



FUSS & O'NEILL

August 15, 2018

Matthew Merritt, President
Old Lyme Shores Beach Association
18 St. Andrews
Glastonbury, CT 06033

RE: Proposal for Professional Engineering Services
OLSBA Stormwater Management Plan

Dear Mr. Merritt:

Thank you for requesting this proposal for professional engineering services to develop a stormwater management plan for the Old Lyme Shores Beach Association (OLSBA) neighborhood. The completion of the Sheffield Brook flood resiliency project to the west has alleviated some of the street and property flooding along the western edge of the OLSBA neighborhood bordering Sheffield Brook. However, several drainage problems remain that cause flooding on streets and private property. This flooding is caused by several factors including:

- Three existing storm drain outfalls on the beach that routinely are blocked with sand. Based on our previous work with Old Colony Beach Club Association (OCBCA), sand is transported from west to east to your beach, which is in an accretion zone. The outfall furthest to the west is more stable as it is located in an old groin.
- The open channel and small culvert system that runs through the backyards between Billow Road and Brightwater Road is undersized.
- There are a number of significantly undersized drainage pipes throughout the project area that are inadequate to convey the volume of runoff that is generated in this neighborhood. In addition, several of the systems may have been modified by past property owners and there are no formal easements for these systems. Some of these systems are also constructed with substandard materials and methods that further reduce their service life.

We understand that the Association views the upcoming sewer project within the neighborhood as an opportunity to improve the management of stormwater in the neighborhood and reduce flooding, since the sewer project will require excavating and repaving the streets within the neighborhood.

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It is also our understanding that OLSBA wishes to eliminate the three existing stormwater outfalls and construct one new, combined outfall in the area of the existing OCBCA outfall.

This proposal is to complete a stormwater management plan for the neighborhood. The purpose of this plan is to identify alternative approaches to managing the stormwater, their approximate costs and relative advantages and disadvantages with the goal of providing the information needed to select a preferred approach that would then be designed. We will prepare future proposals for the preferred approach that include design, permitting, bidding and construction. The following paragraphs describe our proposed scope of services, schedule and fees to complete this project.

Scope of Services

Collect Base-Line Data

- On-site walk-through and kickoff meeting with OLSBA representatives. The purpose of this meeting, which is currently scheduled for August 24, 2018, will be to:
 - Confirm existing areas with flooding problems.
 - Confirm location of critical infrastructure and low points.
 - Review potential approaches to reduce observed flooding to confirm what may or may not be acceptable. These approaches include connecting to the existing stone channel on the Old Colony Beach Club Association beach, disconnecting one or more of the existing outfalls, incorporating green infrastructure in the higher areas of the drainage area to reduce stormwater volumes and increasing pipe sizes.
 - Mark out locations for excavation of test pits, described below.
- Compile project base map with available information. This map will include:
 - Topography from Town of Old Lyme 2002 mapping, field edited by Fuss & O'Neill in 2013. This survey data includes storm drainage structure locations and elevations (top of CB frames, pipe sizes and inverts). We will review existing drainage structures and piping during our site visit.
 - The locations of existing stormwater structures and conveyances.
 - Planimetric data, such as roadway alignments and buildings, available from the Town of Old Lyme GIS database.
- Excavate shallow test pits to evaluate infiltration capability of soils. This work will include:
 - Mark-out of test pit locations during our initial site walkover on August 24. These locations will be noted on a map, and a copy of the map will be provided to the excavation contractor so that he may request a utility mark-out by Call-Before-You-Dig in advance of the test pit date. It is our understanding that you will obtain permission and otherwise notify residents that shallow test pits will be

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excavated. Once excavated, test pits will be reviewed by our engineers and the pits will be backfilled very quickly to minimize safety concerns.

- Retaining the services of an excavation contractor to mobilize a backhoe to the site and perform one day of test pits as directed by one of our engineers. The purpose of excavating test pits is to determine the depth of high groundwater or other limitations to stormwater infiltration. Test pits will primarily be excavated in the northwest, higher portion of the neighborhood, away from the known shallow bedrock in the eastern area, and where the greater depth to the groundwater table is anticipated.
- Hydraulic conductivity, a factor that helps us determine how much stormwater can flow through soil, will be measured in the field using an infiltrometer or another appropriate apparatus. A two-person crew will be on hand to direct the contractor and perform hydraulic conductivity testing.

This task does not include any additional field survey efforts.

Identify Potential Alternatives

- Develop conceptual, planimetric sketches for up to three alternatives. These sketches will simply show where proposed improvements would be planned for each of the potential alternatives. The purpose of these sketches will be to provide a general overview of what is being planned and not to provide any engineering definition. Engineering design plans will be developed as part of a subsequent proposal after a preferred design is selected.
- Develop a hydrologic and hydraulic model of the existing stormwater system using the PCSWMM software. The one-, two-, and ten-year frequency storms will be analyzed. The model results will be used as a baseline, in a subsequent step described below, to assess the relative effectiveness of the proposed alternatives, including infiltration approaches. The total rainfall applied to these storms will be obtained from NOAA Atlas 14 *Point Precipitation Frequency Estimates*. The rainfall distribution will be based on guidance in NRCS Technical Release 55 *Urban Hydrology for Small Watersheds*. Infiltration of runoff into the surrounding soils will be modeled using the Green-Ampt method. The PCSWMM model will be roughly calibrated with past observed flooding if photos, high water marks or other evidence and dates of flooding are made available to us.
- Revise the existing conditions model to reflect proposed conditions for the three alternatives and run for the one-, two-, and ten-year frequency storms to assess improvements in flooding. These alternatives will include stormwater infiltration structures where test pits and hydraulic conductivity testing indicate suitable soils are present.

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- Develop order-of-magnitude (+50% to -30% of actual) opinions-of-construction costs in order to compare relative costs between each of the three alternatives. Budgetary-level (+30% to -15% of actual) of opinions-of-construction-costs will be prepared as part of a subsequent proposal after the preferred design is further developed. The cost of nature-based (i.e., swales) and structural infiltration systems will be identified separately, and the cost savings that may be realized by reducing pipe sizes will be evaluated and identified.
- Summarize relative advantages, disadvantages and maintenance requirements between each of the three alternatives.
- Prepare technical memorandum that concisely summarizes the information developed in the tasks above, including the alternatives, conceptual sketches, and opinions of cost. This technical memorandum will be distributed to representatives of the OLSBA electronically as a PDF.

Select Recommended Plan

- Conduct workshop with select members of OLSBA to review evaluated alternatives, opinions of construction costs, advantages, disadvantages and maintenance requirements. During this workshop, a consensus decision will be made on a recommended plan to resolve the drainage issues on the site.
- Finalize the report by adding a section documenting the selection of a recommended plan. Three hard copies and an electronic PDF version of the final report will be provided for OLSBA's use.

Schedule

We are prepared to complete the proposed tasks within sixteen weeks of receipt of Authorization to Proceed, weather permitting.

Fees

Fuss & O'Neill proposes to provide these professional services on a lump sum basis for a fee of \$38,100. Our policy is to invoice on a monthly basis using a percent complete for each of the project tasks. Individual costs that comprise the lump sum fee are approximated according to the table below.



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Task	Fee
Collect Base-Line Data, Create Base Map, Soil Testing *	\$15,700
Evaluate Potential Alternatives	\$18,900
Workshop, Select Recommended Plan	\$3,500
TOTAL	\$38,100

* Includes a \$5,000 allowance for an excavation contractor; actual price to be determined.

For additional services not included in this proposal, billing will be monthly according to the approved Rate Schedule in effect at the time services are provided.

General Terms and Conditions

The Terms and Conditions stated in our May 16, 2013 Agreement will apply to the services described above.

Receipt of a signed copy of the Authorization to Proceed enclosed with this proposal or issuance of a purchase order referencing this proposal will serve to authorize the work outlined in the Scope of Services.

Thank you for requesting engineering services from Fuss & O'Neill. We look forward to working with you on this project.

Sincerely,

Reviewed by:

Philip E. Forzley, PE
Vice President

Kurt Mailman, PE
Vice President

/ndt

Attachments: Authorization to Proceed

Authorization to Proceed

Philip E. Forzley, PE
Vice President
Fuss & O'Neill, Inc.
146 Hartford Road
Manchester, CT 06040

RE: Authorization to Proceed
Proposal for Professional Engineering Services
OLSBA Stormwater Management Plan

Dear Mr. Forzley:

I hereby authorize Fuss & O'Neill, Inc. to proceed with the above-referenced project in accordance with the Terms and Conditions stated in our May 16, 2013 Agreement and proposal dated August 15, 2018. I understand that billing will be monthly, payable within thirty (30) days of date of invoice with interest accruing at the rate of 1.5% per month thereafter. A 15% administration charge will be added to subcontract services that are billed through Fuss & O'Neill. I further understand that Old Lyme Shores Beach Association will be responsible for the reasonable cost of collection.

Printed Name

Date

Signature

Title