



TOWN OF WESTFORD

ENGINEERING DEPARTMENT

PAUL M. STARRATT, P.E.
Town Engineer
JEREMY R. DOWNS, P.E.
Assistant Town Engineer

To: Town Manager Jodi Ross

From: Paul Starratt, P.E.

Re: TEC, Inc. Contract Amendment – Groton Road Culvert

Date: February 3, 2016

The Engineering Department has been working with our design team at TEC, Inc. and MassDOT to extend the sidewalk and bike lanes on Groton Road as a part of the Oak Hill Road & Groton Road Intersection Improvement Project. In order to accomplish this extension, the culvert at Gilson Brook needs to be replaced near the Ace Hardware Plaza. MassDOT has agreed to pay for the construction of this new culvert, but the town will need to fund the design and permitting.

TEC, Inc. has prepared the attached Scope & Fee Proposal to complete the work in two phases. Phase One will be funded through the original appropriation for the project in the amount of \$38,310. Phase Two will be funded with a \$50,000 capital appropriation if approved by Annual Town Meeting on April 2, 2016.

The Engineering Department recommends approval of this contract amendment.

Engineering Department
28 North Street • Westford, MA 01886-1245
Tel. (978) 692-5520 • (978) 692-5517 • Fax (978) 399-2739



Scope & Fee Summary

- New Contract
 Amendment No.: 2

Project No.: T0519.01
 Date: February 3, 2016

Project Name: Westford – Route 40 (Groton Road) at Oak Hill Road – Proposed Culvert Replacement over Gilson Brook

To:	Task	Current	Amendment	Contract Total
Mr. Paul Starratt, PE Town Engineer Town of Westford 28 North Street Westford, MA 01886	150 – ENVIRONMENTAL	\$ 7,344.93	\$ 6,980.00	\$ 14,324.93
	200 – FUNCTIONAL DESIGN REPORT	\$ 6,115.55	\$ 0.00	\$ 6,115.55
	220 – DESIGN EXCEPTION REPORT	\$ 1,685.99	\$ 0.00	\$ 1,685.99
	300 – 25% DESIGN	\$ 24,612.59	\$ 0.00	\$ 24,612.59
	350 – DESIGN PUBLIC HEARING	\$ 1,072.58	\$ 0.00	\$ 1,072.58
	400 – 75% DESIGN	\$ 22,627.06	\$ 0.00	\$ 22,627.06
	450 – 100% DESIGN	\$ 12,376.85	\$ 0.00	\$ 12,376.85
	500 – RIGHT OF WAY	\$ 4,171.32	\$ 0.00	\$ 4,171.32
	600 – GEOTECHNICAL (SUBCONSULTANT)	\$ 5,404.42	\$ 9,830.00	\$ 15,234.42
	700 – PROJECT DEV. (SUBCONSULTANT)	\$ 0.00	\$ 15,700.00	\$ 15,700.00
	710 – SKETCH PLANS	\$ 0.00	\$ 5,280.00	\$ 5,280.00
	750 – FINAL BRIDGE DESIGN	\$ 0.00	\$ 26,200.00	\$ 26,200.00
	800 – PS&E SUBMISSION	\$ 8,270.46	\$ 9,600.00	\$ 17,870.46
	900 – CONSTRUCTION ENGINEERING	\$ 3,476.77	\$ 2,910.00	\$ 6,386.77
	TASK D – DIRECT EXPENSES	\$ 6,841.48	\$ 2,500.00	\$ 9,341.48
	TASK E – LANDTECH CONSULTANTS	\$ 22,000.00	\$ 7,500.00	\$ 29,500.00
	TOTAL LABOR FEE	\$ 126,000.00	\$ 86,500.00	\$ 212,500.00

Requested by: Client

- Lump Sum
 Cost + Fixed Fee

- Time & Expenses
 Other

Estimated Date of Completion: for FY17 Construction Advertisement

Scope of Services:

The Town of Westford Engineering Department has requested additional engineering design services associated with the replacement of the existing 30" corrugated metal pipe culvert on Route 40 (Groton Road) spanning Gilson Brook. The additional scope of services is in response to MassDOT 25% design review comments for the subject project and MassDOT/NMCOG commitment to fund the construction of the culvert replacement. Based on direction from MassDOT on January 8, 2016, we anticipate that the proposed structure type will be an 8'x8' partially buried precast concrete box culvert to accommodate the Massachusetts Stream Crossing Standards to the greatest extent practical. As such, this scope and fee assumes that a Bridge Type Selection Worksheet is not required.

The following information provides a comprehensive description of the project scope in accordance with Chapter 2 of the MassDOT Project Development Design Guide and the 2013 MassDOT LRFD Bridge Manual. The MassDOT Standardized Scope of Services has been utilized as a template and tasks that are not currently anticipated to be part of this culvert replacement project have been removed. Required meetings associated with the various design tasks have been incorporated into the various design stages as needed.

MassDOT's design development process implements a four (4) step submission schedule including Sketch Plans, 1st Structural Submission, 2nd Structural Submission, and PS&E Submission. Subconsultant services to provide geotechnical engineering, hydraulic engineering, and supplemental survey services are needed to develop the

proposed structure's Sketch Plan submission; subconsultant services are estimated to be completed within 8 weeks from Notice to Proceed, weather permitting (for survey work).

The additional design and engineering services will be performed under existing tasks as defined below:

Task 150 - Environmental **\$6,980.00**

- Amend the previously filed Categorical Exclusion to include the culvert reconstruction.
- Prepare backup documentation for Category II permitting under the U.S. Army Corps of Engineers (USACE), New England Division General Permit upon request. Backup documentation may include the information generated in accordance with the requirements of Section 2.4.2.5, *Environmental Requirements for the Preliminary (25 Percent) Design Submission* of the *Project Development & Design Guide*.
- Prepare and submit an NOI to the Westford conservation commission in accordance with the WPA. Tasks include preparation of all associated forms and backup documentation; permit plans, coordination during review, site walks, and attending conservation commission hearings.

Task 600 – Geotechnical Design (Subconsultant) **\$9,830.00**

- Research, compile, and evaluate available subsurface and foundation data relative to the project site (plans, maps, etc.).
- Conduct a field inspection at the project site to view site conditions, consider existing and proposed substructures, foundation elements, and assess requirements for the subsurface investigation plan.
- Prepare a subsurface investigation plan (boring, probing, testing type, location, depth, etc.) in accordance with the Bridge Manual. Revise and resubmit after MassDOT review.
- Conduct on-site inspections during subsurface operations. Follow inspection procedures, coordinate activities between TEC and MassDOT, and verify work performed by drillers.
- Review soil/rock samples and field/laboratory test results. Evaluate the foundation options and determine parameters for foundation design.
- Prepare and edit the Geotechnical Report in accordance with the Bridge Manual and other guidelines. Correlate the contents of the report with the project construction plans.
- Coordinate and meet with MassDOT for reviews, revisions, and advancement of project submittals.
- Prepare and finalize geotechnical related details and items for the plans, special provisions, and estimates.

Task 700 – Project Development – Structural (Subconsultant) **\$15,700.00**

- Determine the vertical and horizontal alignments and typical cross-sections for the roadway over the brook crossing. Analyze the anticipated span length and vertical clearance as provided by MassDOT project scoping. Provide accommodations on the culvert for both existing and proposed utilities.
- TEC's Subconsultant shall prepare the hydrological analysis and hydraulics report relative to the existing and proposed hydraulic openings, perform all calculations necessary to confirm the adequacy of the proposed hydraulic opening required to accommodate the design flows, and prepare a Hydraulics Report that presents pertinent data and recommendations.

Task 710 – Sketch Plans **\$5,280.00**

- Determine the locations for the proposed culvert borings based on the proposed structure type. Coordinate the boring program and the geotechnical design with MassDOT's Geotechnical Section. Prepare the boring location plans.
- Prepare sketch plans for the structure in accordance with the MassDOT Bridge Manual. Submit review copies together with the foundation report to MassDOT. Check to ensure that the proposed design and construction staging plan addresses the cost and scheduling impacts associated with accommodating both existing and proposed utilities. Review the boring logs and foundation reports. Perform geometric design calculations.
- Participate in MassDOT Sketch Plan review meetings. Prepare responses to agency comments and plan revisions, as necessary. Provide coordination during the soils testing program and prior to the preparation of the soils and foundation reports being provided by the geotechnical staff or Subconsultant.
- Review the design of the proposed structure to ensure that the structure does not present any unusual matters that would unduly increase the cost the project or present potential scheduling delays during construction resulting in claims for extra work. Particular attention must be given to the proposed construction staging and available right of way.
- Revise the existing 25% design submission to accommodate the proposed culvert crossing.
- Prepare and submit Bridge Section Sketch Plan Checklist.

Task 750 – Final Bridge Design **\$26,200.00**

- Prepare the design calculations, and perform an independent design check of the calculations for all superstructure components in accordance with the MassDOT Bridge Manual.

- Prepare the design calculations and perform an independent design check of the calculations for all substructure components, including any cofferdams and permanent excavation support system requirements in accordance with the MassDOT Bridge Manual.
- Prepare the design calculations and perform an independent design check of the culvert geometric calculations, including framing, layout, critical clearance and elevation of precast units, layout and ties, etc.
- Prepare the structural drawings in accordance with the MassDOT Bridge Manual and check the drawings for content and accuracy.
- Prepare and submit the culvert design plans for MassDOT review and subsequent resolution of the comments and recommendations received from MassDOT.
- Prepare the quantity calculations, and perform an independent check of the quantity calculations of the culvert items and related cost estimates.
- Prepare the culvert special provisions in accordance with the MassDOT Bridge Manual.
- Prepare and submit updated final culvert designs plans for MassDOT review and subsequent resolution of MassDOT comments and recommendations.
- Participate in meetings and coordinate in scheduling and advancing the culvert design.
- Perform an independent review of the project by an experienced engineer who is not directly involved in the preparation of the contract documents. Review shall focus on the practicality of constructing the structure based on access to site, equipment needs, material properties, etc. Provide an overall review of the plans, specifications and estimate for conformity to the Guidebook, the Standard Specifications for Highways and Bridges, the latest Supplemental Specifications, the Bridge Manual, the Construction and Traffic Standard Details, and the latest Engineering and Policy Directives.
- Prepare and submit Bridge Section Final Bridge Design Check list.

Task 800 – PS&E Submission **\$9,600.00**

- Prepare a formal written response to all comments received regarding the 2nd Structural Submission (100% submission) review.
- Ensure that all comments from 100% review are addressed and reflected in the contract documents.
- Ensure that the highway plans accurately depict the approved culvert design and that the index correctly identifies the page numbering of the culvert plans. Combine Special Provisions and Estimate into one package that eliminates redundancy and ambiguity.
- Have an experienced engineer who is not directly involved in the preparation of the contract documents perform an independent review of the project. Log on to the MassDOT website for the latest reference documents such as Engineering Directives and Policy Directives, and verify that the Plans, Specifications and Estimate are prepared in accordance with these documents. Review all environmental permits and ensure that the contract documents provide a means of compensating the construction contractor for performing work described in the permits.

Task 900 – Construction Engineering **\$2,910.00**

- Review and respond to inquiries from MassDOT related to the bid documents. Participate in Pre-Bid Conference. Provide written responses to contractor's questions.
- Review and approve or take other appropriate action upon structural shop drawings for conformance with the contract documents.
- Review and approve or take other appropriate action according to the Bridge Manual regarding the conformance of the culvert demolition and erection procedures to the contract documents.
- Provide assistance to MassDOT in interpreting the contract documents. Conduct field visits to the project site during construction as requested by the Engineer to provide consultation on design intent, assistance in addressing unforeseen conditions and /or similar matters, as requested by the Engineer. Attend periodic status and coordination meetings as determined by complexity of the project.

Task E – LandTech Consultants (Subconsultant) **\$7,500.00**

- TEC's Subconsultant shall provide additional survey in accordance with the MassDOT LRFD Bridge Manual to complement the design development process for the proposed culvert replacement. This task assumes 4 days of field work.

The following services are not anticipated and therefore have not been included:

- Sediment Sampling Analysis for dredged materials in Gilson Brook
- Preparation of a DEP Water Quality Certificate Application
- Preparation of a Construction Contract Time Determination
- Preparation of a Post-Construction Live Load Rating
- Hazardous Materials/Research/Review
- Police Details or permits to be provided by the Town

Additional services not listed above may be performed at the request of the Client and will be considered an amendment to this agreement.

Services will begin upon signed authorization of this agreement. TEC will invoice the Client monthly on a percent complete basis for the services performed.

Phase 1 (Tasks 600 / 700 / 710 / E) = \$38,310

Phase 1 Client Authorization _____ **Date:** _____

Prepared by: Jody P. Trunfio, P.E.

CM/PM Initials: KR/MCM

Please execute this Client Authorization for TEC, Inc. to proceed with the above scope of services at the stated estimated costs. No services will be provided until it is signed and returned to TEC.

Subject to attached terms & conditions

Subject to terms & conditions in our original agreement

TEC, Inc. Authorization

By

Client Authorization

(Please sign original & return)

By

Title

Title

Date

Date

