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MEMORANDUM

TO: George Meservey, Planning Director

FROM: Doug C. Prentiss, P.E., PTOE; Christopher S. Broyles, E.I.T. *CSB*

DATE: May 6, 2011

SUBJECT: Preliminary Construction Cost Estimate
Proposed Beach Road Sidewalk
Orleans MA

Introduction

Fay, Spofford & Thorndike has been retained by the Town of Orleans to provide a preliminary construction cost estimate for the Proposed Beach Road Sidewalk Project as mentioned in our revised proposal letter to you dated March 7, 2011. The sidewalk is proposed for the south side of Beach Road from Main Street to Nauset Beach, a distance of approximately 8,000 feet. Based on preliminary discussions, the sidewalk is assumed to be asphalt rather than concrete.

Two alternatives were considered during our cost estimate development. They are:

- Option 1. A 5-foot wide sidewalk with a 4-foot grass strip and no cape cod berm for the entire length of the project;
- Option 2. A 5-foot wide sidewalk with a 4-foot grass strip but shifting the centerline of the roadway within the right-of-way in order to improve sight distance and safety at four (4) separate locations.

GIS plans provided by the town and FST files were used for this estimate.

Observations / FST Reconnaissance

On April 14, 2011 we performed a site survey of the proposed Beach Road sidewalk area noting any obstacles within 9 feet of the edge of the roadway. It was also noted if a retaining wall or other physical measures would be required to accommodate a proposed sidewalk.

The following is a general list of key obstacles within 9 feet of the roadway we noted during our site visit. All numbers are approximate:

- 25 Signs
- 9 Fire hydrants
- 96 Trees (of varying sizes)
- 17 Mail boxes
- 290 Feet of wood fence
- 8 Guy wire for telephone poles
- 6 leaching basins
- 8 Cobble stone aprons at driveway's
- 400 feet of stone walls

Locations that may require a retaining wall to accommodate a sidewalk were also noted. Roughly 20% of the locations noted were in fill. To be conservative a wall was assumed for cost estimating purposes at every location. There may be an opportunity at some of the locations to grade the slope out, and thus avoid retaining wall placement.

Option 2 includes a shift of the roadway at four (4) separate locations while maintaining the 9-foot separation distance from the edge of roadway. The four locations are as follows:

1. Location 1 - Between Barley Neck Road and Mill Lane. In front of Joe's Bar and Grille and 4 Mill Lane;
2. Location 2 - Between #43 Beach Road and Nuthatch Circle;
3. Location 3 - Between Greymoor Way and Cedar Land Road;
4. Location 4 - Between #169 Beach Road and #195 Beach Road. Near Grandview Drive and Nauset Heights Road.

Each location was analyzed while in the field. Photos and notes of each location were recorded, including observations of possible impacts of realignment. Each location was also re-analyzed in the office using the State and Town's GIS database.

Based on field observations and office analysis, it is our opinion that locations 1 through 3 require no alterations to roadway geometry. Based on the speed of the roadway (posted speed = 30 mph), each of these three (3) locations meets the MassDOT and American Association of State Highway and Transportation Officials (AASHTO) guidelines on horizontal curvature. The construction of sidewalks in each of these locations will enhance sight distance and safety.

The "S" curve at Location 4 between address #169 and #195 Beach Road would benefit from roadway geometry alterations. This length of roadway contains three back-to-back curves. The first is a right turn in front of #173 and #174 Beach Road. The second is a left turn in front of #187 Beach Road. The third is a right turn in front of Duck Farm Lane and #195 Beach Road.

The first curve to the right would require takings from three properties. It is our opinion that the takings required for this curve would have a significant impact on #173 Beach Road. To re-align the curve to the left (North) would require one taking. This taking would have minimal impacts to the abutting property. To re-align the last curve to the right in front of Duck Farm Lane would

only require one property taking as well. In order to build a sidewalk in this location a retaining wall would be required. To realign the roadway in this location, more excavation of the embankment would be required along with the removal of more trees. The sight distance and horizontal curvature would be improved in this last curve; however the intersection of Nauset Heights Road would be affected. It is likely a 90 degree re-alignment of Nauset Heights Road with Beach Road would be required. This re-alignment is not included in the cost estimate noted below.

Conclusion

Our estimate is based on the assumption that the sidewalk will be located 9 feet from the edge of traveled way, would be made of *asphalt* and *not* include any berm or curbing. This alignment is consistent for the entire length. There may be some cost savings and impacts minimized if the sidewalk alignment was to be more of a “meandering” alignment to take advantage of existing contours and limit high replacement items such as retaining walls.

Based on the use of MassDOT District 5 average unit bid prices and recommended contingencies (3% for landscaping and 30% overall) the estimated construction cost of the proposed Beach Road sidewalk project will be between **\$770,000** and **\$880,000** for Option 1 and 2 respectively. The later estimate includes \$110,000 for the roadway re-alignment at Location 4. These costs also include approximately \$55,000 in tree removal. The estimated construction cost could be reduced if the Town chooses to undertake some of this work with town forces, thus reducing construction costs. If a concrete sidewalk is preferred, an additional \$24,000 would be added. If an asphalt berm were to be included, an additional \$33,600 would be included. The preliminary construction cost estimate is attached.

MAY 2011

PRELIMINARY ESTIMATE - OPTION 1A
 ENGINEERS ESTIMATE OF QUANTITIES
 BEACH ROAD SIDEWALK
 ORLEANS, MA
 PROJECT NO. PO-004

PREPARED BY: FAY, SPOFFORD & THORNDIKE

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ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
101.	CLEARING AND GRUBBING	A	1.73	\$10,000.00	\$17,325.00
103.	TREE REMOVED - DIAMETER UNDER 24 INCHES	EA	87	\$500.00	\$43,500.00
104.	TREE REMOVED - DIAMETER 24 INCHES AND OVER	EA	10	\$1,000.00	\$10,000.00
120.1	UNCLASSIFIED EXCAVATION	CY	1,300	\$23.00	\$29,900.00
151.	GRAVEL BORROW	CY	1,120	\$30.00	\$33,600.00
170.	FINE GRADING AND COMPACTING	SY	4,200	\$5.00	\$21,000.00
220.	DRAINAGE STRUCTURE ADJUSTED	EA	6	\$300.00	\$1,800.00
222.	FRAME AND GRATE	EA	6	\$600.00	\$3,600.00
223.1	FRAME AND GRATE (OR COVER) REMOVED AND STACKED	EA	6	\$90.00	\$540.00
358.	GATE BOX ADJUSTED	EA	6	\$121.00	\$726.00
376.2	HYDRANT - REMOVED AND RESET	EA	9	\$1,900.00	\$17,100.00
440.	CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL	LB	21,000	\$0.40	\$8,400.00
620.1	STEEL W BEAM HIGHWAY GUARD (SINGLE FACED)	FT	200	\$22.00	\$4,400.00
627.1	STEEL W BEAM TERMINAL SECTION (SINGLE FACED)	EA	16	\$50.00	\$800.00
670.	FENCE REMOVED AND RESET	FT	300	\$25.00	\$7,500.00
690.1	STONE MASONRY WALL REMOVED AND REBUILT DRY	CY	60	\$200.00	\$12,000.00
702.	HOT MIX ASPHALT WALK SURFACE	TON	560	\$140.00	\$78,400.00
706.11	COBBLESTON DRIVEWAY REMOVED AND RELAID	SY	200	\$150.00	\$30,000.00
711.	BOUND REMOVED AND RESET	EA	2	\$270.00	\$540.00
715.	RURAL MAIL BOX REMOVED AND RESET	EA	17	\$100.00	\$1,700.00
751.	LOAM BORROW	CY	500	\$35.00	\$17,500.00
765.	SEEDING	SY	3,300	\$1.40	\$4,620.00
876.1	ELECTRIC POLE REMOVED AND RELOCATED	EA	8	\$300.00	\$2,400.00
877.	SIGN POST REMOVED AND RESET	EA	25	\$100.00	\$2,500.00
901.	4000 PSI, 1.5 IN., 565 CEMENT CONCRETE	CY	400	\$570.00	\$228,000.00

SUBTOTAL \$577,851.00

3% LANDSCAPE \$17,335.53

30% CONTINGENCY \$173,355.30

TOTAL \$768,541.83

SAY \$770,000