work. Notice that velocities are fairly symmetric in magnitude in flood and ebb until the flats of Duck Creek are reached. There the asymmetry is in favor of flood tide velocities. In light of the discussion on tidal constituents, this makes sense. Duck Creek is a shallow



intertidal zone that, when covered, applies a large amount of frictional stress on the moving water. This causes a shift in the relative phase between the M<sub>2</sub> and M<sub>4</sub> tide such that flood tide is much shorter than ebb tide, requiring higher velocities.

Considering sedimentation, deposition or erosion is not only controlled by the relative magnitudes of the velocities on the flood or ebb cycle, but also by the absolute magnitudes. Larger size sediment will require a higher velocity to mobilize than fine-grained particles. That is why channels that are confined and experience higher velocities will have a bottom composition of larger sand grains than quiescent open regions or intertidal zones where finer grains are allowed to settle out. Because of this, when assessing the effects of changes made in Wellfleet, we will focus on velocity asymmetry and magnitude as a function of location, and what this means to long-term bathymetric change.

### Model Modifications

After meeting with Mr. Patrick Woodbury of the Town of Wellfleet, the following hypothetical changes of the Wellfleet system were investigated with the model:

<u>Case</u>	<u>Modification</u>
0	Leave the system as it is.
1	Widen the railroad bridge channel width in Duck Creek from 70 feet to 210 feet.
2	Open the Mayo Creek tide gate to allow freshwater/saltwater exchange within Mayo Creek. Prescribe flow of 0.5 cubic feet per second.
3	Place a 200 foot wide by 10 foot deep (MHW) canal through the Shirttail Point parking lot.
4	Shorten the total length of the Shirttail Point parking lot by 140 feet.

Each of these changes affects the volume of the system and the water exchange. Using the tidal forcing measured by the TDR's as input to the model, the following are the greatest exchanges on ebb tide predicted for the selected regions:

Table 1. Volumes and Exchanges. Units are ft<sup>3</sup>.

Case	Cove Volume	Duck Ck Volume	Cove Exchge	Duck Ck Exchge
0	6.20 x 10 <sup>7</sup>	1.05 x 10 <sup>7</sup>	4.85 x 10 <sup>7</sup>	8.36 x 10 <sup>6</sup>
1	6.20 x 10 <sup>7</sup>	1.06 x 10 <sup>7</sup>	4.86 x 10 <sup>7</sup>	8.60 x 10 <sup>6</sup>
2	6.20 x 10 <sup>7</sup>	1.05 x 10 <sup>7</sup>	4.86 x 10 <sup>7</sup>	8.36 x 10 <sup>6</sup>
3	6.32 x 10 <sup>7</sup>	1.05 x 10 <sup>7</sup>	4.74 x 10 <sup>7</sup>	8.35 x 10 <sup>6</sup>
4	6.30 x 10 <sup>7</sup>	1.08 x 10 <sup>7</sup>	5.00 x 10 <sup>7</sup>	8.62 x 10 <sup>6</sup>

Figures 6 to 8 illustrate the velocity maxima on flood and ebb tides for each of the modifications. Velocity magnitudes govern the movement of sediment through the bottom shear stress term  $\tau_b = (f/8)\rho u^2$ , where  $\rho$  is the water density,  $u$  is water velocity, and  $f$  is the Darcy-Weisbach friction factor, which depends on the sediment grain diameter. Since sedimentation models remain dependent upon empirical relations, their predictions are often in error by orders of magnitude where complex systems with continuously varying sediment types, flow regimes, and water densities exist. Any prediction on our part based upon a sedimentation model would be very generalized, so our approach was to consider the *tendencies* of sedimentation by investigating the magnitudes of velocity maxima, and how these tendencies change from case to case along the branches of the system. Figures 9a-c show how the ratio between flood maximum velocity and ebb maximum velocity evolves along each branch.

## DISCUSSION

### Tidal Constituents

Appendices B-D show that about 83-88 percent of the tidal energy near the Commercial Dock is from the  $M_2$  tide, with a root-mean-square (rms) range of about 2.9 meters (9.5 feet). More than 95 percent of the total energy is determined from the preknown constituents, which is typical for tides with large ranges. Meteorological effects like wind stress and air pressure are assumed to represent the remaining 5 percent. In the Inner Basin, the  $M_2$  tide becomes more dominant with 91 percent of the energy. The rms range is down to 8.1 feet, however. The amplitude ratio  $M_4:M_2$ , which shows the level of frictional activity, is .035 at the Commercial Dock and .01 in the Inner Basin. Even the larger of the two ratios is small, only slightly larger than the ratio of .017 listed for Cape Cod Bay (Irish and Signell, 1992). Although the system is shallow with large intertidal flats, and the velocities are high as a result of the large tidal range, a considerable amount of water enters the Outer Harbor between the mainland and Jeremy Point. Interestingly the  $M_4$  tide loses ground between the Dock and the Inner basin. This is probably a reflection of tidal filtering, the process of losing energy from frictional dissipation, which happens to all constituents. The energy transfer from the  $M_2$  constituents to the  $M_4$  overtide is evidently not fast enough to overcome the dissipation of  $M_4$ -related velocities as the tide propagates up Branch 1 into Duck Creek.

The  $M_2$  and  $M_4$  phase relation from the appendices varies from 125 to 144 degrees at the Commercial Dock, which indicates flood dominance (Friedrichs and Aubrey, 1988). This is consistent with the extent of the intertidal area, and produces flood velocities that are greater than ebb velocities. The relation at the Inner Basin recorder is 66 degrees, which is also indicative of a flood dominated system. However, as mentioned above the Inner Basin tide record was truncated

at low tide, and the patched data cannot be considered sufficiently reliable for comparison with data from the other tide recorders.

## Bathymetry

The contoured color maps of the area around Shirttail Point including the anchorage from 1955 and 1990 (figures 3,4) highlight the sedimentation processes in the system. The natural state of the Inner Harbor is to be completely dry at low tide inside the Commercial Dock. This equilibrium state is governed by the sediment supply and the tidal characteristics. The sediment supply has been interrupted to some extent by the Mayo Beach jetty and the groin field, but the tidal characteristics are relatively unaltered. Therefore, the bathymetry tends to return to pre-1955 depths. Dredging of the anchorage and Inner Basin to 6 feet MLW several times since 1955 has not stopped these areas from beginning to fill within a decade of the dredging. It appears that, given the tidal range, no small-scale alteration of the system geometry will appreciably affect the tendency toward sedimentation. For the anchorage especially, it appears that periodic dredging will be necessary at intervals of about 10 to 15 years to maintain navigable depths.

## Model Application

### *Branch 1 (Inlet - Cove - Shirttail Point)*

Figure 6 shows the velocity maxima on flood and ebb along Branch 1 (figure 1). At first glance, there is only one case that makes an appreciable difference in velocity range. All the cases except case 3 behave much the same. The highest flow is in the narrow channel sections along the jetty and in the channel approaching the tip of Shirttail Point from the Cove. Interesting to note is the reduction of flow in the anchorage section of the branch. Dredging of the large area has caused what is termed a "flow expansion", where suspended sediment can settle out onto the bottom, and bedload sediment will not move. This natural physical process works against dredging activity to continually replace what is dredged with material from other parts of the system.

Interestingly, cutting a channel through the parking area (figure 1) reduces the flow velocities in Branch 1. This result shows that the total water volume flux is parceled out between the new canal and the original waterway around the tip of the Point. These lower velocities suggest that sedimentation will increase in the original channel. This case, therefore, will clearly tend to exacerbate the problem of sedimentation, although it might occur in areas that do not experience it now. One interesting probability is that the original channel and the canal will compete to provide Duck Creek with tidal exchange. The literature (van de Kreeke, 1990) suggests that two "inlets" cannot serve the same embayment without one of them closing.

Figure 9a shows the ratio of flood to ebb velocity maxima. This ratio reflects the asymmetry of the flow. As this ratio increases (flood velocities > ebb velocities), the more of a tendency there will be for sediment and other particulates to remain within the estuary (Friedrichs, et al. 1988). All of the cases show a slowly rising asymmetry along Branch 1. Case 3 has a



peculiar effect near the end of the branch, probably caused by the proximity of the end to the exit point of the canal into the Inner Basin. The travel time of the tidal wave through the canal is probably much shorter than around Shirttail Point, imposing a mismatch in water level in a physical sense. The water level at the end of Branch 1 is controlled in this case by the fastest variation, which comes through the canal, not the natural progression of tide up Branch 1, hence the peculiar behavior.

#### *Branch 2 (Inner Basin)*

Figure 7 shows first that the magnitudes of the velocities are very small. This result explains why there continues to be accretion of fine material in this reach of the system. Opening the tide gate at the mouth of Mayo Creek (Case 2) and imposing an  $0.5 \text{ ft}^3/\text{sec}$  flow does little to the ebbing velocities, and this flow rate is most likely larger than would actually be expected out of Mayo Creek. Also, each of the cases is similar in their effect on flow in Branch 2. Figure 9b shows that asymmetry is slightly in favor of flood velocities. Mr. Woodbury explains that the sedimentary nature of the Inner Basin is a thick layer of very fine "ooze". This material is only deposited in the calmest of waters, giving evidence of the quiescence of this branch. Any future dredging activity will be counteracted by the natural sedimentary process in this area. None of the cases proposed will change the long-term tendency toward sedimentation of the Inner Basin.

#### *Branch 3 (Duck Creek)*

Figure 8 illustrates that the hypothetical modifications would produce more pronounced variations in Branch 3. First, widening the railroad bridge channel (Case 1) reduces the maximum ebb velocities locally, which would probably mean an accretionary reaction. Any time material is removed from the channel, the flow responds by tending to replace the material. Case 3 reduces the maximum flood velocities, possibly because a circular water exchange pattern is established between the canal and the channel around Shirttail Point. Figure 9c shows that asymmetry generally increases with distance up Duck Creek. Case 1 increases the asymmetry locally around the railroad bridge, suggesting that more bedload transport will occur at that location during flood tide.

## SUMMARY

In reviewing the results of this study, three major points stand out:

- (1) The rapid deposition of fine sediment in the dredged channel on the north side of Shirttail Point (branch 2 of Wellfleet Inner Harbor) is produced by a combination of three factors: (1) current speeds are very low in this relatively deep channel (maximum ebb and flood currents less than 0.1 knots, or  $0.17 \text{ ft}/\text{sec}$ ); (2) the adjoining channels (branches 1 and 3 of Wellfleet Inner Harbor) experience much stronger currents (approaching a maximum of 1 knot in upper Duck

Creek); and (3) these adjoining channels pass through thick deposits of fine sediment. The shoaling in branch 2 results from the settling of fine sediments that were put into suspension by more rapid flows in the other branches, particularly in Duck Creek. Both because these fine sediments settle slowly and because they settle in the absence of appreciable flow, they do not become tightly packed, but rather take the form of a fine "ooze".

It is difficult to avoid concluding that the initial dredging of the flats north of Shirttail Point to produce a mooring basin (branch 2) was an engineering error. While mooring basins with similar configurations have been successful in many parts of the world where ambient currents are weak and sediment input is small, the large tidal range and the ample supply of fine sediment in Wellfleet Harbor would seem to disqualify the design as an economically viable option there.

(2) None of the four proposed options for change (widening the railroad bridge channel, opening the Mayo Creek tide gate, creating a new channel through Shirttail Point parking lot, shortening Shirttail Point parking lot) would significantly improve the shoaling conditions in branch 2. This result would appear to leave the Town with only two options: periodically dredge the basin or abandon it. An economic analysis of the periodic dredging option would be a reasonable next step.

(3) While the one-dimensional numerical model used to carry out this work has been effective in answering the questions that motivated the study, the reader must avoid the temptation to apply model results to problems that involve variables not included in the model domain. For example, considerable interest has been expressed in the possibility of increasing the flushing of Duck Creek by either removing the remaining pilings at the abandoned railroad bridge or widening the channel at that location, or both. The model results show that the specified channel widening would decrease maximum ebb flows by approximately one half locally at the former railroad bridge. These results, however, apply only to one specific point — the channel at the former bridge — and not to the broad tidal flats that lie both north and south of that point.

Therefore, the following comments on matters that extend past the model domain are based on our previous experience with similar tidal systems and are qualitative in nature. Removal of the remaining pilings or widening the channel opening at the former railroad bridge would be expected (by decreasing the ebb current velocity at the former bridge channel) to reduce turbulence and sediment scour in that region. The resulting reduction in bed erosion, in turn, would likely reduce the supply of suspended fine sediment to branch 2 and thus also the rate of shoaling there. In addition, it may well be that the railroad embankment across Duck Creek has hindered the development of salt marsh in the upper part of the system and that its removal would stimulate increased marsh development there. If so, the growing marsh would be expected to trap and incorporated into itself fine suspended sediments which, in turn, would also likely reduce the shoaling rate of branch 2.

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## APPENDIX A

### Bathymetric survey system; Woods Hole Oceanographic Institution

Four major components make up the bathymetric survey system (Table A1):

1) Navigation: A master transponder and DDMU (Digital Distance Measuring Unit) are the sea-borne components. Remote transponders are positioned on shore to be integrated by the master on the boat. Range accuracies for each remote transponder are approximately 1 m.

2) Fathometer: A dual-frequency, survey-quality, echo sounder operating at 24 and 200 kHz was used for the bathymetric surveys. One or both of the frequencies can be activated at any time; the use of dual frequency provides a means for evaluating the presence of soft sediments on the bottom. Data from one of these frequencies (user selectable) are digitized and fed into the survey computer hardware and software. Two-way communication allows the computer to annotate the fathometer with time, position, and other information.

3) Data acquisition system: The hardware and software used for data acquisition and survey control consists of a HP series 200 computer, onboard plotter and a specialized survey software system. The data acquisition system software includes synchronization capabilities for side-scan and echo-sounder while surveying in the field, as well as the storage of time, depth, and position information. The post-processing software contains numerous options, including the output of standard, tide-corrected bathymetric plots, three-dimensional bathymetry plots, contour maps, and volume-difference calculations for between-survey comparisons.

In addition to the four primary components listed above, a number of other smaller components are required, including generator, power supplies, etc. which support the above components.

## APPENDIX A1

Indas system components used in data acquisition  
and analysis in Wellfleet survey 1990.

### Del Norte Navigation System

Del Norte model 547 DDMU  
Del Norte Model 547 Master Transponder  
Del Norte model 547 Antenna

### ODOM Hydrographic Systems Fathometer

ODOM Echotrac Model DF-3200 Control Unit  
Dual Frequency (24 kHz, 200 kHz) transducer, model 210-33/9-19

### SAIC Integrated Navigation and Data Acquisition System (INDAS)

#### Computer Hardware

HP 9920S Computer  
HP 98256A RAM  
HP 9153C-010 Disk  
HP 82913 Monitor  
HP 93526A Serial  
HP 2225A ThinkJet Printer  
HP 7475A Plotter  
HP 7596A Plotter  
HP 10833C HPIB

#### Computer Software

INDAS Real time navigation software  
INDAS post-survey processing software

**APPENDIX B**  
Harmonic Constituents from October - December 1989 (Town Pier)

Constituent	Amplitude (meters)	G (deg.)	Kappa (deg.)	Zeta (deg.)	o/o of squares	Tot.Sum
M2	1.40	187.56	47.56	209.61		83.482
S2	0.23	237.25	97.25	16.95		2.469
N2	0.37	141.12	1.12	282.05		5.735
K1	0.16	246.50	176.50	8.65		1.339
M4	0.05	240.87	320.87	284.97		0.114
O1	0.13	221.11	151.11	116.09		1.012
M6	0.05	183.56	123.56	249.71		0.100
S4	0.00	154.59	234.59	73.99		0.000
S6	0.01	259.40	199.40	318.50		0.002
M8	0.01	264.64	64.64	352.85		0.001
MK3	0.02	343.87	133.87	128.06		0.016
MN4	0.03	207.97	287.97	10.94		0.039
MS4	0.02	303.87	23.87	105.62		0.021
MSf	0.01	86.15	86.15	216.33		0.002
NU2	0.05	260.31	120.31	33.31		0.121
MU2	0.03	286.95	146.95	178.82		0.048
2N2	0.04	290.53	150.53	190.32		0.056
OO1	0.01	195.72	125.72	14.88		0.004
LAM2	0.01	214.19	74.19	305.30		0.004
M1	0.01	233.81	163.81	128.33		0.014
J1	0.01	208.51	138.51	216.72		0.006
RHO1	0.00	257.40	187.40	263.33		0.002
Q1	0.03	259.10	189.10	272.95		0.038
T2	0.01	237.25	97.25	306.97		0.009
R2	0.00	237.25	97.25	266.94		0.000
2Q1	0.00	271.70	201.70	44.42		0.001
P1	0.05	246.50	176.50	259.13		0.134
L2	0.04	210.62	70.62	301.14		0.060
K2	0.06	237.25	97.25	301.01		0.285
						95.111

M4:M2 Amplitude ratio: 0.0381  
 2(M2) - M4 Phase relation: 134.2481  
 RMS Tidal Height (meters): 2.900

APPENDIX C  
Harmonic Constituents from December 1989 - January 1990 (Town Pier)

Constituent	Amplitude (meters)	G (deg.)	Kappa (deg.)	Zeta (deg.)	o/o Tot.Sum of squares
M2	1.45	215.11	75.11	57.40	85.558
S2	0.16	280.51	140.51	342.22	1.102
N2	0.31	157.60	17.60	284.20	4.002
K1	0.21	276.36	206.36	320.75	2.063
M4	0.06	304.41	24.41	349.00	0.121
O1	0.12	239.60	169.60	33.46	0.902
M6	0.06	255.86	195.86	142.74	0.147
S4	0.00	194.74	274.74	318.16	0.001
S6	0.02	355.40	295.40	180.53	0.023
M8	0.01	369.05	169.05	98.23	0.002
MK3	0.03	62.26	212.26	308.95	0.039
MN4	0.03	248.00	328.00	216.89	0.026
MS4	0.02	43.76	123.76	307.76	0.012
MSf	0.03	92.60	92.60	322.23	0.032
NU2	0.06	310.86	170.86	359.21	0.123
MU2	0.03	345.91	205.91	318.57	0.049
2N2	0.04	350.62	210.62	41.52	0.058
OO1	0.01	202.85	132.85	325.87	0.004
LAM2	0.01	250.16	110.16	66.40	0.004
M1	0.01	257.98	187.98	253.82	0.016
J1	0.01	221.37	151.37	345.51	0.006
RHO1	0.00	292.12	222.12	292.04	0.001
Q1	0.02	294.59	224.59	12.75	0.034
T2	0.01	280.51	140.51	311.87	0.004
R2	0.00	280.51	140.51	192.57	0.000
2Q1	0.00	312.82	242.82	315.28	0.001
P1	0.07	276.36	206.36	289.63	0.202
L2	0.04	245.45	105.45	350.42	0.038
K2	0.04	280.51	140.51	188.85	0.132

94.700

M4:M2 Amplitude ratio: 0.0389  
2(M2) - M4 Phase relation: 125.8013  
RMS Tidal Height (meters): 2.967

**APPENDIX D**  
Harmonic Constituents from August - September 1992 (Commercial Dock)

Constituent	Amplitude (meters)	G (deg.)	Kappa (deg.)	Zeta (deg.)	o/o Tot.Sum of squares
M2	1.36	185.98	45.98	3.18	87.737
S2	0.22	315.26	175.26	41.76	2.393
N2	0.34	130.67	350.67	163.16	5.621
K1	0.11	297.72	227.72	97.19	0.605
M4	0.05	227.85	307.85	222.27	0.106
O1	0.12	194.82	124.82	203.71	0.732
M6	0.05	139.11	79.11	310.73	0.138
S4	0.00	81.76	161.76	254.76	0.001
S6	0.02	248.06	188.06	147.56	0.020
M8	0.02	530.53	330.53	159.36	0.020
MK3	0.00	75.57	225.57	52.24	0.000
MN4	0.03	201.64	281.64	51.34	0.040
MS4	0.03	338.11	58.11	241.81	0.033
MSf	0.01	22.50	22.50	315.38	0.010

97.453

M4:M2 Amplitude ratio: 0.0346  
2(M2) - M4 Phase relation: 144.1030  
RMS Tidal Height (meters): 2.869



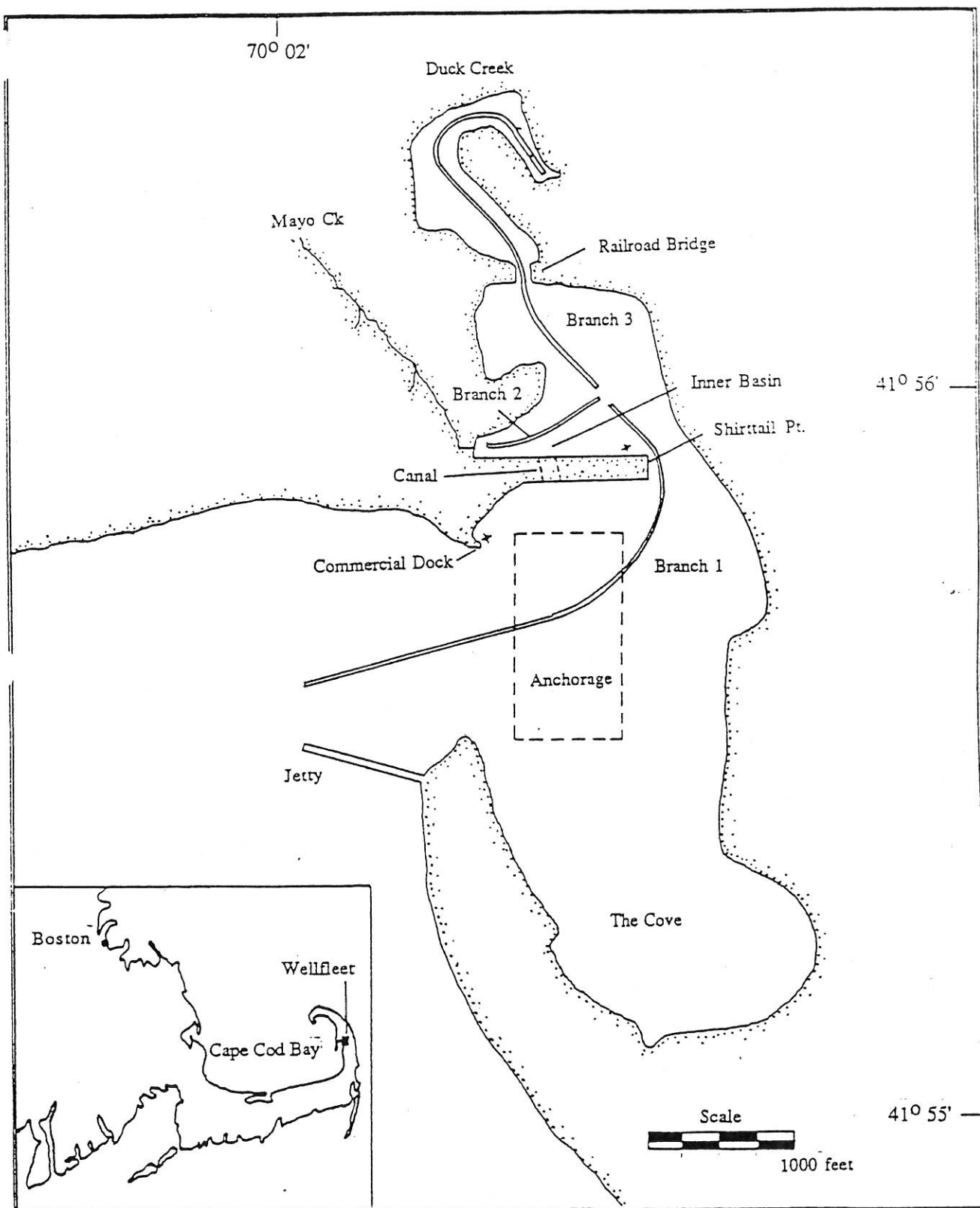


Figure 1. Location map for Wellfleet Inner Harbor. Major features like model branch locations, modifications, and TDR deployment sites (crosses) are also depicted.

APPENDIX E  
Harmonic Constituents from August - September 1992 (Inner Basin)

Constituent	Amplitude (meters)	G (deg.)	Kappa (deg.)	Zeta (deg.)	o/o Tot.Sum of squares
M2	1.23	194.91	54.91	321.74	91.497
S2	0.20	313.72	173.72	346.19	2.469
N2	0.28	143.89	3.89	127.97	4.869
K1	0.10	296.48	226.48	248.77	0.567
M4	0.01	323.40	43.40	217.07	0.008
O1	0.11	206.65	136.65	12.33	0.762
M6	0.06	162.25	102.25	182.74	0.218
S4	0.01	151.42	231.42	216.35	0.010
S6	0.01	260.32	200.32	357.72	0.005
M8	0.01	496.74	296.74	284.07	0.005
MK3	0.01	63.17	213.17	142.30	0.006
MN4	0.04	262.05	342.05	12.96	0.093
MS4	0.03	46.68	126.68	205.98	0.042
MSf	0.04	23.74	23.74	312.95	0.115

100.666

M4:M2 Amplitude ratio: 0.0092  
 2(M2) - M4 Phase relation: 66.4222  
 RMS Tidal Height (meters): 2.575

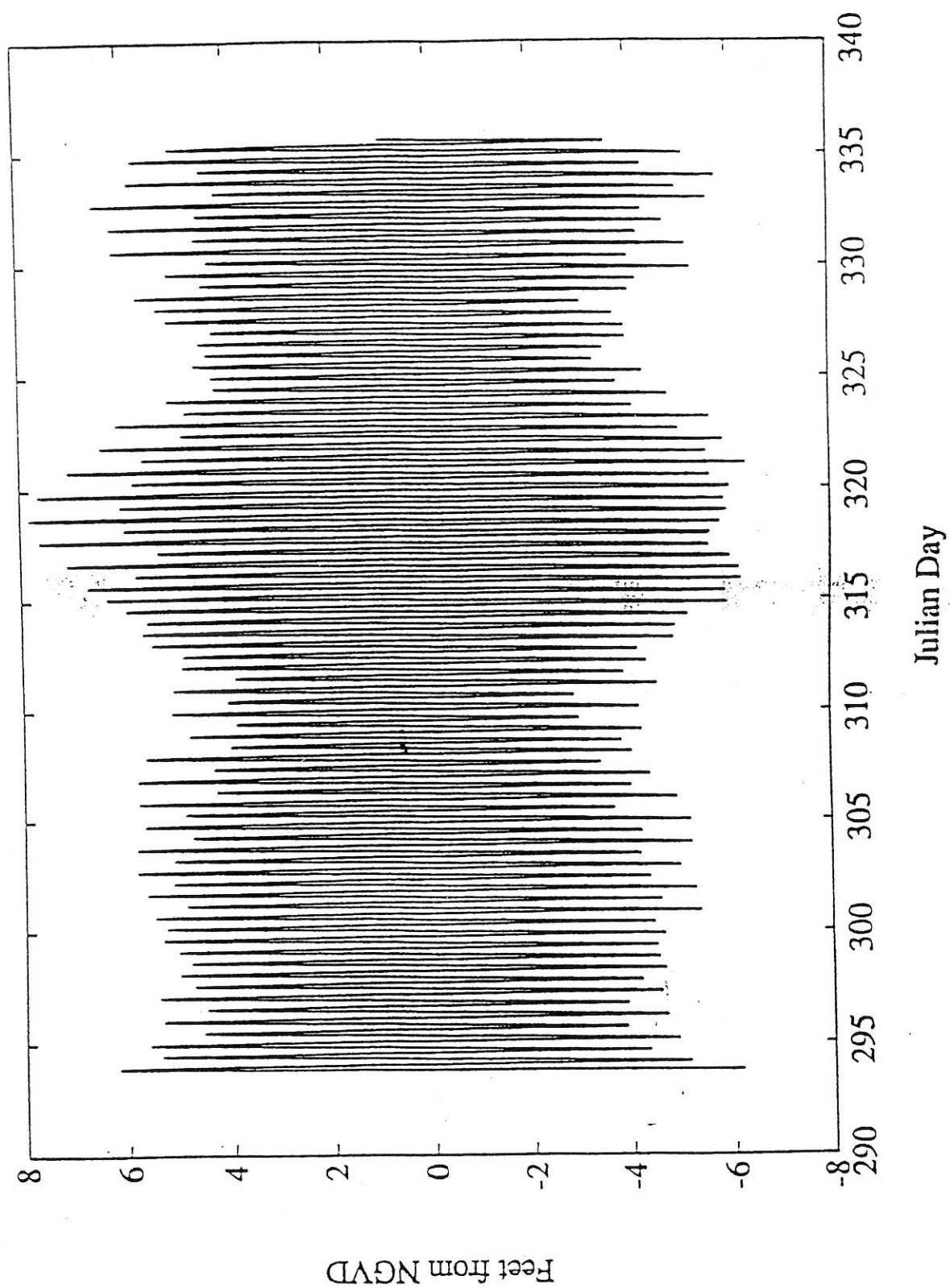


Figure 2. Typical TDR record of water level referenced to NGVD.

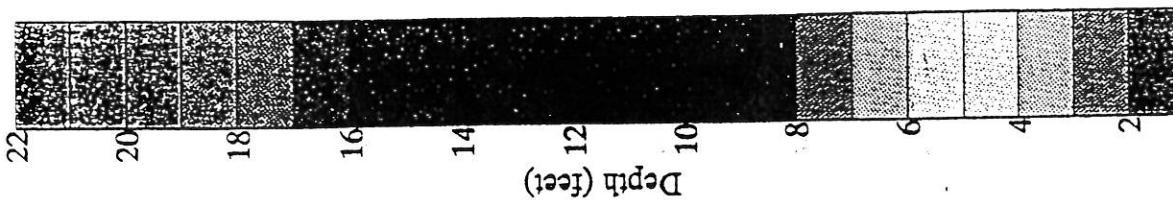
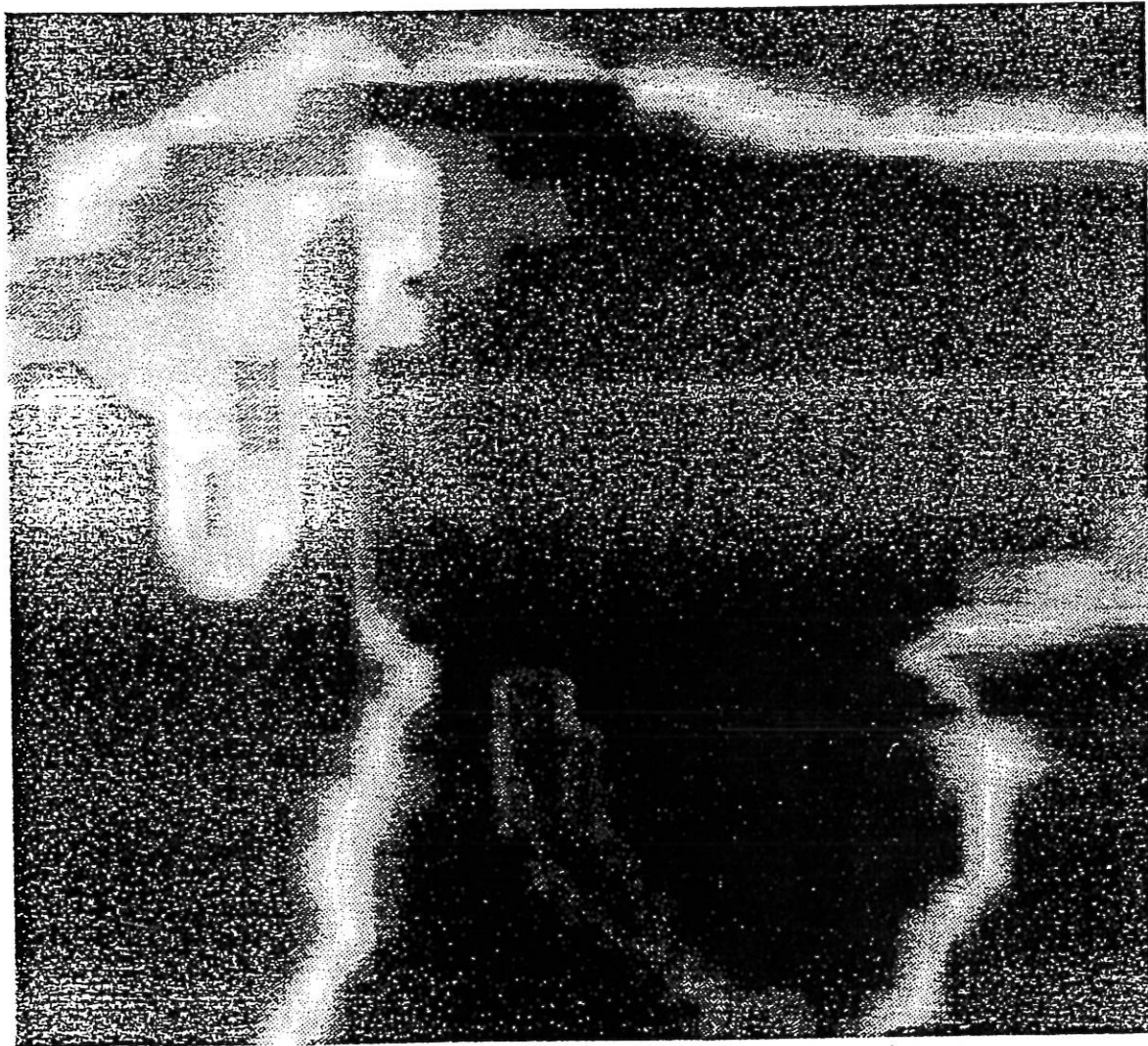


Figure 3. Harbor depths circa 1955. Depths are in feet below mean high water.

1990 Bathymetry



Figure 4. Harbor depths in 1990. Depths are in feet below mean high water.

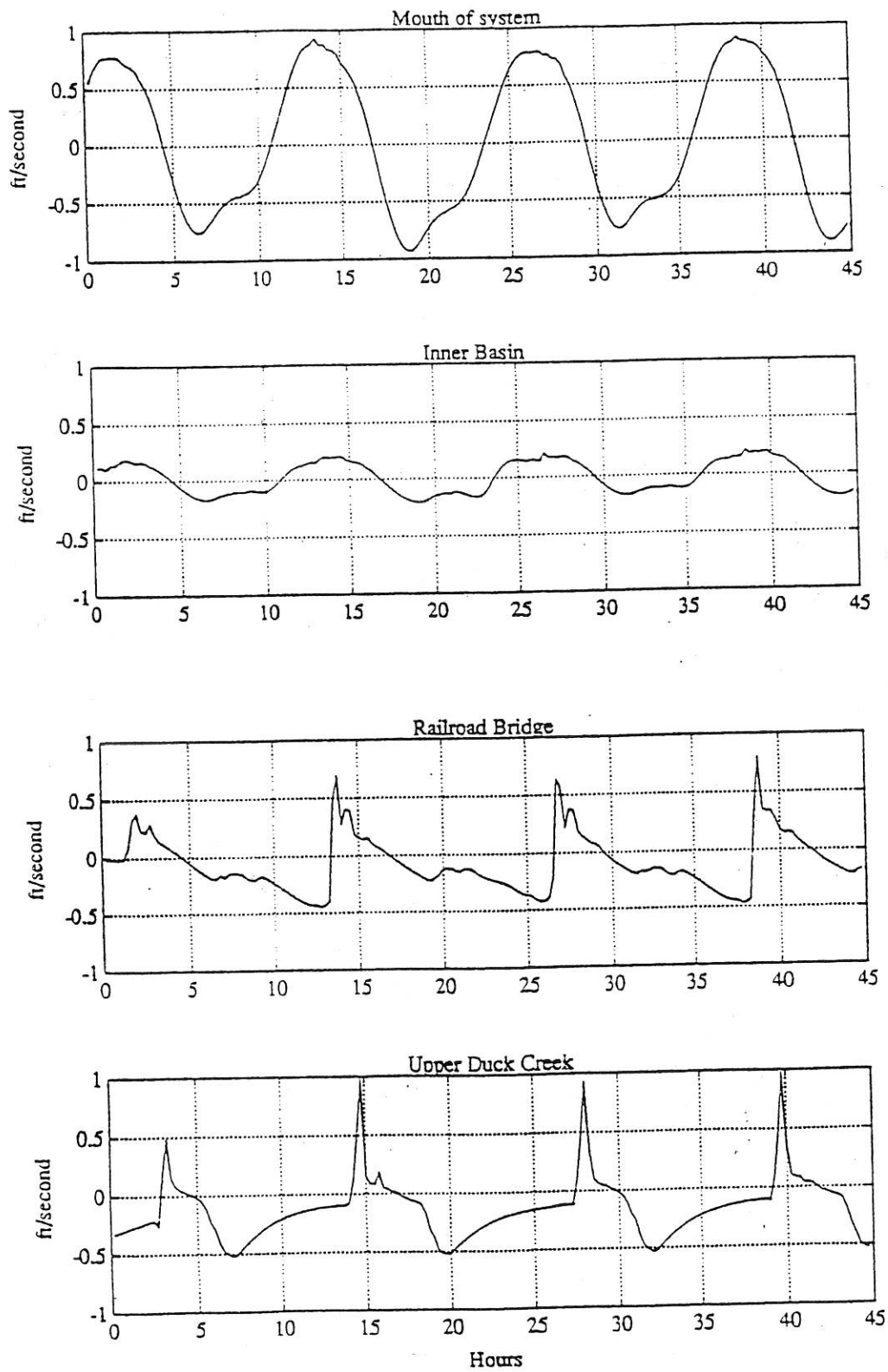
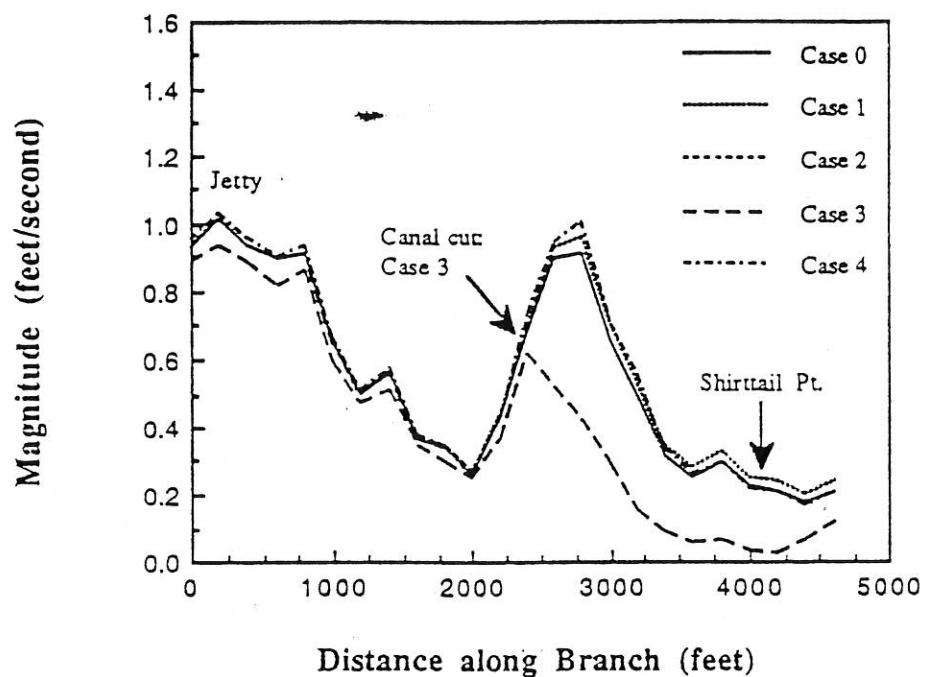


Figure 5. Model velocities from four locations in the system.  
a.) system mouth, b.) Inner Basin, c.) Railroad Bridge,  
d.) Upper Duck Creek.



### Maximum Flood Velocities along Branch 1



### Maximum Ebb Velocities along Branch 1

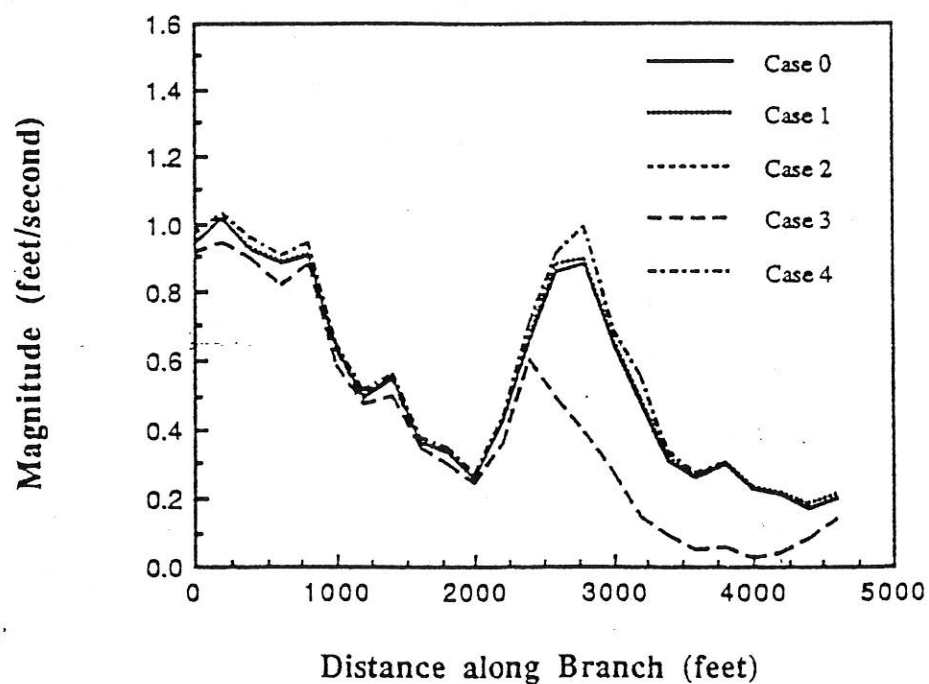
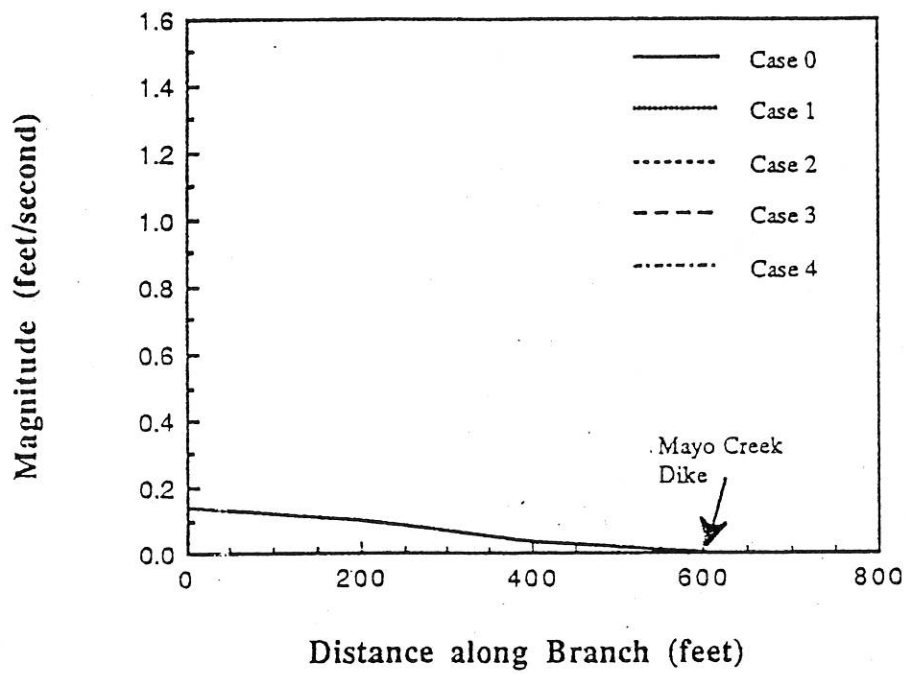


Figure 6. Velocity maxima for flooding and ebbing tides; Branch 1

### Maximum Flood Velocities along Branch 2



### Maximum Ebb Velocities along Branch 2

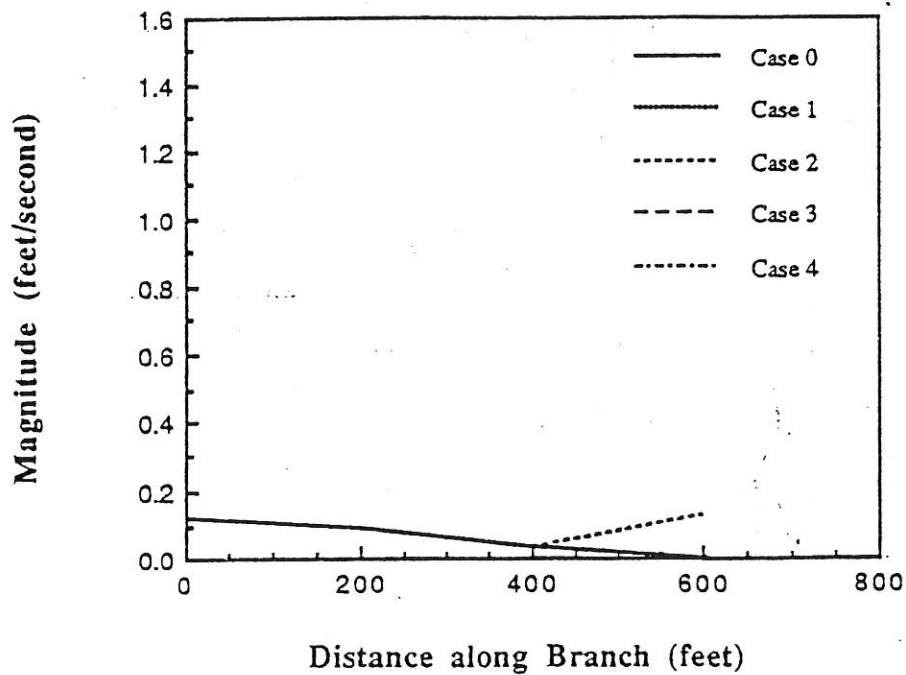


Figure 7. Velocity maxima for flooding and ebbing tides; Branch 2



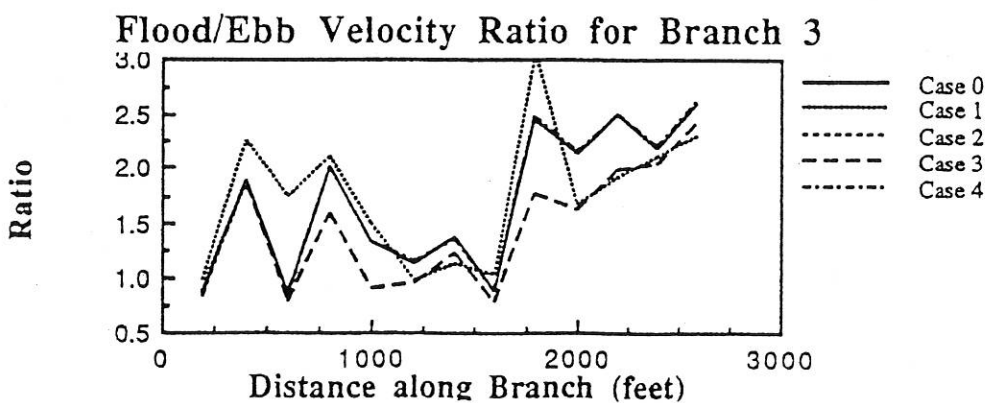
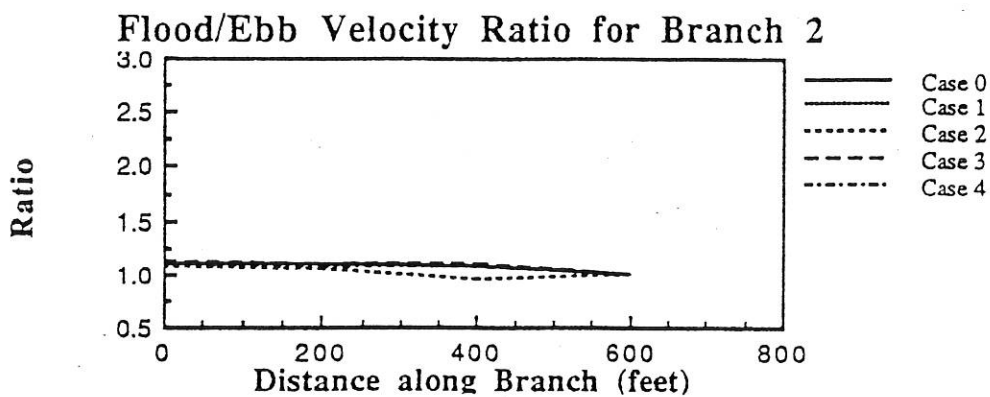
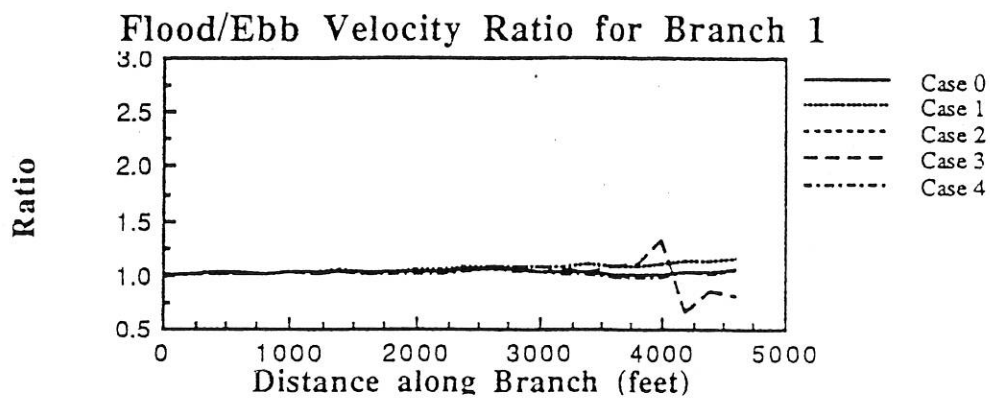
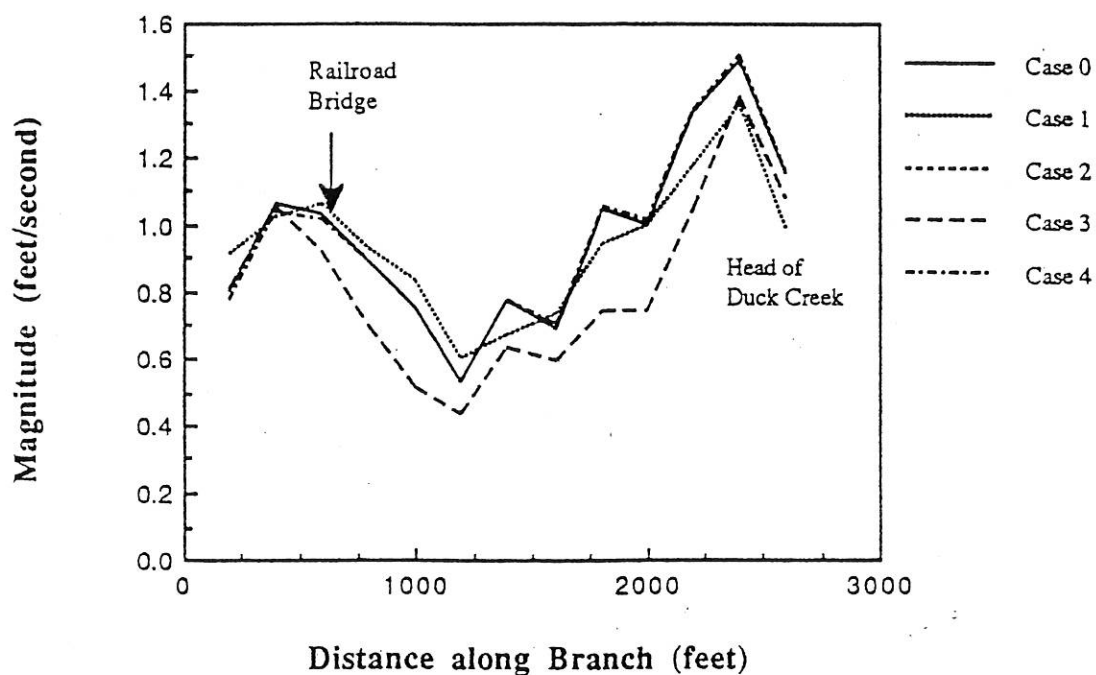


Figure 9. Maximum velocities ratios between flooding; ebbing tides for  
a.) Branch 1, b.) Branch 2, c.) Branch 3.

### Maximum Flood Velocities along Branch 3



### Maximum Ebb Velocities along Branch 3

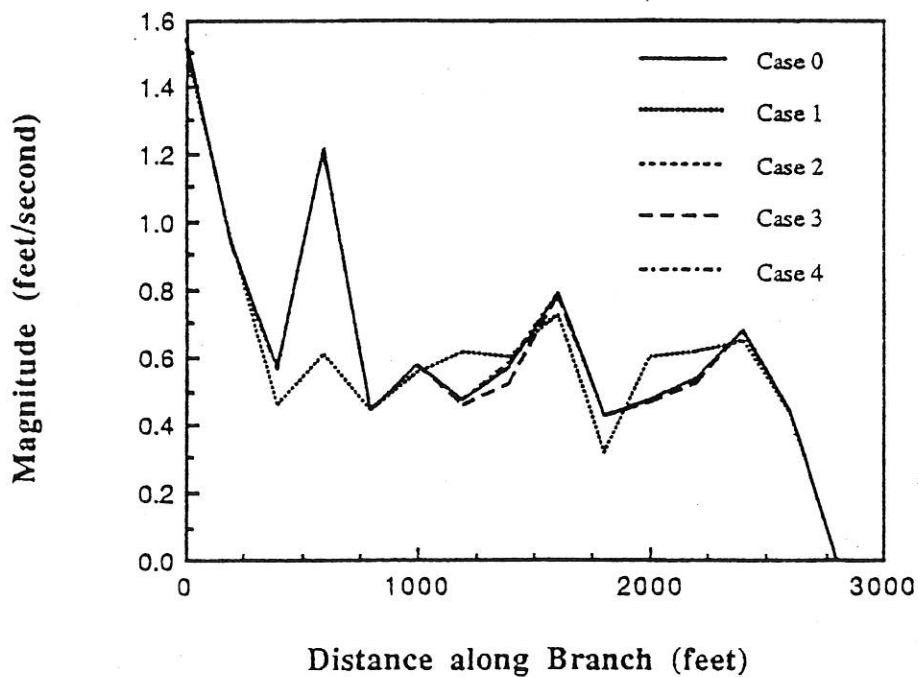


Figure 8. Velocity maxima for flooding and ebbing tides; Branch 3

APPENDIX B

TOWN LANDINGS Draft No. 1 April 13, 1991

1. BOUND BROOK ISLAND LANDING. Assessors' Map No. 6. No lot number (Assessors' indicated dimensions incorrect as of 02:24:91). 624' mol x 200'. S 87° 14'40"E; N 2°45' 20" E; N 87° 14' 40" W; high water line.

Plan: "Plan of Bound Brook Island Road, Wellfleet, Mass. As laid out by the Board of Selectmen. Scale of 50 feet to the inch. March 1944. Schofield Brothers Civil Engineers Eastham Cape Cod Mass." (Town Clerk's files)

ATM Feb. 12, 1945, Art. 21: Voted: "To accept the layout of a Town Way in Wellfleet, called Bound Brook Island Road and terminating in a Town Landing, with the boundaries and measurements as reported by the Selectmen under date of January 15, 1945 ... and authorize and instruct ... to take by purchase or eminent domain ... lands within said layout .. and raise and appropriate ... \$25."

ATM Feb. 13, 1950, Art. 30: Voted: "To accept the layouts of the following Town Ways in the Town of Wellfleet, with the boundaries and measurements as reported and recommended by the Selectmen, and authorize and instruct the Selectmen to take by purchase or eminent domain, in behalf of the Town, the lands or interests in the lands, within the lines of said layouts for said town ways, and for this purpose raise and appropriate a sum of money therefor.... Bound Brook Island Road ...."

NB: Earlier TM acceptances of Bound Brook Island Roads, e.g. in 1800, 1801, 1941.

2. BOUND BROOK ISLAND HERRING RIVER LANDING.

TM May 25, 1801: Layout: "... 5. Way beginning at the public watering place at Herring River or Creek, a little south of said [Solomon] Higgins thence southerly and westerly round by the meadow keeping as near the upland as a cart can conveniently go to the foot of the way that is now used to cart hay out of the old meadow so called, and other meadows adjoining, thence northerly as the said last mentioned way now leads, through said Isaac's [Rich] and Reuben's [Rich] and others' land to the highway. 6. Way beginning at the landing place at the said Herring River about south, and near said Richard's [Atwood] house, thence northerly and westerly as the way now leads, a little to the southward of said Richard's house to the east end of said highway."

3. DUCK HARBOR LANDING, GRIFFIN ISLAND. Assessors' Map No. 11 Lot No. 4. 10.7 acres (466,092 SF).

Plans: [Town Clerk's plans #25 "Griffin Island Duck Harbor Road" and # 170 "Duck Harbor" wanting]

ATM Feb. 12, 1945, Art. 23: Voted: "To accept the layout of a Town Way in Wellfleet, called Griffin Island Road and terminating in a Town Landing, with the boundaries and measurements as reported by the Selectmen under date of December 15, 1944, and ... authorize and instruct ... to take by purchase or eminent domain ... lands within said layout ... and raise and appropriate ... \$25."

ATM Feb. 1947, Art. 47: Voted: "To authorize the Selectmen to

enter into a stipulation with Alexander L. Henderson in Land Court case No, 18775 to establish: 1) a 50 foot way from Parking Area on Griffin Island and Chequesset Neck Road to a proposed Town Landing at Duck Harbor ... 4) A Town Landing adjacent to the shore at Duck Harbor, North of the present dyke at the Northerly edge of the upland of Griffin Island to the waters of Cape Cod Bay containing approximately 12 acres."

ATM Feb. 13, 1950, Art. 30: Voted: "To accept the layouts of the following Town Ways in the Town of Wellfleet, with the boundaries and measurements as reported and recommended by the Selectmen, and authorize and instruct the Selectmen to take by purchase or eminent domain, in behalf of the Town, the lands or interests in the lands, within the lines of said layouts for said town ways, and for this purpose raise and appropriate a sum of money therefor. ... Griffin Island Road ... Duck Harbor Road...."  
[Deed wanting.]

4. THE GUT LANDING, GRIFFIN ISLAND. Assessors' Map No. 18 Lot No. 8. N 86° 51' 00" E, 594' mol; southerly 839' mol by the mean high water line of the Herring River or Wellfleet Harbor; S 86° 51' 00" W, 605' mol; northerly 721' mol by the mean high water line of Cape Cod Bay. 9.2 acres mol.

ATM Feb. 10, 1935, Art. 20: Voted: "To accept a gift from the Capt. L. D. Baker Estate, a certain parcel of land, situated on the Shores of Cape Cod Bay and extending to the shores of Wellfleet harbor, on what is known as Griffin's Island, as a Public Town Landing. Provided that the Town of Wellfleet will agree to construct and maintain a road beginning at what is known as Powers Landing and extending [over] the Herring River Dyke ... to the proposed Public Landing."

Deed: Trustees of Captain L. D. Baker Estate, grantors, to the Inhabitants of the Town of Wellfleet, Jan. 27, 1936. (Town Clerk's files.)

5. FISHERMEN'S LANDING, HERRING RIVER, GRIFFIN ISLAND. Assessors' Map No. 18. No lot number. Undocumented tacit permission by the Cape Cod National Seashore for use of road leading from south side of Chequesset Neck Road to landing east side of barrier by shellfishermen and other members of public. No documentary evidence that this presumed proprietor's road was ever taken by the Town.

6A (north bank) and 6B (south bank). HERRING RIVER DIKE APPROACHES. Assessors' Map No. 18. No lot number. Southerly 970'; by right angle easterly 100'; by right angle northerly 970'; by right angle westerly 100'. 97,000 SF.

Deed: Lorenzo D. Baker, grantor, to the Town of Wellfleet, Sept. 5, 1907.

Plan: ["Plan to Accompany Deed from L. D. Baker to the Town of Wellfleet, Mass. August 12, 1907, Whitman and Howard Civil Engineers." (wanting.)]

7. CHEQUESSET NECK YACHT CLUB LANDING. Assessors' Map No. 19. Lot No. 114 (formerly Way C11). 0.14 acres.

Plan: "Subdivision of part of lot D2 shown on plan 10669G Filed

with Cert. of Title No. 4479 Registry District of Barnstable  
Count Land In Wellfleet Scale 60 feet to an inch August 1944  
Arthur L. Sparrow, Engineer." Assessors' files.)  
[Title to property undetermined as of 03-24-91.]

8. POWERS LANDING, CHEQUESSET NECK. Assessors' Map No.19. No  
lot number. [No plan showing directions or lengths of bounds or  
area.]

TMs Sept. 12, 1763; Jan. 30, 1764; Mar. 4, 1764: Layouts: A road  
"Beginning at the King's Highway a little to the eastward of the  
northeast arm of Duck Creek running over said arm ... southerly  
side of William Atwood's dwelling house ... westerly ... by the  
southerly side of the Rev. Mr. Isaiah Lewis' dwelling house still  
westerly ... over the Pound Hill to the southward of Joseph  
Atkins' house then southwesterly along the head of the meadow  
near the upland bank until it comes to the bottom of the hill  
leading toward Daniel Mayo's house still southwesterly  
orchard fence ... to the southerly end of a swamp near Daniel  
Mayo's barn forty feet wide from beginning to end of the road  
[thence] northward of the old meeting house hill [Taylor Hill]  
then southwesterly as the cart way runs near Major Doane's fence  
then westerly as the cart way runs to the northward of Hulson  
Vickery's dwelling house then still westerly in the cart way till  
it comes to the north end of Doanes Bridge thence across said  
bridge southwesterly by west till it comes to high water mark to  
the eastward of Samuel Hatch's dwelling house and there to a  
landing place."

Record of Roads. June 10, 1858: "We the subscribers Selectmen of  
Wellfleet have straightened and widened the road commencing near  
the house of Solomon Dyer running to the westward of Justin  
Taylor's to Holbrook's landing so called for the use of said town  
as follows viz: Beginning at a stake and stone in the south, line  
of the county road that leads to the Union Wharf near Solomon  
Dyer's thence S 40° W 8 rods 11 links to a stake and stone over  
land of Justin Taylor thence S 44° W 5 rods 4 links to a stake  
and stones thence over land of the same S 33° W 15 rods 2 links  
thence same course 6 rods 11 links over land of the same thence S  
20° W 12 rods 10 links over land of the same thence S 7° W 15  
rods 6 links over land of the same. The road is to be on the  
southerly and easterly side of the above course. Thence crossing  
the road to a stake and stone where the old willow tree stood  
then S 67° W 3 rods 12 links over land of the same thence W 9° N  
3 rods 14 links thence S 87° W 25 rods 21 links thence S 75° W 27  
rods thence S 55° W 4 rods 11 links thence S 30° W 3 rods thence  
S 14° W 19 rods 6 links thence S 14° W 6 rods 13 links thence S  
30° W 32 rods 15 links thence S 24° W 17 rods 13 links thence S  
56° W 8 rods on the south line of the old road thence S 76° W 14  
rods 9 links thence W 7° S 19 rods 4 links thence S 86° W 8 rods  
thence S 62° W 18 rods 11 links over land of Joseph Baker thence  
S 56° W 16 rods 20 links over land of Hezekiah Baker thence S 4°  
E 12 rods to the shore in Hezekiah Baker's range thence westerly  
[sic] by the shore to Cornelius Hamblen's range. The road is to  
be on the northerly side of the last mentioned courses thence in  
said C. Hamblen's range northerly to the edge of the  
upland the road is to be thirty feet wide...."

Deed: Quit-Claim Deed, Ruth H. Atkins, grantor, to the Town of Wellfleet "one half of an undivided lot of land with the buildings thereon ... Beginning at a stake in the range of Hezekiah D. Baker on the road that leads out of the Neck. Thence E 3° N 17 rods to a stake. Thence S 10° E to high water mark on the side of [the] beach. Thence Easterly by high water mark to land of Cornelius Hamblen. Thence N 1° W in said Hamblen range to a stake. Thence E 1° S 21 rods and 15 links to land of Lemuel Newcomb and others. Thence N 28° W 14 rods to the Road. Thence westerly by said road to the point of Beginning." (Town Clerk's files.)

Plan: "Plan of Land in Wellfleet for Howard B. White. Scale 1 inch = 100 Feet April 1965 Carey Engineering Company of Wellfleet. Note: See Land Court Plan 10669C" (Board of Assessors' files.) Showing town landing area.

9. MAYO BEACH A. KELLER'S CORNER. Assessors' Map No. 20 Lot No. 31. [Deed and plan wanting.]

10. MAYO BEACH B. Assessors' Map No. 20 Lot No. 16. 1.7 acres. STM April 20, 1897, Art. 3: Vote: To appropriate (\$2,500) twenty-five hundred dollars for the purchase of Central Wharf Co. making a town landing of same.

Deed: Oliver H. Linnell, grantor, to Inhabitants of the Town of Wellfleet, in consideration of \$450, June 9, 1897, "the following real estate ... as a public landing place ... on Mayo's Beach ... and... known as Central Wharf ... Beginning at a stake and stone on the south side of a town road, thence runs S 25° W 185 ft to a stake, thence runs E 65° S 13 ft to a stake, thence runs S 25° W to the channel, thence coming back to the first mentioned bound and running westerly by the line of the town road to land of George Baker, thence runs southerly in said Baker's range and others 295 ft, thence runs westerly to land of Mrs. T. B., Miller 56 ft 6 in, thence runs S 25° W to the channel, thence runs easterly by said channel until it comes in range of first bound or to the point of the second bound. Reserving a right of way in a twenty-seven ft road to George Baker, Joseph Stubbs, Parker E. Hickman and Edwin P. Cook."

11. MAYO BEACH C. Assessors' Map. No. 20 Lot No. 12.

ATM March 6, 1911, Art. 33: Voted: "To take in fee by right of eminent domain, and maintain as a public playground. the parcels of land severally described as follows to wit: A parcel of beach land situated in Wellfleet, Commonwealth of Massachusetts and bounded and described as follows: Bounded on the West by the Eastern line of lot No. 794 as shown on "Plan of Seashore Lots, Wellfleet Harbor, Wellfleet, Mass., belonging to J. Abbot Clark" dated 1890 and recorded in Barnstable Registry of Deeds, libro 180, folio 522, said Eastern line of said lot No. 794 being produced to the low water mark, bounded on the North by Kendrick avenue, bounded on the East by the Western line of land of the United States running from said Kendrick Avenue to low water mark, bounded on the South by the sea; ..."

Deed: Trustees of Captain L. D. Baker Estate, grantors, to the



Inhabitants of the Town of Wellfleet, Dec. 10, 1941 "Beginning at a point on the Southerly side of Kendrick Avenue in the range of land now or formerly of the United States Government, known as the Mayo's Beach Light, thence S 4° 51' 10" E in range of land of said United States Government or another 150 feet, more or less, to the waters of Wellfleet Harbor; thence Westerly by water of said Harbor 660 feet, more or less; thence N 7° 24' 40" W by land now or formerly of L. D. Baker Estate 80 feet, more or less; thence N 82° 35' 20" E by said Kendrick Avenue 666.75 feet to the point of beginning, or as however otherwise shown on a plan of said land on file with the Office of the Selectmen, Wellfleet, Massachusetts."

STM Sept. 15, 1941, Art. 5: Voted: "To accept a deed of land from the Captain L. D. Baker Estate of all the shore property on the southerly side of Kendrick Avenue to which the L. D. Baker Estate has title which has not hitherto before been conveyed to the Town by said estate."

[Plan wanting.]

12. MAYO BEACH D. Assessors' Map No. 20 Lot 11. .37 acres (15,900 SF).

ATM April 24, 1989, Art. 25: Voted: "To waive the public auction provisions of Article III, Section 7 of the Wellfleet General Bylaws and authorize the Board of Selectmen to transfer or convey to Harry Parkington and Kathleen Parkington whatever interest the Town of Wellfleet has in certain parcels of land shown as lots 10, 11 on Town of Wellfleet Assessors' Map 20 (formerly lots 812 and 20 on Map 122-22) or such portion of the aforementioned lots as the Selectmen deem advisable, such transfer or conveyance to be in consideration for a transfer of land from the said Parkingtons and to be made on such terms and conditions as the Selectmen deem appropriate."

Quit-Claim Deed: Harry and Kathleen D. Parkington. grantors, to the Town of Wellfleet, for consideration of \$1, Sept. 14, 1989, "land ... bounded .. as follows : Northerly by Kendrick Ave., 46.16'; northeasterly by land of Harry ... and Kathleen D. Parkington 25'; easterly by land of Harry ... and Kathleen D. Parkington 63.71'; northeasterly by land of Harry ... and Kathleen D. Parkington 39.38'; easterly by land of Harry ... and Kathleen D. Parkington 110'; southeasterly, southerly, and southwesterly by Wellfleet Harbor, as determined by the mean high water mark, a distance of 125' mol; and westerly by land of the Town of Wellfleet, 179' mol ... Containing 15,900 SF mol and being shown on plan .... (Assessors' files.)

Plan: "Supplementary Plan of Land in Wellfleet to be filed in the Land Court, showing parcel to be severed and dismissed from L.C.C. No. 41113 (confirmation). Scale 1 in.=20 ft. July 1989 Slade Associates, Inc. Reg. Land Surveyors Rte. 6 & Pine Pt. Rd., Wellfleet, MA 02667." (Slade Assoc. files.)

13. MAYO BEACH E. Assessors' Map No. 20 Lot No. 20. 3.51 acres, together with ownership of the flats abreast to extreme low water mark.

ATM March 6, 1911, Art. 33: Voted: "To take in fee by right of eminent domain, and maintain as a public playground, the parcels

of land severally described as follows, to wit: ... ; also a parcel of land situated in said Wellfleet bounded and described as follows: Bounded on the West by the Eastern line of land of the United States running from said Kendrick Avenue to low water mark, bounded on the North by said Kendrick Avenue, bounded on the East by land now, or formerly owned by Joseph A. Stubbs and Edwin P. Cook, running from said Kendrick Avenue to low water mark, bounded on the South by the Sea."

ATM Feb. 9, 1931, Art. 16: Voted "That the Town purchase this property ["the beach land between what is commonly known as Mayo's Beach Lighthouse and the property of Mr. Thomas E. Young extending in width to Kendrick Avenue, an approximate area of six acres for a bathing beach"] and appropriate for 1931 the sum of \$1,000 for this purpose. (The sum of One Thousand dollars to be paid as soon as title is completed) balance of purchase price to be paid by some unknown citizen and serial notes in \$1,000 denominations be issued payable one in each year (on March 1st) without interest until balance of \$5,000 is paid in full." (Total agreed price \$6,000.)

Deed: Trustees of the Captain L. D. Baker Estate, grantors, to the Town of Wellfleet, in consideration of \$6,000, April 4, 1931, "a certain parcel of land ... at Mayo Beach ... bounded and described as follows: Beginning at the northwesterly corner thereof at land of Harry L. Capron, being formerly property of United States of America on which Mayo Beach Light stood; thence about S 65° 17' 50" E 492.25 feet by the Town Way to an angle; thence by said Town Way about S 55° 50' 20" E 421.83 feet to land of the grantors; thence S 32° 31' 10" W 61.8 feet mol by said grantors range to a stake in line with the projection of the northerly end of the sail loft building of Clara J. Young; thence by said grantor's range S 58° 34' 00" E 30 feet to a stake at land of Clara J. Young; thence by said Young's range S 32° 31' 10" W 150 feet mol passing through a stake to high water mark at Wellfleet Harbor; thence northwesterly by high water mark of said Wellfleet Harbor 890 feet mol to the land of Harry L. Capron; thence by said land N 10° 42' 40" E 150 feet mol passing through a stake to the point of beginning. Containing an area above high water mark of 3 51/100 acres mol. Together with our ownership in the flats abreast the above mentioned premises between high water and extreme low water mark. This conveyance is made on the express condition that the premises shall be forever used as a public Town Park for bathing and other recreational uses and for no other purpose, and shall always be maintained by the grantee in a reasonably neat condition." (Town Clerk's files.)

14. MAYO BEACH F. Assessors' Map No. 20 Lot 114. [Area?]

ATM Feb. 14, 1944, Art. 15: "Voted to purchase the Seal Shipt Lot from Mrs. Alexander Grant and that the sum of \$1,500 be taken from free cash in the Treasury to pay for the same." Deed: Edith M. Grant, grantor, to the Town of Wellfleet, for consideration paid, April 1, 1944, "a certain tract of land, with all buildings thereon, that formerly belonged to the Commercial Wharf Company, Central Trading Company, Sea Coast Oyster Company, and Sealshipt Oyster System, ... the whole of said property being bounded and described as follows: Beginning at a granite post 3' 6" north of



the buildings formerly known as the Central Trading Company building and located on the south side of Mayo's Beach ... and in the eastern range or the Central Trading Company's land; thence southerly in said range to the channel; thence westerly by said channel until it comes in the range of land formerly owned by Isaiah C. Young; thence northerly in said Young's range to Mayo's Beach Road; thence easterly by said road to the point begun at. It is understood ... that all riparian rights go with said property. (Town Clerk's files.)

Record of Roads, p. 36, June 12, 1850: "A true abstract from the report of the Commissioners on the petitions of Payne C. Atwood & others for a Highway in Wellfleet made June 12, 1850: Beginning at the County Road near the Northeasterly part of Simeon Atwood's dwelling house [Main St. and Bank St.?] thence S  $3\frac{1}{4}^{\circ}$  E 8 links to a mark on said Atwood's board yard thence ... [presumably along track of present Bank and Commercial Streets] ... thence S  $9^{\circ}$  W 14 rods over land of Payne Atwood to the northwest arm of Duck Creek thence S  $24.5^{\circ}$  W 18 rods across said creek thence same course 10 rods 2 links over land of Simeon Atwood thence S  $16.5^{\circ}$  W 4 rods 12 links over same to high water mark on the southerly side of Mayos Beach thence same course into the sea. The foregoing courses constitute the westerly side of said highway which is to be 1 rods 12 links wide from the beginning at the county road to the southerly end of the bridge to be built over the aforesaid creek thence immediately widening on the easterly side to 2 rods which width is continued over Mayos Beach to the sea."

ATM Feb. 11, 1918, Art. 13: Voted: "To take action toward repairing the Town Landing, and appropriating \$1,000 for the same."

ATM Feb. 11, 1919, Art. 13: Voted: "To appropriate two thousand dollars (\$2,000) and the unexpended balance for repairing the Town Landing."

ATM Feb. 11, 1952, Art. 34: "Upon motion duly made and seconded it was voted to raise and appropriate the sum of \$1,000, for the purchase of Shirt-tail Point and the riparian rights pertinent thereto and that the grantors have the right to reserve in their deed a strip of land not more than 50 feet wide on the westerly side thereof, adjoining the Sealshipt Lot, and that until the Town has a particular use for Shirt-tail Point, that a small building on the easterly side of the building now used as a Lobster Pound shall be considered as personal property and that the owner shall have the right to remove that building upon reasonable notice from the Town to remove same."

Quit-Claim Deed: Maud Payne, grantor, to the Inhabitants of the Town of Wellfleet, for consideration paid, Nov. 20, 1952, land ... bounded and described as follows: On the north by the inner channel of Duck Creek; on the east, by the channel of Duck Creek; on the south, by the waters of Wellfleet Harbor; and on the west, by a Town road known as Commercial Street and a 25-foot Town Landing adjoining the Sealshipt Lot, so called, owned by the Town of Wellfleet; meaning and intending to convey all that portion of land known as 'Shirt-Tail Point,' and the riparian rights appurtenant thereto. Excepting, however, a parcel of land fifty feet square, adjoining the above-mentioned Town Landing,

the location of which parcel of land is to be determined by the Grantor, her heirs [et al.]; restricted, however, to the condition that it adjoin the aforesaid Town Landing on the West." (Town Clerk's files.) Agreement between Town of Wellfleet and Maud Payne determining the location of the 50-foot square reserved lot, with attached plan, July 27, 1961 (Town Clerk's files.)

Quit-Claim Deed: Selectmen of the Town of Wellfleet, grantors, to F. Maud Payne and Evelyn P. Dickey, July, 1961, for 50-foot square lot. (Town Clerk's files [unsigned copy]).

15. RED LOAM LANDING (between old Rivers property [Cove Gallery] and Custom House, Commercial Street?). Map No. 15 Lots Nos. [104-105?].

Warrant from the Selectmen to the Constable "to warn the Inhabitants to assemble ... Monday the third day of March [1766] ... To vote and order the Selectmen of this District to lay out a Way with Gates and Bars with a Landing Place from the way lately laid out from the King's Highway to the waterside near the dwelling house of Samuel Hatch. Beginning at or near Ephraim Atwood's dwelling house to the bank commonly called the Red Loom." TM Mar 3, 1766: Vote "to lay out a way with gates or bars with a landing place from the way lately laid out from the King's Highway to the waterside near the dwelling house of Samuel Hatch. Beginning at or near Ephraim Atwood's dwelling to the bank commonly called the Red Loom."

TM March 21, 1766: "Voted in the Negative with regards to laying out a way with gates or bars from the King's Road or the way leading from the King's Road to the dwelling house of Mr. Samuel Hatches beginning at or near the dwelling house of Mr. Ephraim Atwood thence to the bank commonly called the Red Loom with a landing place. The District refusing to order the Selectmen to lay out the same. ] 1768: "Voted that the Selectmen layout a way TM May 2, 1768: Voted "That the Selectmen lay out a way and landing place to and at the Red Loom provided any number of men shall give the Selectmen security to endemnify this District therefrom."

16. OLD FIRE BARN, COMMERCIAL STREET. Map No. 15 Lot No. 106. .22 acres (9,600 SF). [Deed wanting].

17. UNCLE TIM'S BRIDGE APPROACH, COMMERCIAL STREET. Map No. 15. No lot number.

Record of Roads, Aug. 21, 1856: "We the Selectmen of the Town of Wellfleet have laid out for the use of said Town a Town Way as follows viz: Commencing at the Cahoons Hollow road near the shore south of Elisha A. Bakers at a stake and stone, thence running N 49° W 7 rods 8 links to a stake and stones over the land of Samuel Kemp deceased thence [northwesterly in various courses to the northwest corner of Hamblen's Island] thence N 72° W 7 rods 4 links so as to intersect with the end of the foot bridge which is in building across Duck Creek thence over the same N 20° W 7 rods to the channel thence from the channel over the flats of Timothy A. Daniels N 20° W to intersect with the Town road and to be 20 feet wide and to be on the easterly side

of the above courses."

NB: Town meetings of May 6, 1795, April 5, 1830, Feb. 1, 1847, and March 18, 1856 voted to build foot bridges across Duck Creek to Hamblen's Island, apparently at the site of the modern Uncle Tim's Bridge, but until 1856 there was no legal taking of the land on which the bridges were erected or of the approaches.

18. HAMBLEN ISLAND (Hamblen Park, Cannon Hill). Maps Nos. 15 and 20, No lot number. Area undetermined.

ATM Feb. 9, 1931, Art. 34: Voted "to accept as a gift from Mr. Arthur T. Hopkins and family the land known as Hamblen Island or Cannon Hill to be held by the Town of Wellfleet forever as a public park with the following clauses attached by the donors: First, that the Town shall pay for the deed. Second, that the property shall be used as a public park for all time. Third, that a reasonable amount of improvements to assure this fact shall be made within a period of three years.... [With] a rising vote of thanks to A. T. Hopkins and family for this gift."

Quit-Claim Deed: Annie R. Hopkins, grantor, to the Inhabitants of the Town of Wellfleet, for consideration paid, March 19, 1931, a certain ... parcel of land ... bounded and described as follows: On the north by a creek; on the west by the flats; on the south by land now or formerly of the L. D. Baker Estate and Frank Kendall; and on the east by a creek; subject to the right of way in the Town of Wellfleet running through the center of said parcel. This land is known as Hamblen's Island or Cannon Hill, and is to be held by the Town of Wellfleet as a public park. This conveyance is made on the following conditions: (1) That the property shall be used as a public park for all time; (2) that a reasonable amount of improvements to assure this shall be made within a period of three years from date of this deed.

19. COBB'S ROAD LANDINGS. Map No. 15? Location undetermined.

TM Dec. 24, 1827: Selectmen's Layout accepted by vote: "Road called Cobbs Road and begins at the country road north of Jeremiah Hawes and runs down in front of Samuel Kemp's house to the beach where Johns Island one [once?] was to be kept with gates and bars, an order of Notice to be served on Samuel Kemp and the widow Sally Kenrick to always keep gates and bars for people to pass when the tide is up. Another road to branch out from this on the top of the hill and run down to the shore on the north side of Benjamin R. Witherell's land to a point which is to be a Town landing and from said point around the shore to the wading place over Duck Creek and over the wading place to Samuel Higgins and around the shore northerly to the Red Loam road to be a low water road to pass when the tide is down. Accepted by a vote of the Town Meeting December 24, 1827."

20. EAST ARM OF DUCK CREEK. Map No. 15. Location undetermined.

Surveyor's Certificate: "To whom it may concern: I hereby certify that I have run out as a Town Landing the following flat Viz beginning at the south east corner of Duck [Creek] Bridge by the west side of the County Road thence northerly by said road eight rods & twenty-two links, thence west across Duck Creek to Thomas

Kemp['s] fence, thence southerly by his fence and across the road to the southwest corner of Duck Creek Bridge thence easterly by the south side of Duck Creek Bridge to the first mentioned bound. Sept. 18, 1833. [signed] Josiah Whitman, Surveyor of Land. Registered Barnstable County Courthouse, Oct. 2, 1833 Book 11, folio 238." (Town Clerk's files.)

NB: This certificate was copied by the Town Clerk in the Town Records for 1833, but the landing does not appear to have been laid out by the Selectmen or approved by a Town Meeting.

21. CAHOON'S HOLLOW ROAD LANDING. Map No. 20. No lot number. No area determined.

TM Jan. 17, 1856: Layout of Town way: Beginning at the west side of the County Road at a stake and stone running over land of Thomas Hawes S 47° W 9 rods and 12 links thence over same S 49° W 8 rods thence over same S 53° W 10 rods 16 links thence over same S 52° W 9 rods 21 links to land of John B. Newcomb thence over land of said Newcomb S 52° W 4 rods 4 links thence S 55° W 31 rods over the old road to the shore to be 25 feet wide and to lie on the northerly side of said courses."

22. TAYLOR (OLD PIER) ROAD LANDING. Map No. 22. No lot number. Area undetermined.

ATM Feb. 10, 1930, Art. 21: Voted: "To raise and appropriate the sum of Fifty (\$50.00) Dollars to complete the survey of what is known as Taylor Road to the Beach."

ATM Feb. 9, 1931, Art. 19: Voted: "to accept the layout and survey by the Selectmen of the extension of the Taylor Road from the residence of Margaret Colgate to the Beach, an approximate distance of one-eighth of a mile."

23. INDIAN NECK BREAKWATER LANDING. Map No. 22. No lot number. 2.8 acres.

Quit-Claim Deed: Constance S. Whitman, grantor, to the Town of Wellfleet, for consideration paid, Jan. 29, 1959, land in Indian Neck, bounded and described as follows: Beginning at the northerly side of a 40' way, said point also being the westerly corner of land of Wellfleet Center, Inc., thence S 29° 10' 40" W, 44.04' in range of said way to land of the grantor; thence N 57° 26' 40" W in range of the grantor, 311.40' to the mean high water mark of Wellfleet Harbor; thence N 66° 30' 00" W in range of land of the grantor to the channel of Wellfleet Harbor; thence northeasterly and easterly by said channel until the point of beginning bears S 2° 09' 40" W; thence S 2° 09' 40" W to mean high water; thence S 2° 09' 40" W 625' mol to the point of beginning, containing an area above mean high water of 2.8 acres mol."

ATM Feb. 8, 1960. Art. 33: Voted: "That the Town accept a deed from Constance Whitman as a gift of land on the northwesterly portion of Indian Neck for a town parking lot and bathing beach. It was further voted that a rising vote of thanks be given to Mrs. Whitman for her generosity, and instructions given to the Town Clerk to convey the appreciation of the Town to Mrs. Whitman."

Sketch Plan: Schofield Brothers, Dec. 1961 (Slade Assoc. files.)



24. M. BURTON BAKER BEACH; ACCESS FROM TERMINUS OF INDIAN NECK (COVE) ROAD AND BY HIAWATHA ROAD. Map No. 28. No lot number. Area undetermined.

ATM Feb. 9, 1948, Art. 18: Voted: "To accept a layout of a forty (40) foot road as prepared by Schofield Bros., C.E., of Cove Road from the State Highway to the Indian Neck Heights Development and an extension of said road thirty feet wide through Indian Neck Heights to a Town Landing on Wellfleet Harbor."

Plan: [Schofield Bros. Plan of Cove Road, Cove Road extension and town landing, 1947? Wanting]

ATM Feb. 9, 1948, Art. 19: Voted: "To accept by deed a gift of land from Hilda G. Baker comprising a thirty (30) foot road, being an extension of Cove Road, through Indian Neck Heights to Wellfleet Harbor as shown on a road layout of Cove Road prepared by Schofield Bros., C.E., and described in part by Article 18 of the Annual Town Warrant for the year of 1948."

[Deed: Hilda G. Baker, grantor, to the Town of Wellfleet, 1947? or 1948?, land comprising a 30 foot road, an extension of Cove Road, to Wellfleet Harbor.]

ATM Feb. 9, 1948, Art. 20: Voted: "To accept by deed, a gift of two lots of land in Indian Neck Heights from Hilda G. Baker to be used as a Town Landing in conjunction with the road laid out under Article 18 of the Annual Town Meeting Warrant for the year 1948."

Quit-Claim Deed: Hilda B. Fleming, formerly Hilda B. Baker, grantor, to the Town of Wellfleet, for consideration paid, Dec. 28, 1949, "land ... bounded and described as follows: The two lots of land being numbered 109 and 110 as shown on a plan entitled: 'Plan of Sea Shore Lots At Indian Neck Heights, South Wellfleet, Massachusetts, Scale 1" = 60', May, 1922, Clements and Spear, Civil Engineers.', or the same two lots as shown on the Assessors' Survey Map of the Town of Wellfleet, Sheet XIII, plan entitled 'Indian Neck Heights,' being lots 103 and 104, bounded and described as follows: Southwesterly by Indian Neck Avenue as shown on said plan; Southeasterly by other land of the grantor, shown on the first mentioned plan as Lot 111, and on the second mentioned plan as Lot 105; Northeasterly by Lot 96 as shown on the first mentioned plan, supposedly other land of the grantor, and Northwesterly by the sidelines of Samoset Avenue, and Nauset, sometimes called Wigwam Street. Said land is conveyed for the express purpose of using the same for public parking near the shore at Indian Neck and must be retained by the Town of Wellfleet forever for that purpose, and shall not be sold or otherwise conveyed for private use.

Memorandum: Michael D. Ford, Town Counsel, to Ray Squire, Assessor, Aug. 16, 1990: "The description in the deed from Hilda B. Fleming to the Town of Wellfleet dated December 28, 1949 appears to describe lots 103 and 104 on the 1949 Assessors' Map. It would be my opinion that the property sought to be conveyed to the Town was said lots. However, I cannot give you a definite opinion with respect to location or good, clear record and marketable title without doing a complete title examination."

Quit-Claim Deed: Dorothy B. Snow, grantor, to the Inhabitants of the Town of Wellfleet, for consideration paid, June 30, 1960,

land ... described as follows: "1. The right, title and interest in and to the various ways and streets as shown on the plan hereinafter mentioned, which have not been previously conveyed to the Town of Wellfleet, subject to any and all easements of record and the appurtenant rights of those persons who have acquired title to lots in the development and as shown on the plan. 2. All right, title and interest in the beach and flats on the westerly side of Indian Neck as shown on said plan as Cape Cod Bay, but being more commonly known as Wellfleet Harbor, extending from the northerly line of lands owned by Cape Lands, Inc., to land of Constance Whitman. Said land to be maintained by the Town of Wellfleet in perpetuity as a public beach and to be known as the M. Burton Baker Beach." (Town Clerk's files.)

"Plan of Sea Shore Lots at Indian Neck Heights. South Wellfleet Massachusetts Scale Inch = 60 feet May 1922 George F. Clements Civil Engineer" (Slade Associates files.)

Letter: Charles E. Frazier, Jr. to Mrs. John P. [Dorothy B.] Snow, June 15, 1960, enclosing draft of deed of June 30, 1960: "A good portion of the way shown on the plan as Hiawatha Road, adjoining Sewell's Gutter, is impassable at the present time and the Town has been petitioned to make this street so that lot owners can reach their property."

ATM Feb. 13, 1961, Art. 30: Voted: "That the Town accept a deed of land from Dorothy P. [sic] Snow, being the foreshore at Indian Neck, said land to be called 'M. Burton Baker Beach' and maintained as a public town beach. ... It was further voted that a rising vote of thanks be given to the Snow family for having made a donation of this property, which is a substantial addition to the Town-owned beach properties, and instructions given to the Town Clerk to convey the appreciation of the Town to the donors." ATM Feb. 11, 1963, Art. 11: Voted: "That the Town accept Item No. 1 in a deed from Dorothy B. Snow to the Town of Wellfleet dated June 1960, giving title to the ways and streets on Indian Neck not previously conveyed to the Town; Item No. 2, being the foreshore at Indian Neck, was accepted by the Town at the Annual Town Meeting held February 13, 1961."

25. PRIVATE LANDING KING PHILIP ROAD, INDIAN NECK. Map No. 35. Between lots nos. 55 and 66. Area undetermined.

Plan: "Plan of land in Wellfleet Schofield Brothers Civil Engineers January, 1956 Copy of part of plan filed in the Land Registration Office Feb. 9, 1956 Scale of this plan 400 feet to an inch. C. M. Anderson, Engineer for the Court. [In MS]" Cape Lands [LC] 26390A" "Copy of part of plan 26390E filed in Land Registration Office Oct. 22, 1963. Scale of this plan 100 feet to an inch. C. M. Anderson, Engineer for the Court." (Slade Assoc. files.)

26. PAINE HOLLOW ROAD LANDING. Map No. 35. No lot number. Area undetermined; 20 feet wide, extending to channel.

TM Oct. 16, 1843, Art. 3: Voted to accept road laid out by the Selectmen, "Beginning at a stake and stone near the southwest corner of James Townsend's land near the edge of the high water mark on the northwesterly side of the road leading from the shore running E 28 degrees north through the land of Martin Dill and

others 40 rods; thence ...."

Record of Roads, April 25, 1851: "On the petition of Nathan Y. Payne and others we the subscribers Selectmen of the Town of Wellfleet have laid out for the use of said Town a town way as follows: Beginning at a Public Landing near the house of James Townsend at a stake and stone -- running N 25 degrees E 10 rods to land of James Townsend, thence ...."

27. PLEASANT POINT LANDING. Map No. 35. No lot number. Area undetermined.

STM April 24, 1902, Art. 4: Voted: "To accept the road as laid out by Selectmen from Otis W. Paine's corner to the landing at Pleasant Point, and appropriate (\$350.00) three hundred and fifty dollars for the same."

Plan: "Walker Plan Walker Plan Addition Paine Plan." (Board of Assessors' files.)

Plan: "Plan of Land in Wellfleet Mass. made for Arthur H. Reed et al. Scale 1 in. = 30 ft. Nickerson & Berger Civil Engineers Eastham & Orleans Mass." (Town Clerk's files.)

ATM Feb. 9, 1942, Art. 29: Voted: "To accept layout of Pleasant Point Road and landing as shown on a plan on file in the Town office."

ATM Feb. 13, 1950, Art. 30: Voted: "To accept the layouts of the following Town Ways in the Town of Wellfleet, with the boundaries and measurements as reported and recommended by the Selectmen, and authorize and instruct the Selectmen to take by purchase or eminent domain, in behalf of the Town, the lands or interests in the lands, within the lines of said layouts for said town ways, and for this purpose raise and appropriate a sum of money therefor.... Pleasant Point Road ...."

28. PLEASANT POINT FLATS. Map No. 35. Area between Pleasant Point Landing and lot 139, south Block A, Walker Plan to extreme low tide or 100 rods, which is less. Acreage undetermined.

Plan: "Walker Plan." (Board of Assessors' files.)

ATM Feb. 13, 1950, Art 31: Voted: to authorize the Selectmen to accept by deed of gift or purchase or take by eminent domain "all the land between Block A as shown on Walker Plan and Blackfish Creek."

29. MOUND STREET LANDING, PLEASANT POINT. Map No. 35. Between lots Nos. 118 and 119. 10 feet wide. Between Pleasant Point Ave. and Pleasant Point Flats. Area undetermined.

Plan: "Walker Plan." (Plan Bk.34, Pg. 143)

Plan: "Sketch of Land in Wellfleet showing passageway over Lot 20, Plan Bk.34, Pg. 143. Made for Camille A. Hoheb Scale: 1 in. = 50 ft. Feb., 1991 Slade Associates, Inc. Reg. Land Surveyors Rte. 6 & Pine Pt. Rd., Wellfleet, Ma. (Slade Assoc. files.)

Quit-Claim Deed: Dorothy R. LePage and Jay Walter Mead, Trustee, grantors, to the Town of Wellfleet, for consideration paid, Dec. 31, 1955, the land bounded and described as follows: Being the westerly half of Lot 20, Block A, as shown on a plan entitled "Plan of Walker Land" recorded with Barnstable County Registry of Deeds, Plan Book 34, Page 143; and any and all right, title and



interest which we may have by, through or under the Cape Cod Bay Land Company, in any of the foreshore and flats adjoining all land formerly owned by the Cape Cod Bay Land Company, and shown on various plans as the Paine Plan, Paine Plan Addition, Walker Plan and Walker Plan Addition. Also all our right, title and interest subject to the rights common to rights of way in all the streets and avenues, as shown on any of the above mentioned plans."

ATM Feb. 13, 1956, Art. 31: Voted: "To ... accept a deed from Dorothy R. LePage and J. Walter Mead, Trustee, the owners of the right, title and interest of the Cape Cod Bay Land Company on Pleasant Point, of all their right, title and interest in all streets and avenues, and in the foreshore and flats adjoining land as shown on plans of the Cape Cod Bay Land Company entitled 'Paine Plan, Paine Plan Addition, Walker Plan, and Walker Plan Addition,' and also the westerly one-half of Lot 20 Block A as shown on the Walker Plan."

See, however, letter Chester N. Lay to Christopher Hoheb, Esq., Feb. 8, 1991, questioning validity of above deed of Dec. 31, 1955. (Slade Assoc. files.)

30. SERGEANT ROBERT W. HOWARD MEMORIAL LANDING. Map No. 15 Lot No. 136 (Walker Plan Block A, Lots 25 and 26). Area undetermined.

Quit-Claim Deed: Albert O. Curth and Helen F. Curth, grantors, to the Inhabitants of the Town of Wellfleet, for consideration paid, June 1, 1967, land ... bounded and described as follows: "Northerly by the way shown on the plan hereinafter mentioned as Pleasant Point Avenue, 40' mol; easterly by Lot 27, as shown on said plan, 80' mol; southerly by land now supposedly of the Town of Wellfleet, being the foreshore, 40' mol; westerly by Lot 25, as shown on said plan, 80' mol; being Lot 26, as shown on the plan recorded with the Barnstable Registry of Deeds, entitled in part Cape Cod Bay Land Co., Walker Plan...."  
Plan: "Walker Plan" (Plan Bk 34 Pg. 143.)

ATM April 25, 1977, Art. 66: Voted: "To declare Lots No. 25 and 26 Block A, Walker Plan, Pleasant Point, a Town Park or landing, naming the area Sergeant Robert W. Howard Memorial Landing."

31. EASTERN STREET SOUTH END LANDING, PLEASANT POINT. Map 35 Lot 148 (Walker Plan, Block A, part of Lot 41, Lots 42 and 43) 8,000 SF.

Plan: "Walker Plan" (Plan Bk 34 Pg. 143.)  
[Deed or taking wanting]

32. EASTERN STREET NORTH END LANDING, PLEASANT POINT. Map No. 35. No lot number. Area undetermined; 40 feet wide.

Plan: "Walker Plan" (Plan Bk 34 Pg. 143.)

Deed: Dorothy R. LePage and Jay Walter Mead, trustee, grantors, to the Town of Wellfleet, for consideration paid, Dec. 31, 1955, "land ... bounded and described as follows: ... any and all right, title and interest which we may have by, through or under the Cape Cod Bay Land Company, in any of the foreshore and flats adjoining all land formerly owned by the Cape Cod Bay Land Company, and shown on various plans as the Paine Plan, Paine Plan

Addition, Walker Plan and Walker Plan Addition. Also all our right, title and interest subject to the rights common to rights of way in all of the streets or avenues, as shown on any of the above mentioned plans.

33. SHELL STREET LANDING, PLEASANT POINT. Map No. 35. No lot number. Area undetermined; 40 feet wide.

Plan: "Walker Plan" (Plan Bk.34 Pg. 143.)

Deed: Dorothy R. Lepage and Jay Walter Mead, trustee, grantors, to the Town of Wellfleet, for consideration paid, Dec. 31, 1955, "land ... bounded and described as follows: ... any and all right, title and interest which we may have by, through or under the Cape Cod Bay Land Company, in any of the foreshore and flats adjoining all land formerly owned by the Cape Cod Bay Land Company, and shown on various plans as the Paine Plan, Paine Plan Addition, Walker Plan and Walker Plan Addition. Also all our right, title and interest subject to the rights common to rights of way in all of the street or avenues, as shown on any of the above mentioned plans.

34. LOAGY BAY LANDING, PLEASANT POINT. Map No. 35. Lot No. 160. (Walker Plan, Block 5, Lots a, b, c, d, and e.) Area undetermined.

Foreclosed April 1973 (Assessors' files.)

35. CANNON HILL BEACH, SOUTH WELFLEET. Map Nos. 30 and 36. No lot number. Area undetermined.

Quit-Claim Deed: George L. Rogers, grantor, to the Inhabitants of the Town of Wellfleet, for no consideration, August 1, 1938, "land ... bounded and described as follows: Beginning at the intersection of the sand beach and the salt meadow running westerly 300 feet mol; thence southerly to the channel; thence by the channel in an easterly direction 300 feet mol; thence in a northerly direction through the marsh to the point of beginning. Being a section of the Cannon Hill Property known as the Mill Ditch." (Town Clerk's files.)

ATM Feb. 1939, Art. 32: Voted: "To accept a certain parcel of land on Cannon Beach, South Wellfleet, as deeded to the Town by Mr. George L. Rogers, and raise and appropriate the sum of \$1.00 for the same, and to give him a vote of thanks."

36. OLD WHARF ROAD LANDING, EDMUND'S ISLAND, SOUTH WELFLEET. Map No. 35 between Lots Nos. 8 and 14. Area undetermined.

TM Dec. 24, 1827: Voted: "To accept: ... The 3d road called the Old Spring Road begins at near the old spring at the country road northeast from Ebenezer Ward's house and runs about northwest to where the old road was fenced out in front of Major John Witherell's house and then it turns northerly and runs by Gersham Boyington's land where the old road was traveled to the landing place by Edmunds Island and down to the wading place across Blackfish Creek to be kept open 20 feet wide."

ATM Feb. 14, 1927, Art. 19: Voted: "To authorize the Selectmen to locate and lay out the road leading westerly from the State Road to Old Wharf (so called) and appropriate the sum of \$150.00.

STM April 28, 1980, Art. 8: Voted: "To discontinue those portions

of the way shown on Land Court Plan No. 35351-A (Sheet 2) as 'Old Wharf Road (Public - 16.00 wide)' and 'Old Wharf Road (Private - 24.00 wide)' as lie within the boundaries of Lots 15, 17, 18 and 27 shown on said plan."

STM April 28, 1980. Art. 9: Voted: "To accept as a public way that portion of the way shown on Land Court Plan No. 35351-A (Sheet 2) as 'Old Wharf Road (40.00 wide)."

Plan: Land Court Plan No. 35351-A (Sheet 2). (Assessors' files.)

37. OLD TRY WORKS ROAD LANDING, SOUTH WELLFLEET. Map No. 35, part of Lot No. 39. Area undetermined.

Land Court, No. 35351, Luther A. Crowell and Earl W. Godwin, Co-partners d/b/a Cape Cod Realty and Building Company, Nov. 1, 1978. ... SECOND PARCEL: Northwesterly/Westerly about 204 feet, and 23.77 feet by land now or formerly of Frank X. Becker et al.; Northwesterly by land of Owner Unknown and by land now or formerly of Luther Crowell et al., 786.12 feet; Northeasterly by land now or formerly of Lewis F. Stone, about 333 feet; Southeasterly by land now or formerly of Marie Barker Williams et al being the middle line of [the] creek; and Southwesterly, southeasterly, easterly, southeasterly and southwesterly by Loagy Bay. Said land is shown as lot 2 on said plan.... All of said boundaries, except the water lines, are determined by the Court to be located as shown on a plan drawn by Schofield Brothers, Inc., Surveyors, dated November 1966, July 1967, April 1971, and October 4, 1976, as modified and approved by the Court, filed in the Land Registration Office, a copy of a portion of which will be filed with the original certificate of title issued on this decree.... So much of said lots 2, 18, and 27 as is included within the limits of Way-1 and "Access Area," approximately shown on said plan, is subject to the rights of all persons lawfully entitled thereto, including members of the public, in and over the same,, to park in the Parking Area on said lot 2, and to use the "Access Area" for access to and egress from Loagy Bay."

Plan: Sheet 6 of above described plan, 35351A.

38. CLIFF AVENUE LANDING, LIEUTENANT'S ISLAND. Map No. 40. No lot number. Marked "Town of Wellfleet." Formerly Block 41. Area undetermined.

Plan: "Cape Cod Bay Land Co. Plan of Lieutenant's Island (East Part)/(West Part) Wellfleet Bay. Dec. 1888, Surveyed by Tully Crosby Jr." Block 41. (Assessors' files.)

Plan: "Plan of Land at Lieutenants Island So. Wellfleet To Be Filed In The Land Court Luther A. Crowell & Earl W. Godwin. Scale 1 in. = 100 FT Mar. 1969. Nickerson & Berger Civil Engineers Eastham & Chatham Mass. Sheet one of Two Sheets." Blk. 41 marked "Town of Wellfleet."

[Deed wanting.]

39. POND AVENUE LANDING, LIEUTENANT'S ISLAND. Map No. 40. Location undetermined. Area undetermined.

ATM Feb. 11, 1963, Art. 39: Voted: "That the Town accept the road running from Pond Street to the Town Landing on Blackfish Creek on Lieutenant's Island as laid out by Nickerson & Burger in December 1962 as per plan on file at the Town Office."

[Nickerson & Berger Plan of 1962 wanting. (Town Clerk's files: Map. No. 67 "Lt. Island 1962.")]  
ATM April 30, 1979, Art. 79: Voted: "To raise and appropriate the sum of \$1,000.00 for the purpose of laying out and defining Pond Avenue on Lieutenant Island."

40. MEADOW AVENUE LANDING, LIEUTENANT'S ISLAND. Map No. 40  
Lots Nos. 170 and 171. Formerly Block 70, Lots 1-9 and Block 71,  
Lots 1-5. Areas: Lot 170: 25,900 SF; Lot 171: 14,000 SF.  
Taken for taxes (Assessors' files.)  
[Deed wanting.]

41. HATCHES CREEK LANDING. Map No. 46 Lot No. 18. 5.0 Acres.  
Acquired by Town from Frank H. Newton, December 1957.  
(Assessors' files.)  
[Deed wanting.]

42. NEWCOMB'S HOLLOW LANDING. Map No. 5 Gross Hill Road and  
Lot No. 7. Lot 7: 1.80 acres (78,408 SF).  
[Taking or Layout of Gross Hill Road wanting.]  
ATM Feb. 6, 1905, Art. 20: Voted: "To build a bulk-head for the  
protection of the beach at Newcomb's Landing, so called, and  
appropriate \$499.50 for the same."  
ATM Feb. 8, 1954, Art. 31: Voted: "That the Town authorize the  
Selectmen to take by eminent domain, or otherwise, titles to  
certain parcels of land on the northerly side of Gull Pond Road,  
sometimes called Gross Hill Road, at Newcomb's Hollow, so-called,  
and raise and appropriate the sum of \$1,000 therefor."  
Quit-Claim Deed: Allison W. Marsh and Margaret A. Marsh,  
grantors, to the Inhabitants of the Town of Wellfleet, for  
consideration paid, October 15, 1960, "land ... bounded and  
described as follows: Northwesterly by Lot 6, as shown on the  
plan hereinafter mentioned, land of Stacy May et ux., 820 feet  
mol; Northeasterly by the Atlantic Ocean, as shown on said plan;  
Southeasterly by Gross Hill Road, a Town Way, 670 feet;  
Southwesterly by Lot A, L.C. Case No. 17293 133.96 feet. Being  
Lot No. 7, as shown on said plan. All of said boundaries, except  
the water line, are determined by the Court to be located as  
shown on subdivision plan 106130, dated September 1960, drawn by  
Arthur L. Sparrow Co., Engineers, filed in the Land Registration  
Office at Boston, a copy of which is filed in Barnstable County  
Registry of Deeds, with Certificate of Title No. 4652.  
Plan: See above.

43. CAHOON'S HOLLOW LANDING. Map No. 17. No lot number. 3.33  
acres.  
ATM Feb. 9, 1948, Art. 17: Voted: "To accept a layout of a forty  
(40) foot road as prepared by Schofield Bros., C.E., of Old  
Cahoon's Hollow Road from the State Highway to the Atlantic  
Ocean."  
ATM Feb. 13, 1950, Art. 30: Voted: "To accept the layouts of the  
following Town Ways in the Town of Wellfleet with the boundaries  
and measurements as reported and recommended by the Selectmen and  
authorize and instruct the Selectmen to take by purchase or  
eminent domain, in behalf of the Town, the lands or interests in



the land, within the lines of said layouts for said town ways, and for this purpose raise and appropriate a sum of money therefor.... Cahoon Hollow Road ...."

Quit-Claim Deed: Florence M. Cook; Chellis R. Cardinal (as individual), and Chellis R. Cardinal (as conservatrix of estate of Arthur Richmond Cook), grantors, to the Inhabitants of the Town of Wellfleet, for consideration paid, Jan. 10, 1953, "land ... bounded and described as follows: Beginning at a concrete bound at the Northwesterly corner of the premises, thence N 72° 50' 00" E by land of Russell S. Gallagher et ux., 131.69 feet to a concrete bound; thence in the same course 119.62 feet to a stake near the top of the bank; thence in the same course about 99 feet to the mean high water mark; thence Southerly by the waters of the Atlantic Ocean about 363 feet; thence S 72° 50' 00" W by the land of Helmi E. Frazier about 167 feet to a concrete bound; and continuing in the same course 222 feet to a concrete bound; thence N 17° 10' 00" W by land of said Gallagher et ux., 218.76 feet to a concrete bound; thence S 52° 42' 10" W by land of said Gallagher 180.95 feet; thence S 56° 03' 50" W by land by land of said Gallagher et ux., 104.33 feet; thence N 33° 56' 10" W by the end of the County Highway layout of the Ocean View Drive and Cahoon's Hollow Road intersection, 40 feet; thence N 56° 03' 50" E by land of said Gallagher et ux., 103.16 feet to a concrete bound; thence N 52° 42' 10" E by said Gallagher et ux., 194.44 feet to a concrete bound; thence N 17° 10' 00" W by the said Gallagher et ux., 100 feet to a concrete bound at the point of beginning. This parcel contains an area of about 3.333 acres and is shown on a plan filed at the Town Office of the Town of Wellfleet ...." (Town Clerk's files.)

Plan: "Plan of Cahoon's Hollow Common Landing in Wellfleet, Mass. as laid out by the Selectmen. Scale 1 in = 50 ft. August 1952. Schofield Brothers Civil Engineers Orleans, Mass." (Town Clerk's files.)

Quit-Claim Deed: Russell Gallagher, also known as Russell S. Gallagher, and Ruth H. Gallagher, also known as Ruth Harriet Gallagher, grantors, to the Inhabitants of the Town Of Wellfleet, for consideration paid, Jan. 13, 1953, land ... bounded and described as follows: [description substantial identical with description in above deed granted by Florence M. Cook et al., Jan. 10, 1953.] "Meaning and intending to convey any and all rights which we may have in this parcel of land as shown on a plan filed with the Town of Wellfleet Town Office, Wellfleet, Mass." (Town Clerk's files.)

ATM Feb. 9, 1953, Art. 32: Voted: "That the Town accept deed or deeds of the land located at Cahoon's Hollow from Florence M. Cook, Chellis R. Cardinal, Russell S. Gallagher, Ruth H. Gallagher, Leslie O. Schuster, Charles E. Frazier, Jr., and Chellis R. Cardinal as conservatrix of the estate of Arthur R. Cook, for the purpose of a town landing and road leading thereto; and that a vote of thanks be extended to the various individuals named in this article."

44. MAGUIRE'S LANDING. Map No. 25A. No lot number. (Formerly Lot No. 21W4853.) 19,360 SF (Assessors' Map). .45 acres (19,602 SF) according to Assessors' files, ref. to Bk. 686 Pg. 346.

ATM Feb. 9, 1942, Art. 30: Voted: "To accept layout and common landing at Cook's Road at ocean front on property of Maguire as shown on a plan on file in the Town office."  
Plan: "Plan of A Town Landing in Wellfleet, Mass. as laid out by The Board of Selectmen on November 1, 1943. Scale of 40 feet to an inch. Schofield Brothers, Civil Eng'rs. Eastham, Cape Cod, Mass. Accepted at a Town Meeting held on 1944 Town Clerk." (Assessors' files.)

ATM Feb. 12, 1945, Art. 26: Voted "To accept the layout of a Town Landing in South Wellfleet, called Lacount's [sic] Landing, with the boundaries and measurements as reported by the Selectmen under date of January 15, 1945, and authorize and instruct the Selectmen to take by purchase or eminent domain, in behalf of the Town, the lands or interests in the lands within the lines of said layout for said Town Landing and for this purpose raise and appropriate the sum of \$10.

ATM Feb. 12, 1945, Art. 27: Voted: "To discontinue any part of the landing which was formerly used and which is not within the lines of the layout of Lacount's [sic] Landing as reported by the Selectmen under date of January 14, 1945."

ATM Feb. 10, 1947, Art. 48: Voted: "To accept a lot of land, as laid out by the Selectmen November 1, 1943, as shown on a plan entitled 'Plan of a Town Landing in Wellfleet' and to be known as Maguire's [sic] Landing and to authorize the Selectmen to fence it off."

Quit-Claim Deed: Frank G. Maguire, grantor, to the Town of Wellfleet, for consideration paid, Dec. 15, 1947, "land ... bounded and described as follows: Commencing at a concrete bound at the Southwesterly corner of the premises conveyed in the range of land supposedly of Florence Cook; thence N 49° 49' 30" E 205.95 feet in the range of other land of said Maguire to a concrete bound; thence in the same course and range 158 feet mol to the waters of the Atlantic Ocean; thence by the waters of the Atlantic Ocean 51 feet mol to land now or formerly of Stephen Brown; thence S 49° 49' 30" W in said Brown's range and range of Frank G. Maguire 172 feet mol to a concrete bound; thence still in the same course and in the range of land of said Maguire 150 feet to a concrete bound; thence S 40° 15' 00" W in said Maguire's range 112.99 feet; thence N 79° 11' 20" E 63.64 feet to the point of beginning or as however otherwise described on a plan entitled, 'Plan of a Town Landing in Wellfleet, Mass. as laid out by the Board of Selectmen on November 1, 1943 to be recorded herewith.' This town landing is the same as was accepted under Article 48 of the Annual Town Warrant for the year 1947 and is to be known hereafter as Maguire's Landing."

ATM Feb. 9, 1948, Art. 24: Voted: "That the Town accept as a gift by deed from Dr. Frank G. Maguire and as laid out by Nelson H. Maguire, known as Nellie Road, that part of which is now graded to Wilson Ave., which connects Maguire's Landing."

ATM Feb. 9, 1948, Art. 25: Voted: "That the Town accept as a gift by deed from Dr. Frank G. Maguire and as per plan by John R. Dyer, C.E., of Truro, Mass. August 1939, Wilson Avenue, and the easterly part of said Wilson Avenue as graded to Maguire's Landing now owned by the Town of Wellfleet."

Quit-Claim Deed: Frank G. Maguire, grantor, to the Inhabitants of

the Town of Wellfleet, for consideration paid, February 13, 1948, "land ... bounded and described as follows: Parcel 1. Wilson Avenue: Beginning on the East side of the road leading to Wellfleet by the Sea, so called, and now a Town Way; thence Easterly ... and Southeasterly ... to the Town Way known as Maguire's Landing. Said road to be 30 feet wide throughout.... The above described road is hereby conveyed to the Inhabitants of the Town of Wellfleet as a gift in accordance with the vote passed under Article 25 of the Warrant for the Annual Town Meeting, held on February 9, 1948. Parcel 2 Nellie Road. Beginning on the East side of the Road leading to Wellfleet by the Sea, so called, and now a Town Way; thence Easterly ...; thence turning at an angle of 90 degrees and running Southerly to the North side of Wilson Avenue, described in Parcel 1. Said Road to be 31.5 feet wide ... until it turns, then 30 feet wide to Wilson Avenue. The above described road is hereby conveyed to the Inhabitants of the Town of Wellfleet as a gift in accordance with the vote passed under Article 24 of the Warrant of the Annual Town Meeting, held on February 9, 1948."

ATM Feb. 14, 1949, Art. 26: Voted: "To widen Maguire Landing to the 50 foot width as given by Dr. Maguire to the Town, and to be completed by June 15, 1949, and that the money be taken from the General Highway appropriation."

ATM Feb. 13, 1950, Art. 30: Voted: "To accept the layouts of the following Town Ways in the Town of Wellfleet, with the boundaries and measurements as reported and recommended by the Selectmen, and authorize and instruct the Selectmen to take by purchase or eminent domain, in behalf of the Town, the lands or interests in the lands, within the lines of said layouts, and for this purpose raise and appropriate a sum of money: ... Nellie Road ... Wilson Avenue."

STM June 3, 1971, Art. 11: Voted: "To discontinue that portion of Wilson Ave. as laid out and accepted by the Town of Wellfleet in 1950 [sic] bounded and described as follows: 'Commencing at the northeast corner of said layout at the intersection of LeCount Hollow Rd. thence southerly, crossing Wilson Ave. 35 ft. more or less, to an angle point on said road; thence S 82° 37' 00" E, 175.87 ft. to LeCount Hollow Rd. 35 ft. more or less to the point of beginning.'"

45. WILLIAMS POND LANDING. Map No. 4 Lot No. 40. Formerly Lot 19W4160. 3 acres.

Barnstable Registry of Deeds, Bk. 185 Pg. 332. Title transferred to Town from Arthur H. Rogers.

[Deed wanting.]

Plan: "Sketch Of Land in Truro MA showing tract number 19T-8525 Scale: 1" = 20' Nov. 1980 Slade Associates, Inc., Surveyors East Main St. & Rte. 6, Wellfleet." (portion of Lot 40 north of Wellfleet-Truro line.) Bounds: northerly 52.76' by "vehicle tracks"; northeasterly 175' mol; southerly 290' mol by Truro-Wellfleet line; westerly 60.72'; northwesterly 109.00'. (Slade Assoc. files.)

Plan: Anonymous tracing of Seashore Tract Map, lot no. 19W4160 showing dimensions: northerly 60' by way; northeasterly 260'; southeasterly by Williams Pond 430'; southwesterly 220'; westerly



340'; northwesterly 95'. (Assessors' files.)

Plan: "Slade Associates, Inc. Registered Land Surveyors East Main Street at Route 6 Wellfleet Massachusetts 02667." Plan of Lot 18T-8525" northerly 52.76' by way; northeasterly 133' mol crossed out and 175 in MS; southerly 227' mol crossed out; westerly 59.1' northwesterly 109.00' "Scale 1" = 50'" "TOPO The property is a portion of a former cranberry bog, including a small piece of upland in the northwest corner. At the east end it is at elevation 10' M.S.L. and it rises to 30' at its west end. It is covered with dense brush and trees. One half of the area is lowland. VIEW From the high land at the west end it is possible to see Slough Pond, which is 200' to the north...."

NB It is reported that this lot 18T8525, the southern boundary of which is defined by the Truro-Wellfleet line, was sold by an unidentified supposed owner to the Cape Cod National Seashore prior to November 1980. (Oral communication from Richard F. Lay, January, 1991.)

46. HIGGINS' (NEWCOMB'S) POND LANDING. Map No. 4 Lot No. 41. Formerly Lot 19W8722. .07 acres (3250 SF)

TM Dec. 24, 1827: Road layout accepted: "Road begins on the east side of the country road northwesterly from Stephen Young's house and runs up north of Eleazer Higgins barn and Ephraim Higgins house and between the Gull Pond and Newcomb Pond and to the westward of Josiah R. Higgins and east of John Y. Newcomb's and enters Pamet Point Road near the Widow Thankful Swett's where said road is now traveled to be kept with gates and bars as it always has been."

Record of Roads: Report of Selectmen May 28th, 1849 on petition of John Y. Newcomb et als [sic] for town road. We the subscribers Selectmen of the Town of Wellfleet have widened and straightened and defined anew for the use of the town the town way leading from Joseph Swett's dwelling house between the ponds known as by the names of Newcomb and Gull Pond down by Freeman's windmill to the County Road near Ebenezer Freeman's dwelling house as follows viz: Beginning at a stake and stone in the line of Truro in the range of Joseph Swett's land thence S 18.5° E 7 rods over land of said Swett to the land of John Y. Newcomb, thence S 38° E 6 rods 3 links over land of said Newcomb thence S 23.5° E 11 rods 16 links over same, thence S 45° E 6 rods over same, thence S 6° E 7 rods 9 links over same, thence S 40° E 6 rods 2 links over same, thence S 4° E 6 rods 12 links over same, thence S 37.5° W 11 rods 4 links over same, thence S 40° W 5 rods 8 links over same to land of Elisha C. Newcomb, thence S 35° W 2 rods 11 links over land of said Newcomb, thence S 15° W 13 rods 13 links over same to land of Josiah R. Higgins, thence S 9° E 12 rods over land of said Higgins, thence southerly and westerly around the [Newcomb] Pond 75 rods to the brook called Gull Pond Brook, thence westerly and northerly around the pond 28 rods to land of Josiah R. Higgins, thence N 41° W 16 rods over land of said Higgins, thence N 82° W 16 rods over same, thence N 71° W 13 rods 9 links over same to unenclosed woodland to be 20 feet wide except on the premises of Joseph Swett and Elisha C. Newcomb when it is to be 17 feet wide and be on the easterly and southerly side of said courses, thence southerly and westerly over the old

town way known as the Old Hay Road leading by Freeman's windmill to the county road recently laid out by the county commissioners near Ebenezer Freeman's dwelling house adopting the center of the old road for the center of the new road which is to be 20 feet wide .... Which said road is hereby reported to the town for their acceptance and when accepted and recorded is forever after to be known as a public town way subject to gates and bars. Wellfleet, May 14, 1849 [signed] John Newcomb, [----] Wiley, Edward Hopkins, Selectmen."

47. GULL POND LANDING. Map No. 9A Lot No. 37. Formerly Lot 19W4187. 5.32 acres.

ATM Feb. 9, 1948, Art. 21: Voted: "To authorize the Selectmen, acting in conjunction with the Board of Park Commissioners, when elected or appointed, to acquire by deed or gift, purchase or eminent domain, if necessary, a certain parcel of land on Gull Pond for a Town Landing and any money for this purpose to be taken from Park Commission funds."

ATM Feb. 14, 1949, Art. 38: Voted: "To authorize the Selectmen, acting in conjunction with the Board of Park Commissioners, to acquire by deed or [sic] gift, purchase or eminent domain, if necessary, a certain parcel of land on Gull Pond for a Town Landing, and any money for this purpose to be taken from the Park Commission funds."

ATM Feb. 12, 1951, Art. 31: Voted: "To authorize the Selectmen to take by eminent domain, by deed of gift, or by purchase, land on Gull Pond and land on Great Pond for the purpose of a Town Landing, and use the money already appropriated for that purpose in the Treasury."

ATM Feb. 1952, Art. 26: Voted: "To authorize the Selectmen to take by eminent domain, by deed of gift, or by purchase, land on Gull Pond and land on Great Pond for the purpose of a Town Landing, and use the money already appropriated for that purpose in the treasury."

ATM Feb. 9, 1953, Art. 34: Voted: "To authorize the Selectmen to take by eminent domain or otherwise title to a certain parcel of land at Gull Pond, and use the money already appropriated for that purpose."

Quit-Claim Deed: Esther L. Thomas, grantor, to the Town of Wellfleet, for consideration paid, Dec. 28, 1953, "land ... bounded and described as follows: Commencing at a concrete bound on the Westerly side of a Town road, at the Southwesterly corner of the premises, in the range of land now or formerly of Mary Hamblin; thence N 20° 26' 30" E to a concrete bound in the range of land now or formerly of Frazier et ux; thence N 89° 51' 30" E in the range of said Frazier 608 feet, mol, through a stone bound to the waters of Gull Pond; thence Southeasterly by said Gull Pond 395 feet, mol, to a cement bound in the range of land of Benjamin O. Eaton; thence S 68° 19' 20" W 505 feet, mol, to a cement bound in the range of land now or formerly of Noah Swett et al; thence N 9° 16' 50" W in the range of said Swett 409.57 feet to an iron pipe; thence N 78° 38' 10" W through a concrete bound 251.02 feet to the concrete bound at the point of beginning. Subject to the rights of way which may legally exist over the Northwesterly portion of said parcel. Containing 5.32

acres more or less, as shown on a plan entitled "Proposed Town Way and Common Landing, in Wellfleet, Mass. Scale 1" = 100'. February, 1953, Schofield Bros., C.E.'s, Orleans, Mass...."

[Plan wanting.]

Title registered Bk. 863 Pg. 72. (Assessors' files.)

48. LONG POND LANDING. Map No. 16A Lot No. 50. Formerly Lot 22W4539. 0.9 acres.

ATM Feb. 11, 1952, Art. 3: Voted: "To authorize and empower the Selectmen to accept by gift, purchase, or take by eminent domain the land on the South side of Long Pond Road so-called, between said road and Long Pond, which land was formerly owned by Albert M. Kemp, for the purpose of a Town Landing, and to raise and appropriate a sum of \$100 for this purpose."

[Deed wanting.]

[Plan wanting.]

49. GREAT POND LANDING. Map No. 16A Lot No. 47. 2.8 acres (121,968 SF).

ATM Feb. 9, 1948, Art. 22: Voted: "To authorize the Selectmen, acting in conjunction with the Board of Park Commissioners, when elected or appointed, to acquire by deed or gift, purchase or eminent domain, if necessary, a certain parcel of land on Great Pond for a Town Landing, Any money for this purpose to be taken from the Park Commission funds."

ATM Feb. 14, 1949, Art. 39: Voted "To authorize the Selectmen, acting in conjunction with the Board of Park Commissioners, to acquire by deed of gift, purchase or eminent domain, if necessary, a certain parcel of land on Great Pond for a Town Landing, and any money for this purpose to be taken from Park Commission funds."

ATM Feb. 12, 1951, Art. 31: Voted: "To authorize the Selectmen to take by eminent domain, by deed of gift, or by purchase, land on Gull Pond and land on Great Pond for the purpose of a Town landing, and use the money already appropriated for that purpose in the Treasury."

ATM Feb. 11, 1952, Art. 26: Voted: "To authorize the Selectmen to take by eminent domain, by deed of gift, or by purchase land on Gull Pond and land on Great Pond for the purpose of a Town Landing, and use the money already appropriated for that purpose in the treasury."

ATM Feb. 9, 1953, Art. 33: Voted: "To accept a deed by gift, purchase or sale from James Lay and Catherine N. Lay of land located at Great Pond for the purpose of a town landing, and that the Town raise and appropriate the sum of \$500 therefor."

Quit-Claim Deed: James T. Lay and Catherine N. Lay, grantors, to the Town of Wellfleet, for consideration paid, April 15, 1953, "land ... bounded and described as follows: Northerly by Great Pond, about 615 feet; easterly by other land of the grantors, about 50 feet; southeasterly by Cahoon's Hollow Road, about 815 feet; southerly by an old road, about 300 feet; westerly by other land of the grantors about 30 feet; northwesterly by the 'Freeman Bog' so-called, about 450 feet."

50. DUCK POND TOWN LANDING. Map No. 23A Lot No. 4. Formerly

Lot 22W5329. 2.500 SF.

Collector's Deed 103/6E6. See Doc. #104 Town Records Assessors' files. Taken for taxes March 31, 1870 from James Harding.

[Plan wanting.]

ATM Feb. 8, 1954, Art. 32: Voted: "That the Town authorize the Selectmen to take by eminent domain, or otherwise, including the right to enter into a stipulation to be filed in the Land Court in connection with the proposed registration of the land of Noble Foss, certain land located on the southerly of said Foss land for a parking place, certain land located on the southerly side of Duck Pond for a landing, a 10-foot right of way leading from the parking area to the Town Landing, and a 40-foot way along the southerly boundary of Foss' land, the land of the N.Y., N.H. & Hartford Railroad, and raise and appropriate the sum of \$100 therefor."

[Deed or stipulation wanting.]

[Plan wanting.]

[TM acceptance wanting.]