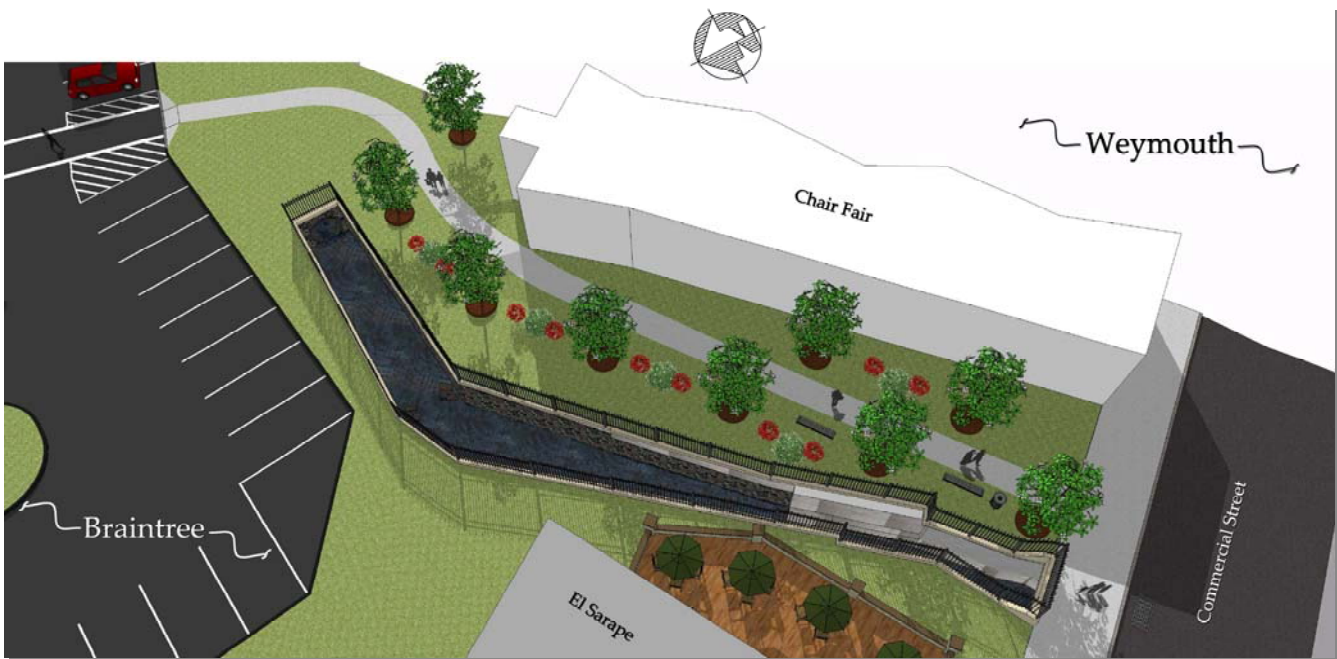


WEYMOUTH LANDING DAYLIGHTING ANALYSIS FEASIBILITY STUDY

Weymouth, Massachusetts



PREPARED FOR:

*TOWN OF WEYMOUTH
Department of Planning and Community Development*

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INTRODUCTION

The Town of Weymouth (TOWN) has contracted Pare Corporation (PARE) to perform a preliminary engineering analysis of the feasibility and impacts associated with daylighting approximately 150 feet of the Smelt Brook in the Weymouth Landing area. The Smelt Brook is a small tributary to the Weymouth-Fore River subbasin, within the towns of Weymouth and Braintree. The stretch of the brook in the Weymouth landing area is a prominent area for spawning habitat of the rainbow smelt.

As part of the mitigation plan for the construction of the MBTA's Weymouth Landing Station Project, the Town of Weymouth agreed to investigate the feasibility of daylighting a portion of the Smelt Brook from Commercial Street to the municipal parking lot. The Massachusetts Department of Environmental Protection (MADEP) issued a Chapter 91 License (#10164) requesting approximately 150 linear feet of the 72" piped portion of the Smelt Brook be replaced with an open-air culvert. In addition, the requirements suggested the work include site improvements such as landscaping with a viewing area and habitat improvements to the sub base of the channel.

This report is presented in five parts. First is an introduction and brief description of the project. The second is a description of the methods utilized for the assessments. Third is a narrative of observed conditions and structural assessment of the existing culvert and adjacent buildings. The fourth section discusses the anticipated permitting requirements. The last section provides a report summary, conclusions, and opinion of probable construction cost.

1.1 Project Description

The project is located along the town line between the Town of Weymouth and the City of Braintree. It is bound by the intersection of Commercial Street and Brookside Drive to the west and the MBTA Weymouth Landing Station and municipal parking lot to the east. The buildings adjacent to the Smelt Brook are the Brick Grill and Edward Morante Insurance Company and Barber Shop (Morante Insurance / Barber Shop). The El Sarape Restaurant abuts the Morante Insurance / Barber Shop while the Chair Fair building is adjacent to the Brick Grill. See the Project Location Plan in Appendix A for more information.



Brick Grill (#2 Commercial Street, Weymouth, MA)

The building is a partial two-story brick and wood structure that is currently abandoned. Based upon the Town's subdivision records, the two-story portion of the structure is approximately 1,220 square feet with a one-story portion including a concrete patio in the rear estimated to be approximately 1,280 square feet. The Brick Grill Restaurant previously occupied the first floor of the two-story structure while a vacant apartment once occupied the second floor. A basement is located underneath the entire structure consisting of a concrete slab-on-grade floor along with concrete, masonry, and stone rubble foundation walls. The exterior load bearing walls are multi-wythe brick construction. The floor, roof, and interior walls are generally constructed with nominal lumber. In general, the timber floor and roof framing is in fair condition. The exterior basement walls are generally in fair condition. The structure is currently vacant.

The building's basement forms the southeast culvert walls of the Smelt Brook. The building's timber flooring spans over the culvert section and is supported by the culvert walls.

Refer to Appendix B for photographs and a photo location plan illustrating the conditions at the Brick Grill basement level and its exterior.

Chair Fair (#8 Commercial Street - Rear Portion, Weymouth, MA)

The single story rear portion of the Chair Fair building (approximately 75' x 40') is constructed of exterior load bearing brick walls supporting steel joist framing. The flat roofing system consists of a rubber membrane system. The portion of the building is generally in good condition.

Edmund A. Morante Insurance & Barber Shop (#1 - #3 Commercial Street, Braintree, MA)

The single story brick building is a wood structure currently occupied by Morante Insurance and a Barber Shop. Based upon the Town of Braintree's subdivision records, the building area is approximately 2,015 square feet. The basement is located underneath the entire structure and consists of a soil and concrete slab-on-grade floor along with a concrete foundation walls. The exterior load bearing walls are multi-wythe brick construction. The floor, roof, and interior walls are generally constructed with nominal lumber except for some steel framing of the first floor over the culvert. In general, the timber floor and roof framing is in fair condition. The exterior basement walls are generally in fair condition.



The building's basement forms the northwest culvert walls of the Smelt Brook. The building's timber and steel framed floors span over the culvert section and is supported on the culvert walls. Several steel beams cantilever from the basement wall over the Smelt Brook and support timber floor joists and the building's exterior wall.

Refer to Appendix B for photographs and a photo location plan illustrating the conditions at the Morante Insurance / Barber Shop basement level.

Smelt Brook Culvert (Weymouth/Braintree, MA)

The Smelt Brook culvert is constructed of variety materials including concrete, field stone, and masonry block. The section beneath Commercial Street is in poor to very poor condition with several areas of spalled concrete and visible corroded reinforcing. Areas of the culvert walls and intermediate piers have lost stone and appear to have rotated. The roof structure of the culvert over Commercial Street must be investigated further to ensure the structural adequacy to carry vehicular traffic. Downstream of Commercial Street, the culvert walls change in section and material type. Several areas of scour were observed in areas where the cross sectional area (width of the channel) was reduced. The geometry changes in width from 8'-0" beneath Commercial Street to 4'-0" approximately 16'-0" downstream of Commercial Street. The northwest wall (adjacent to Morante Insurance/Barber Shop building) shows significant signs of movement assumed to have resulted from over 2 feet of scour observed beneath it. The floors of the Brick Grill and the Morante Insurance /Barber Shop are comprised of both timber and steel framing members which are supported on the existing culvert walls. Several different framing configurations were observed from conventional timber floor joists to miscellaneous steel beams and concrete encased framing members. The inconsistency of the framing is a concern and is considered in poor condition. The steel members are severely deteriorated and show signs of significant delamination and section loss. The section of the culvert beyond the building is in fair condition. It is covered with timber decking supported on steel rails spanning the culvert walls. A 12" thick reinforced concrete pad is located over the end of the culvert section as it enters the existing 72" piped segment of the Smelt brook. The concrete pad is in good condition. The field stone and concrete walls of the culvert as it approaches the pipe are in fair condition with little signs of observed failures. The bottom of the channel approximately 8 feet below grade is comprised of loose gravel material with miscellaneous stones and boulders scattered throughout.



To help illustrate the existing conditions observed in the field, PARE has developed a series of perspectives which have been included in Appendix B. These were developed from field notes existing GIS information and data provided by both the Town of Weymouth and the Town of Braintree. A complete survey was not performed as part of this project. The various perspectives will help to show the overhang of the buildings as well as the condition within the channel.

1.2 Permitting

Daylighting a section of Smelt Brook was originally conceived as part of a much larger suite of improvements associated with rehabilitating the Old Colony Railroad Greenbush Line, specifically the construction of the Weymouth Landing station, which opened on October 31, 2007. The original location for this work was in a proposed parking lot where the daylighted channel would occupy an “island”. The Town of Weymouth now prefers to locate the daylighting to a new location closer to Commercial Street. Although intimately tied into the required mitigation for the larger project, it is anticipated that the new configuration of the daylighted section of Smelt Brook may be considered a stand-alone project. Because of the highly complex permitting required for the Weymouth Landing project; the daylighting project should be discussed with the regulatory agencies prior to preparation of plans or permit applications. A new round of coordination with the Massachusetts Division of Marine Fisheries is also recommended.

Massachusetts Environmental Policy Act (MEPA)

The Weymouth Landing project was reviewed under MEPA as part of the Statewide Old Colony Railroad Rehabilitation Project (EOEA #5840). Originally submitted to MEPA on February 10, 1986, this process was completed on August 17, 2001 when the Final Environmental Impact Report (FEIR) was determined to be adequate. Although a copy of the FEIR Certificate was not available, it is anticipated that the Smelt Brook daylighting would have been included as part of the overall mitigation package. Since more than 5 years have passed since the FEIR Certificate was issued, the daylighting would require, at a minimum, submission of a Notice of Project Change (NPC) to the MEPA office. The daylighting itself does not appear to exceed any other MEPA thresholds that would require an Environmental Notification Form (ENF), or a separate EIR. Careful review of the prior MEPA actions should be undertaken prior to submitting the NPC.



Wetlands Protection Act (WPA)

The project received Orders of Conditions from both the Weymouth and Braintree Conservation Commissions under File Number 81-890 and 8-528, respectively. These Orders were subsequently appealed, and on February 24, 2004 the Massachusetts Department of Environmental Protection issued a Superseding Order of Conditions (SOC) for the project. The SOC would have expired on February 24, 2007 unless extended. It is not known whether the SOC was extended. The SOC, which covered the entire rail rehabilitation project, stated that the daylighted portion of Smelt Brook may not be covered with grating and prohibited the use of trash racks. Presuming that the SOC has expired, new Orders of Conditions will be required from the both Weymouth and Braintree for the project.

Massachusetts Waterways Program (Ch. 91)

The Massachusetts DEP issued a Chapter 91 Waterways License (#10164) for the Greenbush Commuter Rail Restoration Project as a whole on March 31, 2005. This License was for work within filled or flowed tidelands and included "...replacing approximately 150 linear feet of the existing 72" pipe with an open-air culvert within Smelt Brook including the adjacent landscaped viewing area and habitat improvements". In a Written Determination issued on November 18, 2004, the Department found that the Smelt Brook work was a water dependent activity. The new channel was to "...provide suitable water depth, water velocity and substrate conditions to support adult smelt attraction and smelt egg survival in accordance with the MA Division of Marine Fisheries guidance". It also required an additional 100 feet of substrate improvements in the 72" culvert, prohibited the use of grates or trash racks, required a vegetated buffer with a minimum width of 30 feet (15 feet wide along each side of the channel), trees to shade the open water, a pathway, viewing area with at least two benches, and interpretive signage. The License was to expire for uncompleted work 5 years from the date of issuance, unless it was extended. It is not known whether the license was extended.

Based on information included on the Waterways License plans it appears that the current location contemplated for the Smelt Brook daylighting is also located in filled tidelands, and that a separate Waterway's License will be required for daylighting this reach of the channel.



Water Quality Certification (WQC)

Although no Water Quality Certification for this project was reviewed as part of this study, it is certain that one was issued. For the Smelt Brook work, a new or amended certification will be required for the substrate improvements in the channel (discharge of fill in wetlands or waters).

US Army Corps of Engineers (ACOE) and Section 106

The DEP, in their “findings” section of the SOC, stated that the MBTA had (as of February 2004) “...entered a review process with the U.S. Army Corps of Engineers (ACOE) under Section 404 of the Clean Water Act regarding potential impacts on wetlands and historic properties”. The outcome of this process is not known; however, given the scale of the project as a whole it is possible that an Individual Permit may have been required. The DEP findings also state, with respect to historic properties, that the Section 106 process resulted in a Programmatic Agreement, dated February 28, 2001, by the ACOE, the MBTA, the Massachusetts Historical Commission (MHC), and the National Advisory Council on Historic Preservation. This document was not available for review as part of this study, but that statement suggests that the historic preservation issues have been vetted for the project as a whole, including the Smelt Brook daylighting. Coordination with the ACOE will be necessary to determine whether the existing authorization remains in effect. The Section 106 Programmatic Agreement needs to be obtained and reviewed to determine whether the new location of the daylighting was addressed. If not, coordination with the Massachusetts Historical Commission will be required.



ASSESSMENT METHODOLOGY

The condition survey of both the buildings and culvert was a visual-only investigation deemed to document their current structural conditions. Therefore, it is restricted to the “visually accessible” portions of the interior and exterior areas, including its building basement and all accessible floors and culvert walls and roof slabs where applicable. Roofs and roof framing were observed from the floor below and/or from ground level.

2.1 Limitations

Limitations on “visually accessible” areas include the following:

- Many areas of the structural floor, roof, and wall systems are obscured by finishes such as plaster, carpet, and tile. Except for indications of water staining, sagging, or failures of the finished surfaces, the findings of the condition survey can only speculate on the condition of unexposed floors and roofs.

2.2 Documentation

Observations were documented using color photographs, sketches, and field notes. Existing plans of the structures were not available.

2.3 Structural Assessments

The structural assessments contained herein are meant only as a guide in understanding the current condition of the existing structures. They are not airtight assessments. This was a visual investigation, general in nature, limited to reasonably safe and accessible portions of the structures. The assessments are based on general observations, reasonable assumptions, professional judgment, and experience with similar structures.



Nomenclature used in the assessment is generally defined as follows:

- *Good:* Structural elements have little to no observed deterioration and can perform their intended function. Concrete and masonry surfaces are clean with little to no cracking or spalling. Wood is clean with no staining or mold. Plaster surfaces are firm and crack free.
- *Fair:* Structural elements have low levels of deterioration and can perform their intended function, but may have some minor reduction in capacity. Concrete and masonry elements may have hairline cracks and localized spalling, efflorescence, and staining, but surfaces are largely intact and clear. Wood members may have some checking and localized staining/mold, but appear sound. Plaster surfaces may have some staining and minor cracking at corners, but surfaces are firm.
- *Poor:* Structural elements show advanced section loss or deterioration and have moderate to large reductions in capacity. Concrete may exhibit large spalls and/or extensive efflorescence. Large cracks may be observed in concrete or masonry elements. Wood may be stained and/or damp with mold and/or small areas of rot. Vertical elements may be out of plumb and have lost veneer elements. Floors/roofs may have rotted/missing finishes and/or are easily deflected.
- *Very Poor:* Structural elements show severe section loss or deterioration and can no longer safely perform their intended function. Concrete may have extensive spalling and deterioration with corroded reinforcement. Large, extensive cracking and loss of masonry units may be observed in concrete or masonry elements. Wood members may have extensive mold and rot along their length and/or at their supports. Floors/roofs and vertical elements may exhibit large, permanent deflections.
- *Failed:* Structural elements have lost the ability to perform their intended function. Elements have collapsed or are near collapse.



FINDINGS

Based on our field investigation (exclusive of an asbestos and hazardous material survey) , it was uncovered that the Brick Grill and the Morante Insurance /Barber Shop span over portions of the existing Smelt Brook culvert. To accommodate a “full” daylighting concept of the Smelt Brook (150 linear feet), both buildings must be removed or partially removed. It appears these buildings can be conventionally demolished independent from the abutting Chair Fair and El Sarape structures. The rear portion of the Chair Fair building can also be conventionally demolished and isolated from the main portion of the building. Obviously, a new exterior wall for the Chair Fair building will have to be constructed to provide a weathertight enclosure.

The inconsistent geometry of the Smelt Brook is a significant concern. The necking down of the channel width has resulted in significant scouring beneath the side walls causing settlement, rotation, and failure in the south east wall. The walls of the culvert varying from rubble stone to formed concrete faces to masonry block and brick. It is our opinion that these walls will not be sufficient alone to act as the permanent retaining structure for the proposed daylighted culvert.

The piped section of the Smelt Brook begins approximately 110 feet east of Commercial Street, therefore, in order to fully daylight the 150 linear feet, a forty foot segment of new culvert construction will be required. This will require the removal of 40 linear feet of the existing 72” pipe segment up to the municipal parking lot. Flow will be required to be diverted during this process.



SUMMARY

Based on our findings, PARE has presented two options that will daylight the Smelt Brook, 150-foot Alternative (full daylighting) and 110-foot Alternative (reduced daylighting). For each alternative, it is our recommendation that the Brick Grill, Morante Insurance / Barber Shop, and the rear portion of the Chair Fair buildings be demolished. This will require acquisition of the properties and a full asbestos and hazardous material survey be performed.

To achieve 150-feet of Smelt Brook daylighting, an additional 40 linear feet of culvert will need to be constructed just east of the start of the 72" pipe. This can be accomplished by constructing concrete retaining walls (approximately 8-foot high) on either side of the existing pipe. The new walls will have to be extended below the projected scour depth. The wall types can either be a gravity or cantilever type retaining wall. A new concrete scour pad will be required below the bottom of the channel which will require a temporary diversion of flow within the 72" pipe.

For either alternative, the existing walls of the culvert will not be adequate to support the permanent loads induced by the lateral pressure from the backfill material within the basements. To stabilize the existing culvert walls, it is our recommendation that an independent retaining wall (approximately 8-foot high) be constructed within the building basements just behind the existing culvert walls. This new wall will then act, independently, as the permanent support for the lateral pressure exerted by the soil. The existing culvert walls can either be left in place or removed upon completion of the new retaining walls.

It is recommended that a concrete scour pad be installed at the base of the channel and then filled with a 12" layer of crushed stone or other material to create an acceptable bedding layer.

A new walkway with ornamental railing and a landscaped area with benches can be created to allow for pedestrians to pass from Commercial Street to the municipal parking lot. These perspectives have been depicted in Appendix C.

All permitting requirements with appropriate agencies will be required as outlined in Section 1.2.



Included in Appendix D is an Opinion of Probable Construction Cost for each alternative. The estimated cost for the 150-foot daylighted option is the range of \$850,000 while the 110-foot daylighted section is approximately \$580,000. The costs for property acquisition and asbestos and hazardous material abatement have not been included in these opinions. Environmental site assessments were not included as part of this project and any potential costs associated with contaminated soils must also be considered.



APPENDIX A

PROJECT LOCATION PLAN



APPENDIX B

EXISTING CONDITIONS

Perspectives # 1 thru #6

Photo Location Plan

Brick Grill Basement Level – Photographs

Morante Insurance /Barber Shop Basement Level – Photographs

Smelt Brook– Photographs

Exterior – Photographs



APPENDIX C

WEYMOUTH LANDING DAYLIGHTING ALTERNATIVES

150-Foot Daylighting Alternate (Perspectives 'A' thru 'D')

110-Foot Daylighting Alternate (Perspectives 'A' thru 'D')



APPENDIX D

OPINION OF PROBABLE CONSTRUCTION COSTS

