

Town of Plymouth

TO: Board of Selectmen
Advisory and Finance Committee

FROM: Joseph Young
IT Manager

RE: Fiber Infrastructure Relocation

DATE: September 7, 2016

The reason for my request of \$100,000 is to relocate (384) fiber strands from 11 Lincoln Street to South Russel Street. The fiber infrastructure is the backbone on which all municipal data, voice and video is transported. We have over 40 Town and School sites connected via municipal fiber.

In order to maintain connectivity during this transition we need to incorporate a phased approach. We will move half of the fibers to new location, once new equipment is up and running we will then relocate the second half of the fibers.

We need to get the fiber stock ordered ASAP because of limited available supplies.

Thank You for your consideration in this matter.



4B
TOWN OF PLYMOUTH
DEPARTMENT OF PUBLIC WORKS

159 Camelot Drive
Plymouth, Massachusetts 02360

FAX: (508) 830-4165

PUBLIC WORKS DEPARTMENT

MEMO

Date: September 6, 2016

To: Advisory & Finance Committee

cc: Melissa Arrighi, Town Manager
Lynne Barrett, Finance Director
Gary Frizzell, Wastewater Manager

From: Jonathan Beden  Director of Public Works

Re: **Fall 2016 Annual Town Meeting**
Article 4B-Wastewater Treatment Plant Audit

We are requesting funds to evaluate current conditions at the Wastewater Treatment Plant and the 5 municipal lift stations which include; Holmes Point, Water Street, Hedge Road, Industrial Park, and the Long Pond Stations.

Combined, these facilities are covered under the current operation and maintenance agreement with Veolia North America, which is set to expire on June 30, 2021. All relevant disciplines will be reviewed and a risk matrix will be developed along with a preliminary planning cost estimate. This condition assessment is critical, as it will delineate any item needing to be addressed, including its value. This will also allow the town to effectively and efficiently address any deficiencies that may be observed.

The Operator (Veolia) is required to transition the Plant and all the Stations back over to the town in good working order and in compliance with all legal requirements subject to normal wear and tear, consistent with good industry practice. The proposed assessment will assist the Town in determining the current condition of the infrastructure.

The lump sum cost to perform this work is \$174,470 and is expected to take approximately 5 months to complete. Our overall Capital request is for \$200,000 should any more in-depth investigations be required. We respectfully request your support in developing a comprehensive wastewater condition assessment.





August 22, 2016

Mr. Jonathan Beder
 Director, Department of Public Works
 159 Camelot Drive
 Plymouth, MA 02360

**SUBJECT: PROPOSAL FOR PROFESSIONAL SERVICES
 WASTEWATER FACILITIES CONDITION ASSESSMENT/AUDIT**

Dear Mr. Beder:

We appreciate the opportunity to assist the Town with conducting a condition assessment/audit of its wastewater facilities, including the wastewater treatment plant (WWTP) and five (5) wastewater pump stations, including Water Street, Holmes Point, Hedge Road, Industrial Park, and Long Pond Road. The goal of the project is to document existing conditions that will be used as a baseline to establish future capital improvement needs and approaches to operation and maintenance.

Kleinfelder's proposes to evaluate the condition of these facilities utilizing a comprehensive multi-disciplinary approach consisting of Kleinfelder experts as well as a team of specialize sub-consultants. Disciplines represented include wastewater process engineering; Supervisory Control and Data Acquisition (SCADA); architecture; structural engineering; heating, ventilation and cooling (HVAC); electrical; plumbing and fire protection. In addition, Kleinfelder proposes to conduct a building code review to assess gaps between the facilities and current building, fire protection, egress and life safety codes. The evaluation from each discipline will be consolidated into an overall risk matrix of the wastewater facilities. Further, a preliminary planning level cost estimate will be prepared that would address the deficiencies observed.

Kleinfelder will participate in up to three (3) meetings with the Town to convey the findings of this study. Further, Kleinfelder is available to assist the Town in future phases of evaluation should there be such a need.

This proposal is based on our discussions to date with you Gary and Chad, as well as our site visit, and consists of our proposed Scope of Work, Schedule and Compensation for services rendered, as detailed in the following sections.

SECTION 1 - SCOPE OF WORK

1) Preliminary Tasks

- a) Develop List of Information (Data, Plans, Reports, etc.) Needed and Obtain from Town
- b) Review, summarize, and tabulate acquired Information

- c) Kick-Off Meeting with Town to review Scope, Schedule, Deliverable
- d) Develop Methodology for Conditional Assessment
- e) Develop Forms for Field Assessment
- f) Develop Asset Inventory and pre-populate Field Assessment forms
- g) Develop a detailed process flow diagram
- h) Conduct Staff Interviews to understand condition, design, and redundancy concerns

2) Conduct Field Assessment

- a) Coordination with Field Assessment Team, including sub-consultants
- b) Perform WWTP and Pump Station Field Assessment (the following disciplines)
 - i) Wastewater Process and Mechanical
 - ii) SCADA, Instrumentation and Control
 - (1) Age and condition of SCADA computers
 - (2) Version/revision/support status of all software and OS
 - (3) Network architecture
 - (4) Age, FRN, and legacy status of PLC hardware
 - (5) Accuracy/adequacy/viability of all process instrumentation
 - (6) Assessment of alarm notification/response system
 - (7) Failure analysis of critical components/hardness assessment
 - iii) Building Condition and Code Compliance
 - (1) Architectural
 - (2) Structural
 - (3) HVAC / Plumbing / Fire Protection
 - (4) Electrical (Power, Lighting, Standby Power)
 - (5) Building Code Review (building, fire, life safety and accessibility)
- c) Corrosion Assessment of Inlet Tank (*one side only*) by dewatering tank and entering for visual inspection:
 - i) Review existing information and conduct staff interviews
 - ii) Perform a field inspection of the concrete inlet tank not previously rehabilitated.
 - iii) Inspections may consist of the following:
 - 1. Visual inspection; and
 - 2. Sounding tests.
 - iv) Review data and assess the condition of the concrete structures.
- d) Determine Process Equipment in need of further evaluation/inspection
- e) Coordination with Manufacturer Service Representatives to conduct follow-up evaluations
- f) Conduct Return Visits with Manufacturer's Representatives to perform more in-depth evaluations. Up to Five (5) follow-up site visits are assumed for budgeting purposes and include the following processes:
 - i) SBR Control and Equipment review
 - ii) Water Street pump station pumping systems
 - iii) Standby generators at WWTP and pumping stations
 - iv) Gravity Belt Thickener
 - v) One Process to be determined
- g) Compile and Archive Field Forms and Photographs
- h) Summarize WWTP and pump station general conditions and deficiencies

- 3) **Pump Station Force Main Corrosion Assessment (four (4) force mains)**
 - a) Review existing information and conduct staff interviews
 - b) Perform a site walk of each force main and identify potential access points (manholes) and test pit locations.
 - c) Coordination with the Town to dig test pits, and coordination with corrosion specialist.
 - d) Perform laboratory tests of soils to assess external corrosivity.
 - e) Perform direct visual inspection to assess the condition of the pipe and measure remaining wall thickness using ultrasonic testing (up to three locations per force main).
 - f) Review data and assess the condition of each force main.

- 4) **Risk Assessment of the Condition Findings**
 - a) Conduct a Workshop with Town to review findings from Prior Tasks
 - b) Review of CMMS program, preventive maintenance schedule and maintenance history of equipment
 - c) Prepare Risk and Condition Assessment
 - i) Develop numerical Condition Rating Criteria
 - ii) Develop Criticality Weighting Criteria
 - iii) Develop Risk Based Asset Matrix (Equipment, Buildings, etc.)
 - iv) Complete the Prioritized Asset Matrix Condition Assessment
 - d) Determine best alternative to address deficiencies – *NOTE: Under this phase of the work, we will not consider alternative technologies*
 - i) Do Nothing/run to failure
 - ii) Refurbish/rehabilitate
 - iii) Replace In Kind
 - e) Develop preliminary planning level costs to address deficiencies
 - f) List operational or maintenance concerns discovered from Field Assessment
 - g) Summarize findings, recommendations and Draft Report
 - h) Conduct a Workshop with Town to review Draft Report
 - i) Finalize Report

- 5) **Meetings with Town**
 - a) Prepare for and attend up to three (3) meetings with the Town as follows:
 - i) (1) Board of Selectmen Executive Session
 - ii) (1) Public Presentation at Board of Selectmen Meeting
 - iii) (1) Additional Board of Selectmen (or others) Meeting

- 6) **Project Management and Administration**
 - a) Develop agreements with sub-consultants
 - b) Monthly status report and invoicing
 - c) Project coordination and communications

DELIVERABLES

1. Presentations for Public Meetings
2. Final Report summarizing findings from the audit and preliminary planning level costs to address deficiencies

SCOPE OF WORK CLARIFICATIONS AND DETAILS:

1. Town will provide Kleinfelder a digital asset list exported from the Town's CMMS database.
2. This phase of the work will not analyze alternative solutions. However, if appropriate, a cost range to implement a variety of solutions may be developed to address a particular deficiency.
3. Where access to certain areas is infeasible, we will make assumptions of condition based on other observations made of similar equipment/facilities and conditions.
4. Architectural and structural assessments of buildings and structures will not include drilling, coring, sampling or testing to determine deficiencies, deteriorations, or remaining concrete wall thickness over rebar, unless explicitly described above. Assessment will be made on visual observations. Based on the findings, we may recommend further investigations as part of a future phase.
5. The following assumptions are made for pricing of the force main corrosion assessment. These assumptions are subject to revision upon review of force main as-built records which were not available during preparation of this proposal:
 - o No corrosion assessment of the Water Street Pump Station force main will be performed since it is being replaced.
 - o Town will provide excavator / operator for test pits related to FM corrosion analysis. Test pits will be pre-dug prior to the corrosion evaluation in order to maximize the time of the evaluator on site.
 - o Three test pits will be dug for each force main.
 - o 2 days will be needed for assessment of each force main, for 8 days total field evaluation time.
 - o 1 soil sample will be analyzed for each test pit (12 in total).
6. In cases where multiple tanks or structures exist (SBR tanks for example), we will assess the condition of one tank only and assume the remaining tanks are of a similar condition.
7. Town staff may be requested to dewater tanks and structures or operate equipment to make access available for evaluations.
8. Town will directly pay for police details, if any.
9. Potential future work tasks are identified below:
 - o Condition assessment follow-up where more in depth investigations are warranted.
 - o Develop WWTP staffing plan.
 - o Develop WWTP process model.
 - o Evaluate wastewater process redundancy needs.
 - o Review WWTP operations for potential O&M cost savings.
 - o Assess alternative wastewater technologies for potential cost savings.
 - o Review contract operations agreement relative to the results of this condition assessment.

SECTION 2 - SCHEDULE

We are prepared to commence work under this proposal immediately upon execution of an Agreement between the Town and Kleinfelder. The schedule below shows approximately five (5) ^{MONTHS} to complete the project, not including the subsequent meetings. We will keep the Town fully apprised of the project status as work progresses.

TASK	TASK DESCRIPTION	2016			2017			
		OCT	NOV	DEC	JAN	FEB	MAR	APR
0	Notice to Proceed	█						
1	Preliminary Tasks	█	█					
2	Conduct Field Assessment		█	█				
3	Pump Station Force Main Corrosion Assessment			█	█			
4	Risk Assessment of the Conditions				█	█		
5	Town Meetings						█	█
6	Project Management and Administration		●	●	●	●	●	●

SECTION 3 - COMPENSATION

We propose to provide services rendered under this proposal on the basis of the lump sum amount indicated below.

Task	Description	Hours	Labor	Expenses	Subconsultants	Total
1	Preliminary Tasks	52	\$7,860	\$200	\$0	\$8,060
2	Conduct Field Assessment	202	\$30,360	\$970	\$26,000	\$57,330
3	FM Corrosion Assessment	20	\$4,340	\$150	\$37,800	\$42,290
4	Risk Assessment	162	\$23,390	\$350	\$18,700	\$42,440
5	Town Meetings	42	\$8,930	\$430	\$0	\$9,360
6	Project Management & Admin	80	\$14,940	\$50	\$0	\$14,990
PROJECT TOTAL		558	\$89,820	\$2,150	\$82,500	\$174,470

We hope you find this proposal meets the needs of your project. We look forward to working with you, Gary and Chad. Please contact us should you have any questions on this proposal.

Sincerely,

KLEINFELDER



David T. Peterson, P.E.
Project Manager



Mark J. Thompson, P.E.
Principal-In-Charge

cc: File

TOWN OF PLYMOUTH
 11 Lincoln Street
 Plymouth, MA 02360
 (508) 747-1620

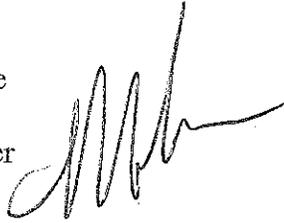
OFFICE OF TOWN MANAGER
 MEMORANDUM

To: Board of Selectmen
 Advisory and Finance Committee
 Lynne Barrett, Director of Finance
 Chris Badot, Selectmen's Office

From: Melissa G. Arrighi, Town Manager

Date: August 18, 2016

Re: Fall Town Meeting, Article 4C



ARTICLE 4C: *(condensed article language) To see if the Town will vote toborrow a sum of money for the construction of a parking deck:*

When 26 Court Street was considered as a site for the new Town Hall, the adequacy of parking spaces was reviewed. We had parking data from a variety of sources including a visitor's survey that Park Plymouth conducted, parking supply from the Town Hall Feasibility Study Report, and a parking utilization survey conducted by VHB. Although those studies found that "the number of parking lot spaces is sufficient to accommodate the Town Hall's total projected demand", there were many that remained quite skeptical. We committed at that time to establishing "Park 1820", a Town Hall Parking Committee, to discuss management and regulation of the on-and-off street parking around 26 Court Street.

Today, over two years later, while the construction of the new Town Hall is progressing, parking still remains a valid concern for many, particularly by those who truly know the area and how it is utilized.

Rather than setup this "Park 1820" committee to look at the existing parking, we have been approached by the Plymouth Growth and Development Corporation (PGDC) to consider a parking deck on South Russell Street.

History of PGDC— At the Fall 2001 Town Meeting, Town Meeting representatives authorized the Selectmen to petition the general court to enact legislation establishing the Plymouth Development Corporation (now Plymouth Growth and Development Corporation (PGDC)). Among other purposes, this non-profit public corporation, made up of Plymouth citizens, was needed to manage, operate, and develop off street and structured parking facilities in the Plymouth Downtown-Waterfront area.

Now, in 2016, the PGDC would like to move forward with establishing a two level parking deck at the new Town Hall. If approved at Town Meeting, the Town would bond for the project, the Building Committee would oversee the construction, the PGDC would pay the costs of building the parking deck, and they would also oversee its management. The architectural firm, the contractor, and the project manager for the new town hall would also be the individuals involved in building the parking deck.

We believe this will provide for a continuity in design, construction, and scheduling.

The current parking lot has 63 parking spaces. If a parking deck is built at that exact location, the preliminary design provides for 152+/- parking spots.

We believe this project is feasible and that the PGDC's financial model can support the 25 year expenditure. In addition, we believe this results in a parking model that will accomplish two very important goals: (1) substantial parking for the new town hall, and (2) visitor parking, downtown workers parking, and local resident parking through a structured process (such as after normal business hours).

Based on the above, I would ask that you support Article 4C.

Enclosures:
PGDC Letter
Financial Model

PLYMOUTH GROWTH & DEVELOPMENT CORPORATION

40 Court Street, Floor 1, Unit 1

Plymouth, MA02738

September 1, 2016

Melissa Arrighi
Town Manager
Town of Plymouth
11 Lincoln Street
Plymouth, MA02360

SUBJECT: Proposed South Russell Street Parking Deck

Dear Melissa,

The PGDC Board of Directors approved funding for the South Russell Street Parking Deck Feasibility Study completed for the Town and PGDC by DBVW Architects in July, and it has authorized funding the design and construction of a new 2-level, 152-space parking deck in coordination with the Town Hall construction project. Although the PGDC will be paying for the entire project, we are requesting that the Town bond the construction for a 30-year term to take advantage of competitive interest rates and borrowing terms that will lower overall project costs.

Purpose and Need

PGDC believes the new parking deck will provide ample parking to accommodate parking needs of Town Hall while providing additional parking supply to the growing Town Center, which has a documented shortage of on- and off-street parking. The new parking deck will increase the number of spaces in the South Russell Street lot from 63 to 152, providing parking for both Town Hall employees and visitors, but also for other downtown employees, visitors and residents.

The proposed operating plan would provide reserved parking for Town employees on the top floor of the deck during the work week (M-F) while allowing general public parking on the first floor at the downtown parking rate of \$1/hour. On nights, weekends and holidays, both floors of the deck would be available to visitors and the general public and would be managed to ensure sufficient availability in the facility when Town Hall night meetings are scheduled. It is proposed that the first floor of the parking deck be access/gate controlled and available for parking 24 hours/day, 7 days/week. Monthly permits for deck parking would also be sold.

Construction Cost Comparison and Facade

The feasibility study concluded that a simple two-level, 152-space parking deck could be constructed on the existing Town Hall parking lot at an estimated construction cost of \$3,178,000. The construction cost

per structured parking space is \$20,908, which is lower than the average cost for constructing structured parking in the Boston Metropolitan area (\$25,000/space)¹. It is also lower than the estimated construction cost per space of structured parking on the Town's Main Street Extension parking lot (\$30,000/space) or Middle Street parking lot (\$40,000/space) based on previous PGDC parking studies. It is significantly lower than the estimated construction cost per space of the proposed 204-space downtown parking garage approved by the City of Newburyport, MA earlier this year (\$34,310/space) as well as the proposed 600-space downtown parking garage approved by the City of Portsmouth, NH in 2015 (\$30,000/space).

The lower cost of the proposed parking deck is due in large part to it being a simple structure devoid of internal ramps, elevators, ventilation/sprinkler requirements, and because it is screened on three sides by Burial Hill. An attractive façade, sympathetic to the Town Hall design, is provided on the front-facing portion of the structure while keeping the muted views from Burial Hill consistent with its current state as a surface parking lot. Architectural renderings and elevations have been prepared by DBVW Architects.

Project Delivery and Schedule

It is assumed that the parking deck will be designed and constructed by the Town's current contractors on the active Town Hall project through a negotiated change order. This will save on bidding costs, contractor mobilization costs (contractor is already mobilized), and schedule and price escalation costs. The construction project would continue to be overseen by the Town's Building Committee. The estimated design and construction schedule for the parking deck is 12 to 16 months.

PGDC Funding and Town Bonding

With regard to funding the project, PGDC would pay for all "soft costs" including the design and engineering oversight of the parking garage out of PGDC cash reserves. The PGDC already provided funding for the feasibility study that was completed earlier. We estimate the soft costs to be \$590,000 or 15% of the total project cost. The PGDC would also make a 10% down payment on deck construction and on installation of \$150,000 worth of security cameras and revenue control equipment which amounts to an additional \$332,800. In other words, the PGDC would fund \$922,800 in "up-front" costs from cash reserves. The remaining \$2,995,200 in construction costs would be bonded by the Town and paid for by the PGDC over the 30-year bond term. The debt service costs of the bond and the operating costs of the deck would be paid from PGDC parking revenues.

Financial Model

A draft financial model for the garage has been prepared showing the total project costs, revenues, and operating assumptions/expenses for the opening year condition. Given the current cash reserves and net positive cash flow of the PGDC from operating the entire parking program (meters, pay-by-phone, permits and enforcement), we are confident that paying the debt service and operating expenses associated with this project will have minimal negative impact on the parking program.

¹ Access Magazine, Donald Shoup, UCLA, 2016.

We are happy to meet with you to discuss the proposal further and look forward to working with the Town on this important downtown project.

Sincerely,

A handwritten signature in cursive script, appearing to read "Leighton Price".

Leighton Price, President
Plymouth Growth & Development Corporation

Cc: PGDC Board of Directors

South Russell Street Parking Deck - Financial Model

Estimated Project Costs

Soft Costs (design/engineering, OPM, legal, bidding, const. admin., testing, etc.)	\$ 590,000	15% of total project cost
Hard Costs		
Construction of 152-space, 2-Floor Parking Deck including contingency and escalation	\$ 3,179,000	SDI Engineering Cost Estimate
Revenue Control Equipment and Security Camera System	\$ 150,000	Budgeted
Subtotal Hard Costs (total construction)	\$ 3,328,000	
Total Project Cost	\$ 3,918,000	

Operating Revenues & Expenses

Key Assumptions:

- Design in 2016/2017 and construction in 2017/2018 through contract change order with Town Hall designer, OPM and contractor.
- PGDC funds estimated soft costs (\$590,000) from cash reserves in 2017 and 2018.
- PGDC funds 10% down payment (\$332,800) on construction in 2017 from cash reserves with the other 90% (\$2,995,200) bonded over 30 years @ 5.0% (Town GO Bond).
- PGDC funds monthly payments on debt service (Town GO Bond).
- Upper floor (76 spaces) reserved for town employees weekdays until 5 pm and open to the general public nights, weekends and holidays @ \$1/hr until 7 pm, year-round
- Lower floor (76 spaces) w/gated access open to the general public (parking passes and transients) - \$1/hr, 24/7, year-round
- On-street time limits in the immediate vicinity of Town Hall are set at 1-hour or less.
- Parking deck is automated (no cashiers). Regular monitoring and on-call services by current Park Plymouth staff.

Revenues & Operating Expense Assumptions - Opening Year

REVENUE	spaces	rate	% avg use	Assumptions
Transient Revenue (Lower Floor)	76	\$ 1.00	0.50	\$1/hr. gated access 24/7
Transient Revenue (Upper Floor)	76	\$ 1.00	0.40	\$1/hr. nights, weekends & holidays until 7 pm
Parking Pass Revenue (Lower Floor)				\$15,000 24/7 Pass, Weekday Pass, etc.
Town reimbursement for emp. parking oper. exp.				\$26,057 28.6% of deck annual operating cost*
Russell/St. metered parking (nights/weekends)				\$2,100 34 spaces @ \$650/yr./space
Citation/Fine/Fees				\$35,850 Associated with metered parking & upper deck
Gross Revenue				\$773,407

OPERATING EXPENSE

Parking Deck Operating Exp.	\$50 /space/mo.	152 spaces	utilities, maint, plowing, supplies, ins, etc.
Major Repair & Replacement Fund	\$100 /space/yr.	152 spaces	No expected repairs until at least 2020
Pay Station/Permit Fees - credit card, gateway, etc			\$15,855 7.5% for pay stations, meter & permit rev.
Citation Fees - ticket/cc processing, hearings, etc.			\$4,314 12% of citation fee and fine revenue
Gross Operating Expenses			\$126,569

NET OPERATING INCOME

Gross Revenue minus Gross Operating Expenses	\$146,838
DEBT SERVICE	\$194,842
NET CASH FLOW	-\$48,004

BALANCING CASH FROM PARK PLYMOUTH SYSTEM

Net operating income minus debt service	\$0
From annual systemwide meter, fines & fees	\$48,004

Permanent Debt Service Assumptions

General Obligation Bonds	Interest	Amortization	Payment	Loan Amount
	5.00%	30	\$ 194,842	\$ 2,995,200

Notes:

*Total reimbursement for Town employee parking equates to 28.6% of total deck operational cost since employees use 50% of the deck for 40 out of 70 paid parking hours: 0.5 x 40/70 = 286

7-Sep-16

TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST FORM
5 YEAR PLANNING - FY17 REQUEST FORM

Department: Fire Department	Priority #:	
Project Title and Description: Purchase and Equip new Engine 9	Total Project Cost:	\$598,600.00

Department/Division Head: Chief Bradley

Check if project is: New Resubmitted Cost estimate was developed: Internally Externally

For project re-submittals, list prior year(s):

Basis of Estimated Costs (attach additional information if available)			If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.		
Capital:	Cost	Comments	Fiscal Year:	Capital	O & M
<i>Planning and Design</i>			<i>FY17</i>		
<i>Labor and Materials</i>			<i>FY18</i>		
<i>Administration</i>			<i>FY19</i>		
<i>Land Acquisition</i>			<i>FY20</i>		
<i>Equipment</i>	\$598,600.00		<i>FY21</i>		
<i>Other</i>					
<i>Contingency</i>					
Total Capital					

Possible sources and amounts of funding, if known: _____

Project Justification and Objective: Please see the attached documents.

For Capital Project Requests:

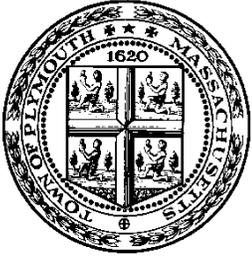
Will this project be phased over more than one fiscal year? If yes, enter it on the 5 Year Plan Yes No
Can this project be phased over more than one fiscal year? Yes No

For Capital Equipment Requests:

XX Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

1994 Pierce Arrow pumping engine, (Ma. Registration MF 6247, VIN 4P1CA02D4RA000446). Will be removed from service December 2016, if not sooner.

Attach additional information, estimates, or justification.



Town of Plymouth
Fire Department
114 Sandwich Street
Plymouth, Massachusetts 02360
508-830-4213
Fax 508-830-4174

To: Lynne Barrett, Kere Gillette

From: Chief Bradley

Date: August 26, 2014

Let me provide a little background that supports this pumper request.

In 2005 and continuing in 2006 the Fire Department's apparatus status was dismal. There were days that there were not enough Engines in service to place one in each of the Town's seven fire stations. During this period there were shifts that a station had a car to transport personnel and a pick-up truck to carry gear to an emergency, but no pumper or water! Planned replacement requests had been delayed or suspended over a period of time due to various reasons; the result was the department was forced to request funding to purchase multiple apparatus at one time. Such requests are extremely expensive and leave the town and Department in the same predicament 10 to 12 years later as the apparatus is all due for replacement at once.

I have attached an article that appeared in the Old Colony Memorial newspaper October 1, 2005. This article provides some history of the "state of the fleet" during those dismal years when regular apparatus replacements were ignored.

Town Meeting appropriated funding at the FATM in 2005 for a new ladder truck and two new pumping engines, that appropriate was \$1.24 million. Although the ladder truck (tower) purchase was a heavy duty custom chassis to ensure years of service, the pumping engines purchased were prefabricated commercial chassis and not heavy custom pumpers; this was an attempt to keep the total cost low. At the time of purchase it was stated that these commercial trucks would last ten years. That time limit has now arrived; the two pumping engines were built on 2006 International Chassis were delivered to Plymouth in February 2007.

Those two pumpers are Engine 6 and Engine 3. Of these two engines, Engine 6 has had more down time and repairs. We have noticed an increase in "down time" for E6 and more complex repairs, many requiring the apparatus to be sent to specialized vendors for repairs (some of these repairs have already been done to Engine 3). Last year E6 was out of service 33 times, not including regular maintenance, this year (January to August) it has been taken out of service 19 times. This is a clear indication of the need to move this apparatus from "front line" to ready

reserve. The sister engine, Engine 3 will be close behind however I hope it can remain a “front line” apparatus until FY19, a year earlier than indicated on the Five Year Plan.

In addition, the Town purchased two additional new pumping engines in 2008, all four of these pumpers are seeing more use than in past years due to the call volume and could “wear out” to the failure point at the same time unless we break up the replacement cycle. We are trying to “break up” the replacement years to avoid the need for multiple purchases in one fiscal year, this will require apparatus purchases in each of the coming years.

Engine 9 is a “ready reserve” engine; it is a 1994 Pierce Arrow pumping Engine equipped with a 750 gallon water tank, both Class A and B foam capabilities and a 1,500 gallon per minute fire pump. This apparatus has 97,750 odometer miles, 8,800 engine hours which calculate to 369,600 road miles. (Ma. Registration MF 6247, VIN 4P1CA02D4RA000446).

This replacement is on the Department’s Five Year plan for FY18; its recent failure has us moving the request to FATM. The realization that this apparatus would fail minimal requirements as an emergency response apparatus and the extreme cost to make the apparatus comply came in late February, too late for consideration at the 2016 Spring Annual Town Meeting.

Over its lifetime, this apparatus has had an automatic transmission replacement and a rebuilt diesel engine in 2006. The apparatus had an earlier (in September 2000) automatic transmission replacement after a catastrophic failure due to a wiring problem. A wiring circuit “cross connected” causing the pump to engage while the apparatus was responding to a fire. The result was the transmission, along with the pump transmission, were destroyed scattering parts over a 75 foot area. The engine was towed from the scene and was out of service for over three months waiting repairs. The Department records indicate that we have spent more funding on this apparatus than we have on any other that we now own.

Last December this vehicle did not pass its annual Federal Motor Vehicle and State Safety inspection. Our mechanics were able to perform limited repairs and on a re-inspection the vehicle passed, however the rust and corrosion to the frame and body structure made it obvious that it would be the last inspection without major work.

Early this spring the diesel engine and transmission had issues that required the truck be taken out of service. Those repairs were made but we capped the expenses at \$5,000.00 due to its age and condition, these repairs made the apparatus reliable for the short term.

Quotes to repair the apparatus to minimal standards are well over the worth of the vehicle and only addressed the safety and structural issues, the pump, engine and transmission pricing would increase the repairs by another \$130,000.

4D

All of the major Fire Apparatus manufacturers plan a yearly price increase, the NFPA has tracked the manufacturers yearly price increases and report that, on an average, the prices in the past ten years have increase 5 to 7 % yearly. These yearly price increases almost doubles the cost of an apparatus over a ten year period. Our experience has been that apparatus manufacturers have historically increased their pricing, on an average, 6% each year. Much of that increase recently has been due to federally mandated equipment changes and emission upgrades.

This year the top four manufactures have again announced increase of 4 to 6 %, most beginning September or October of this year. E-One has announced 4% increase for November of this year, therefore, if we are poised to move quickly after the October meeting we could save just under \$20,000 by placing the order before the increase. Basically the truck's purchase price will increase by \$20,000 overnight; we have a chance to avoid this increase.

This purchase will;

- Provide a new “front line” apparatus to replace Engine 6 at the Cedarville Station
- Relieve the current Engine 6 from “front line” activity, allow the mechanics to make it a reliable safe “ready reserve” pumping engine which will,
- Replace a 22 year old failing pumping engine that will be removed from service December 2016.

If we wait for Spring Town Meeting the department will be “down” a pumping engine for at least a full year's time, authorizing the funding at FATM will decrease that time by seven months and save almost \$20,000.

Fire chiefs hope town meeting will buy new fire engines

Last week old vehicles fell apart

By Daniel Axelrod
MPG Newspapers

PLYMOUTH – For Deputy fire chief Art Lamb, Sept. 22 was “Black Thursday.”

Three out of Plymouth’s nine fire engines were out of service; firefighters used a ladder truck as a substitute engine and trucks just kept breaking.

“It was like we were hanging by one hand and someone stepped on our knuckles,” Lamb said. “Normally your bad luck stops, but it kept going on.”

Had multiple fires and emergencies occurred across town, the department’s remaining resources would have been seriously taxed.

Now, Lamb and chief James Pierson hope town meeting representatives approve Article 4F at the fall town meeting, or \$1.24 million to purchase a new ladder truck and two new fire engines.

Lamb also hopes Plymouth officials hire an extra mechanic and implement a long-range plan to regularly spend on bigger capital expenditures like fire trucks rather than waiting until vehicles fall apart.

“We went from this sleepy little town to really a city,” Lamb said.

“The town needs to look into the methods of funding capital purchases; whether for the DPW, the fire department, we need a more rigorous schedule to get things replaced.”

Under a perfect scenario, nine fire engines would sit in Plymouth’s seven stations. One reserve engine would be stored at the West Plymouth station on Samoset Street and another would be at the State Road station in South Plymouth.

But Lamb’s perfect scenario hasn’t existed for some time.

During Sept. 22, the department was already short an engine at the North Plymouth station. A ladder truck was running in its place.

Plus, both backup fire engines were being used full-time at the South Plymouth fire station on Bourne Road, so there were no reserve engines to serve 56,000 Plymouth residents.

Suddenly, the department was short a reserve engine, too.

The steering box in Engine 9, a 1975 Farrar, simply fell to pieces. The truck is so old the Farrar Company no longer exists. Fire officers scrambled to track down a steering box, but it would take five days to get the part shipped across the country.

The truck was limping along to begin with. The 30 year old engine’s radiator problems were so bad, the truck was close to being taken off the road already.

“The truck’s pump pipes and chambers were so corroded from all the years of use, you were certain you were going to blow a pipe when you were using it,” Lamb said.

Then, right around Sept. 22, the



Staff photo

The replacement – The fire department wants to purchase of two International quad pump engines that carry up to five firefighters.

department mechanic yanked Engine 6, a 1986 Ford, off the road. Its frame was rotten. Its springs were dead. So, it was put in the repair shop.

DPW director George Crombie’s plan to use fewer chemicals when clearing the roads was helpful with the corrosion problem. But, as citizens’ complaints spurred local towns to use increasingly exotic road chemicals like magnesium chloride to remove ever more ice and snow, the chemicals contributed to the corrosion of Engine 6’s wiring harnesses and rotted its frame.

“Black Thursday” carried into Friday, Sept. 23, and by week’s end three out of nine engines were out of service.

“We had to do a reshuffling of engines,” Lamb said. “How were we going to cover this station at this period of time? That night we put a rescue truck and brush truck up at the Samoset Street station in West Plymouth.

“A brush truck has a hose and water but no pumping capability and ladders, and the rescue truck’s capabilities are similar.”

Lamb said building-filled village centers such as North Plymouth and downtown were most vulnerable to a major fire.

“With a big fire we can get equipment to things quickly because we would respond with six engines and a ladder,” Lamb said. “Plus, chiefs in the surrounding counties have a mutual aid plan to have another five engines and a ladder there within 15 minutes.

“But what would be hard is if we had a car fire in downtown Plymouth, a dumpster fire and then a medical call all at once; then that gets hard to handle because we wouldn’t initially respond to those calls.”

The department was so short on fire trucks Friday, Pierson called up neighboring fire chiefs to temporarily renege on Plymouth’s agreement to respond to emergencies in the areas of other towns along Plymouth’s borders.

Since then, the 1975 Farrar is back in action, and Plymouth is honoring its agreement with neighboring towns. And between calls, firefighters have taken to helping the mechanic identify and fix the department’s trucks.

But Lamb said despite Plymouth’s firefighters’ best intentions, they’re not trained fire truck mechanics. Fire officials hope fall town meeting representatives will fund another mechanic.

The department had two mechanics for more than 20 years until one retired four years ago.

“We believe if there was another mechanic, he’d save his salary in preventing these problems,” Lamb said. “A big trucking company is always greasing springs and pins and if we had a mechanic, he could keep up with adjusting the brakes and keeping all the other bushings and bearings in proper order.”

Some trucks simply aren’t worth fixing though, Pierson said, and now he thinks it’s time to get new trucks.

Years of budget crunching by town officials led former chief Thomas Fugazzi to open the Pine Hills station in 2002 without a new fire engine.

“The chief had originally asked for the new truck, but he took it out because of the budget constraints,” Lamb said.

Fire department officials studied whether it was worth fixing the broken down trucks. They decided it was a better value to buy new trucks.

“These are prefabricated trucks,

but just because they’re cheaper doesn’t mean they’re poor quality,” Pierson said.

The manufacturer would use special kits to assemble the new trucks Pierson wants to buy. Fire officials would choose what options they want, making the trucks less costly.

The department is currently protecting more than 14,000 acres of forest, plus Plymouth homes and businesses, with one ladder truck. A second ladder truck would cost \$850,000.

Each fire engine costs \$390,000. They’re likely to last only 10 years because of the massive number of calls they’ll respond to.

“It’s not so much mileage with fire engines; it’s use since the engines are put under tremendous stress while helping pump at fires,” Lamb said. “When the engines hit 5,000 hours, they’re on the verge of self-destruction.”

The Bourne Road station’s engine has 6,000 hours on it.

As fire officials await fall town meeting representatives’ decision, they’re hopeful a study will be done sometime after December by the consulting firm hired after spring town meeting to evaluate ways to improve the department’s present and future performance.

That study will likely suggest Plymouth implement a regular maintenance and replacement schedule for fire trucks instead of the current fix it and replace it as it breaks policy.

If the department doesn’t get the new fire trucks and a second mechanic, Pierson and Lamb said the department will make do.

However, Pierson said things wouldn’t get any easier.

“I can understand putting a cobble response together to get you through a day or two, but it’s not a way to run an entire department,” Pierson said.

**EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
DAM, LEVEE AND SEAWALL REPAIR AND REMOVAL**

ADMINISTRATIVE SUMMARY

PROJECT TITLE:	Warrens Cove Revetment Repair	STATE ID #	#057-041-000-029-100 #035-053-000-042-200
LOCATION COORDINATES:	Latitude	42° 56' 30"	Longitude -70° 37' 15"

RESPONDING ORGANIZATION

Contact Name: David Gould, Town of Plymouth, Department of Marine & Environmental Affairs

Address: 11 Lincoln Street, Plymouth, MA 02360

Telephone: 508-747-1620 ext 134

Facsimile: 508-830-4140

Internet Address: DGould@townhall.plymouth.ma.us

PROJECT CATEGORY (CHOOSE ONE):

- Category 1 - Dams and similar unregulated impoundments
- Category 2 - Seawalls, coastal flood and/or foreshore protection
- Category 3 - Inland flood control structures and levees, excluding dams and similar unregulated impoundments

FUNDS SOUGHT FROM PROGRAM

State Funds via EEA \$810,993

Anticipated Matching Funds (*cash and in-kind*) \$270,307

Sources (*Federal? State? Local?*): Local

AUTHORIZED APPLICATION SIGNATURE

Signature _____ Date _____

Print Name and Title David Gould, Director

**EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
DAM, LEVEE AND SEAWALL REPAIR AND REMOVAL:
APPLICATION FOR FUNDING – CONSTRUCTION FINANCE
RESPONSE PROPOSAL**

Introduction

This response to the Executive Office of Energy and Environmental Affairs (EOEEA), Request for Quotes (RFQ) is being submitted by the Town of Plymouth to repair and reconstruct portions of the 720 linear feet of revetment primarily fronting Bert's Cove Restaurant and the Pilgrim Sands Motel. The existing stone revetment fronts a vertical concrete seawall. The proposed revetment work will consist of dismantling the existing structure in selected locations, placement of filter fabric, and reconstruction of the structure with appropriately sized stone. The revetment will be reconstructed to the same overall dimensions (height and slope) as the existing structure. Areas where revetment reconstruction will be performed are shown on the attached plan (Attachment A).

This project provides improvements to storm damage protection to the properties landward of the seawall. Over the past several decades, northeast storm events have continued to cause significant damage to coastal infrastructure in Warren's Cove. Specifically, the low lying landform at the south end of Plymouth Beach (including the Town beach parking lot, Bert's Cove Restaurant, and Pilgrim Sands Motel) have experienced wave overtopping during severe storm events. Most recently, the series of severe northeast storms over the 2012-2013 winter season (including the influence of Hurricane Sandy) caused continued lowering of the fronting beach and moderate damage to the revetment. Although the seawall and revetment have remained intact, the repairs performed following the 1991 northeaster ("the Halloween Storm") did not return the structure to its "as-built" condition. More recent work in 2002 re-established the revetment to design conditions; however, portions of the revetment have settled over the past 10+ years as the beach continues to lower, allowing wave action to destabilize portions of the revetment. Although much of the property directly landward of the wall is private, the integrity of the concrete seawall and the stone revetment fronting this seawall is the responsibility of the Town. The seawall is owned and maintained by the Town of Plymouth, where public access along the seawall is provided from the Town parking lot immediately north of the project area (along the crest of the concrete seawall that is a continuation of the seawall in the project area). In addition, the revetment and seawall also protect Warren Avenue (Route 3A) directly landward of the restaurant and motel. This roadway serves as one of the primary evacuation routes from the Pilgrim Nuclear Generating Station.

Between 1978 and 2001, total FEMA claims paid to the two property owners protected by the existing revetment was \$1,069,976, where a total of nine (9) claims were filed over this 23-year period. With on-going sea-level rise, the storm damage

costs are anticipated to escalate in the future and reconstruction of the revetment is required to (a) provide direct shore protection needs to the properties and roadway, and (b) reduce wave overtopping during significant coastal storms.

The estimated commencement date for the Project is October, 2016 with completion in June, 2017. This is a Category 2 project as failure of the wall would likely cause loss of life and/or serious public infrastructure damage.

Part I: Project Identification and Narrative

Section A: Review of Current Conditions

The Project Area is located at the southern limit of Plymouth Long Beach in the Town of Plymouth. The Warren Cove shore protection consists of 720 linear feet of seawall and revetment structure located on the east side of the barrier beach system along Warren Avenue (Route 3A). The location of the Project is shown on the USGS topographic map shown in Figure 1 and a more detailed aerial photograph in Figure 2. The beach and seawall may be accessed by the public Town immediately north of the project area (along the crest of the concrete seawall that is a continuation of the seawall in the project area). This roadway serves as one of the primary evacuation routes from the Pilgrim Nuclear Generating Station, as well as numerous other properties in the Plymouth Beach vicinity. However, the road often becomes overwashed with sediment and debris during severe storms as a result of excessive overtopping of the seawall.

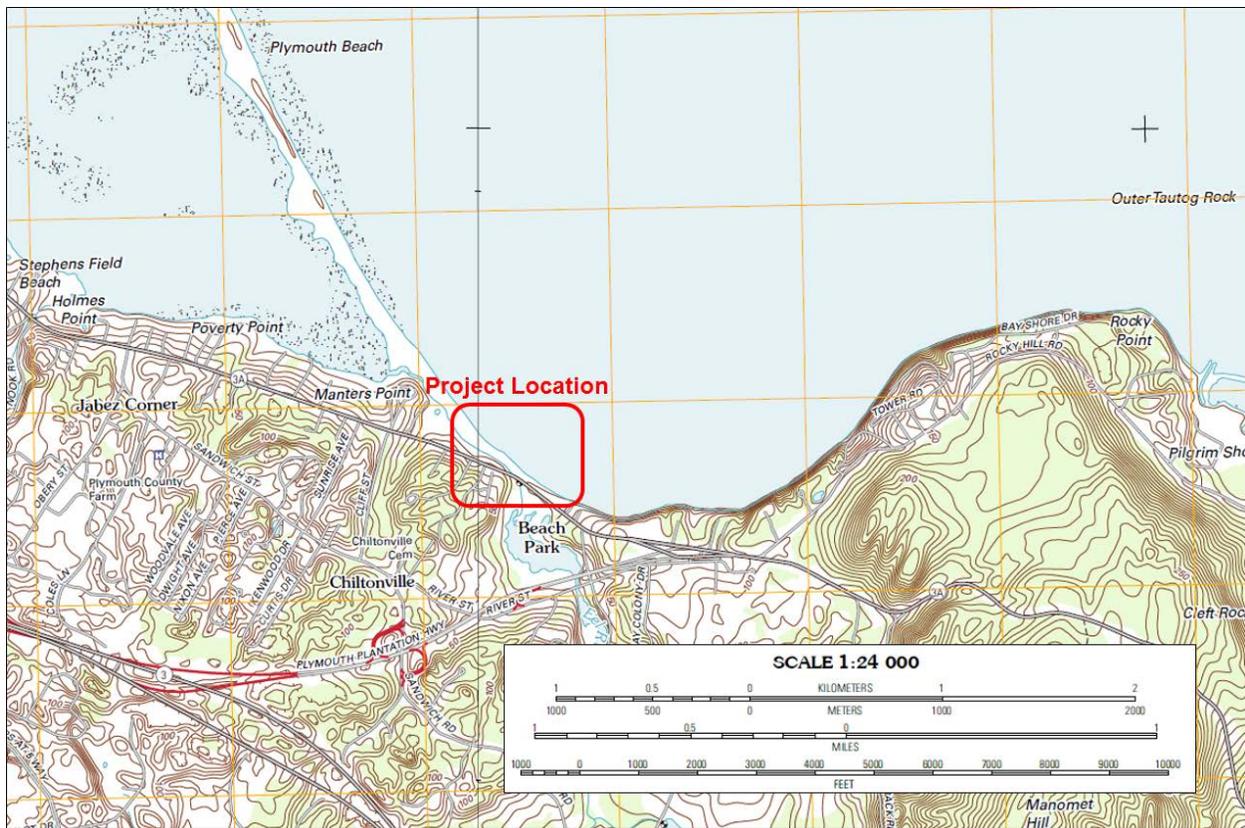


Figure 1. Project Area vicinity showing Plymouth Beach and Warren Cove (map from USGS).



Figure 2. Project Area close-up aerial photograph, where red box indicates specific project area (photo from Google Earth).

The low lying landform at the south end of Plymouth Beach (including the Town beach parking lot, Bert's Cove Restaurant, and Pilgrim Sands Motel) have experienced wave overtopping during severe storm events. Most recently, the series of severe northeast storms over the 2012-2013 winter season (including the influence of Hurricane Sandy) caused continued lowering of the fronting beach and moderate damage to the revetment. Although the seawall and revetment have remained intact, the repairs performed following the 1991 northeaster ("the Halloween Storm") did not return the structure to its "as-built" condition. More recent work in 2002 re-established the revetment to design conditions; however, portions of the revetment have settled over the past decade, allowing wave action to destabilize portions of the revetment. Although much of the property landward of the wall is private, the integrity of the concrete seawall and the stone revetment fronting this seawall is the responsibility of the Town. As stated in a 1977 Memorandum from the Engineering Division, "upon completion of the construction this [the seawall/revetment] was turned over to the Town of Plymouth to maintain." Based on this understanding, the Town of Plymouth requested Applied Coastal Research and Engineering, Inc. (Applied Coastal) to review the existing condition of the revetment and recommend areas that required reconstruction. This analysis was completed in April 2014 (see report in Attachment B).

The 2007 “South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project” by Bourne Consulting Engineers identified the wall as #057-041-000-029-100 and #035-053-000-042-200 and gave it a Condition C (Fair) rating. The report assigned a Priority IV (High) rating stating “(l)andform may not be sufficient to fully protect shoreline during a major coastal storm”. An excerpt from the report is included as Attachment C.

The Project Area has a long history of storm damage. Repair plans dating back to 1946 state that seawall and revetment have been replaced and/or reinforced several times. The most recent plans from 2001 called for extensive reconstruction of the revetment fronting the seawall. Figure 3 illustrates typical storm-induced wave overtopping that leads to long-term degradation of the structure.



Figure 3. Splash-over and wave overtopping at Warrens Cove during Hurricane Sandy (photo from Terence O'Neill).

Section B: Environmental Concerns

As mentioned, primary evacuation routes from the Pilgrim Nuclear Generating Station. In addition, emergency response time to the Plymouth homes south of this overwash area is substantially increased when the road is impassable due to flooding. The storm wave overtopping is also directly responsible for the significant repetitive loss FEMA claims for the Project Area. Both properties in the Project Area have received flood reimbursements from FEMA and are severe repetitive loss properties.

Approximately \$1.1 million in federal claims have been paid out between 1978 and 2001, with an average of \$119,000 per claim.

Section C: Project Plan

In 2013, the Town of Plymouth funded a condition survey and engineering design for repairs to the shore protection infrastructure along this stretch of the Warren Cove seawall/revetment. A Notice of Intent (NOI) was prepared and an Order of Conditions was received in 2014. Available funding from the Town is \$220,307, with a private match of \$50,000, totaling \$270,307.

The design conditions for the seawall and revetment were based on the 100-year storm. The proposed design calls for repair and reconstruction of damaged portions of the 720 linear feet of revetment primarily fronting Bert's Cove Restaurant and the Pilgrim Sands Motel. The existing stone revetment fronts a vertical concrete seawall. The proposed revetment work will consist of dismantling the existing structure in selected locations, placement of filter fabric, and reconstruction of the structure with appropriately sized stone. The revetment will be reconstructed to the same overall dimensions (height and slope) as the existing structure. Areas where revetment reconstruction will be performed are shown on the attached plan (Attachment A).

The proposed seawall and revetment is designed to structurally withstand the 100-year storm wave condition. In addition, the rough-faced configuration of the proposed revetment repairs will reduce wave overtopping volumes. Wave overtopping runoff and debris that flows onto Warren Avenue is expected to be modestly reduced by proposed design.

It was not possible to incorporate sea level rise projections into the proposed design, as extensive structure enlargement (higher seawall, higher revetment crest, larger footprint, etc.) would be required to further mitigate storm damage. This larger structure would have substantially higher construction costs, as well as significantly greater environmental impacts to adjacent Land Under the Ocean resources. In addition, the surrounding landform (i.e. the remainder of the barrier beach fronting Eel River on Plymouth Beach) would also need to be raised to mitigate storm damage to the roadway. In the future, the seawall and revetment may require additional armoring and/or other shore protection solutions to reduce overtopping to acceptable volumes depending on the magnitude of sea level rise; however, it does not appear that the substantial costs and expanded environmental impacts are warranted at this time.

All environmental regulatory permits are in place for the proposed revetment repairs and reconstruction effort. In addition, a bid package has been developed by the Town.

Chapter 91 public access is provided along the crest of this publically maintained seawall.

Part II: Proponent Qualifications

The project proponent is the Town of Plymouth, in Plymouth County, Massachusetts. The Town was officially incorporated in 1620.

The primary contact for the project will be David Gould, Director, Department of Marine and Environmental Affairs. The secondary contact will be Kerin McCall, Environmental Technician. Copies of the resumes for these key personnel are attached.

Engineering and design of this project was done by Applied Coastal Research and Engineering, Inc. (Applied Coastal) in association with Sullivan Engineering. Additional engineering services for this project will be contracted with Applied Coastal. Resumes for the primary Applied Coastal engineers (John Ramsey and Hugh "Trey" Ruthven) are attached.

Part III: Project Schedule and Cost Estimates

The estimated commencement date for the Project is October 2016 with completion in June, 2017. The total requested EOEEA Grant Funding is \$810,993, with Town Match totaling an additional \$270,307 (25% of the total project cost). A detailed cost estimate is provided in Attachment D.

Part IV: Ongoing Operations and Maintenance Plans

Because the coastal structure in the Project Area plays such an important role by protecting both upland property and critical infrastructure, the Town of Plymouth is committed to ongoing care and maintenance of the Warren Cove revetment/seawall. The Town has been proactively maintaining this structure since 1991.

As part of the project, the Town and Applied Coastal will develop an operations and maintenance plan for the structure that will include a routine inspection component. The engineering inspection process will utilize a methodology consistent with the state South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project, as Applied Coastal was one of the collaborators with Bourne Consulting Engineers on this project.

LIST OF ATTACHMENTS

Attachment A: Project Design Plans

See attached permitting plans by Applied Coastal and Sullivan Engineering.

Attachment B: Planning Report(s) used as project basis: Applied Coastal 2014 Analysis

See attached excerpts from Applied Coastal.

Attachment C: Planning Report(s) used as project basis

See attached excerpts from Bourne Engineering.

Attachment D: Detailed Cost Estimate

See attached cost estimate.

Attachment E: Resumes

Resume of David Gould, Kerin McCall, John Ramsey, and Hugh Ruthven

**Warren Cove Seawall Removal and Reconstruction
Cost Estimate**

Item No.	Item	Quantity	Unit	Cost/Unit	Total
1	Mobilization/Demobilization	1	lump sum	\$80,000	\$80,000
2	Site Work/Demo/removal	1	lump sum	\$50,000	\$30,000
4	Seawall Construction	200	linear feet	\$3,000	\$600,000
5	Revetment Reconstruction	200	linear feet	\$500	\$100,000
					\$810,000

Total Construction Cost **\$810,000**
Contingency (20%) **\$162,000**
Total with Contingency **\$972,000**

**EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
DAM, LEVEE AND SEAWALL REPAIR AND REMOVAL**

ADMINISTRATIVE SUMMARY

PROJECT TITLE:	Design and Permitting for Long Beach Seawall	STATE ID #	#057-039-000-010B-100		
LOCATION COORDINATES:	Latitude	42° 56' 36"	Longitude	-70° 37' 07"	

RESPONDING ORGANIZATION

Contact Name: David Gould, Town of Plymouth, Department of Marine & Environmental Affairs

Address: 11 Lincoln Street, Plymouth, MA 02360

Telephone: 508-747-1620 ext 134

Facsimile: 508-830-4140

Internet Address: DGould@townhall.plymouth.ma.us

PROJECT CATEGORY (CHOOSE ONE):

- Category 1 - Dams and similar unregulated impoundments
- Category 2 - Seawalls, coastal flood and/or foreshore protection
- Category 3 - Inland flood control structures and levees, excluding dams and similar unregulated impoundments

FUNDS SOUGHT FROM PROGRAM

State Funds via EEA \$93,563

Anticipated Matching Funds (*cash and in-kind*) \$31,188

Sources (*Federal? State? Local?*): Local

AUTHORIZED APPLICATION SIGNATURE

Signature _____ Date _____

Print Name and Title David Gould, Director

**EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
DAM, LEVEE AND SEAWALL REPAIR AND REMOVAL:
APPLICATION FOR FUNDING – DESIGN AND PERMIT
RESPONSE PROPOSAL**

Introduction

This response to the Executive Office of Energy and Environmental Affairs (EOEEA), Request for Quotes (RFQ) is being submitted by the Town of Plymouth to perform design and environmental permitting services for the reconstruction/upgrading of approximately 900 linear feet of revetment primarily fronting the Plymouth Long Beach parking lot and Route 3A. The existing vertical concrete seawall has failed at several locations and does not provide an appropriate design for the lowered condition of the beach. The proposed seawall and revetment design will consist of providing an appropriate concrete gravity seawall to an elevation that reduces overtopping volumes during nor'easters. The fronting revetment will be designed within the existing revetment footprint, where the height of the structure will be similar to existing conditions. Areas where seawall/revetment reconstruction is planned are shown on the attached existing conditions plan (Attachment A).

This project provides improvements to storm damage protection to the properties landward of the seawall. Over the past several decades, northeast storm events have continued to cause significant damage to coastal infrastructure in Warren's Cove and the Plymouth Long Beach parking lot. Specifically, the low lying landform at the south end of Plymouth Long Beach (including the Town beach parking lot, Bert's Cove Restaurant, and Pilgrim Sands Motel) have experienced wave overtopping during severe storm events. Recently, the series of severe northeast storms over the 2012-2013 winter season (including the influence of Hurricane Sandy) caused continued lowering of the fronting beach and moderate damage to the revetment and seawall. In February 2016, a minor nor'easter caused an approximate 200-foot section of seawall to completely fail and collapse toward the ocean. This complete failure, along with several areas where repairs have been made when sections of the upper seawall have been sheared off since 2005, are indicative that the structure is beyond its serviceable life. The property directly landward of the wall is public, where the revetment and seawall protect Warren Avenue (Route 3A) directly landward of the parking lot. This roadway serves as one of the primary evacuation routes from the Pilgrim Nuclear Generating Station.

The estimated commencement date for the Project is September, 2016 with completion in April, 2017. This is a Category 2 project as failure of the wall would likely cause serious public infrastructure damage.

Part I: Project Identification and Narrative

Section A: Review of Current Conditions

The Project Area is located at the southern limit of Plymouth Long Beach in the Town of Plymouth. The shore protection consists of approximately 900 linear feet of seawall and revetment structure located on the east side of the barrier beach system along Warren Avenue (Route 3A). The location of the Project is shown on the USGS topographic map in Figure 1 and a more detailed existing conditions plan is provided in Attachment A. The beach and seawall may be accessed by the public Town along the entire length of the project area, as the entire area is Town property. The Town parking lot landward of the seawall fronts both Warren Avenue (Route 3A) and a portion of Eel River. Warren Avenue serves as one of the primary evacuation routes from the Pilgrim Nuclear Generating Station, as well as numerous other properties in the Plymouth Beach vicinity. Even moderate storms wash tons of sand, rock, and debris over the seawalls and into Eel River, blocking flow. In addition, debris washes across Warren Avenue, often causing temporary closure of the roadway. The source of most of the overwash material is the gravel and stone parking lot for Plymouth Long Beach. The earth moving equipment is often tasked, and at considerable expense, with removing tons of sand from the river. The blockage causes upstream flooding as well as damage to the river and its biota.

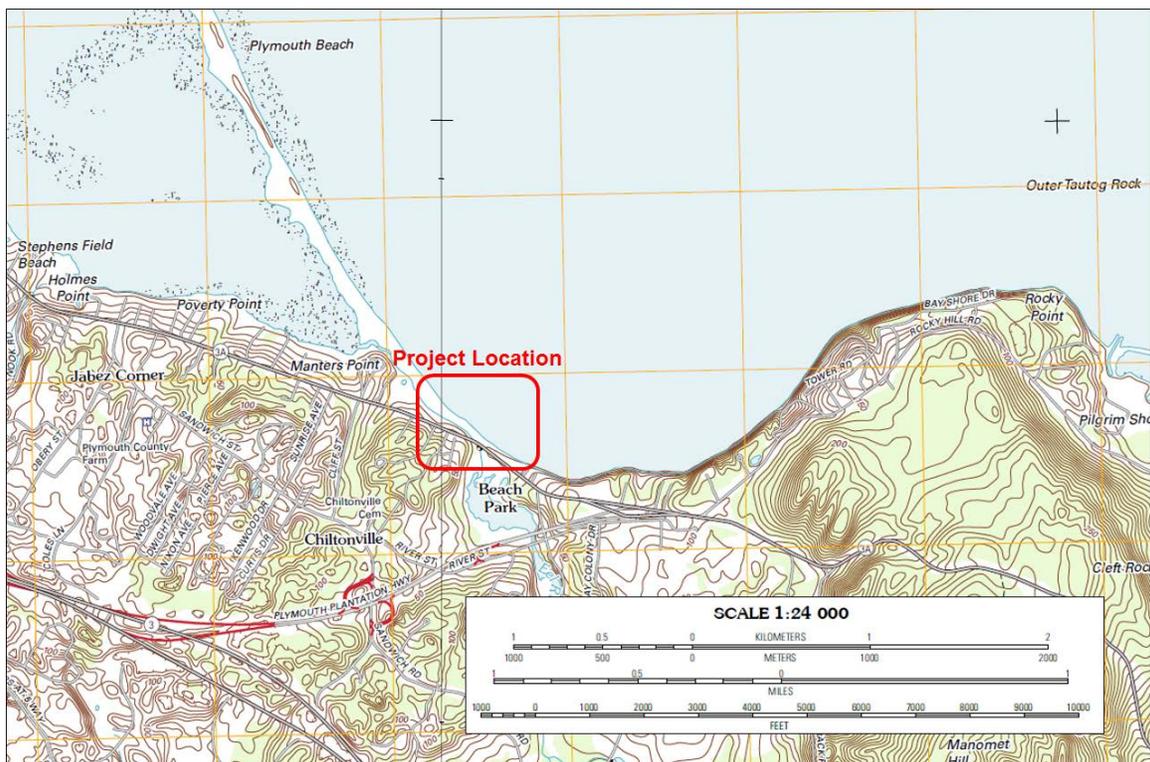


Figure 1. Project Area vicinity showing Plymouth Beach and Warren Cove (map from USGS).

The low lying landform at the south end of Plymouth Beach has experienced wave overtopping during severe storm events. Recently, the series of severe northeast storms over the 2012-2013 winter season. Damage during a Nor'easter in January 2013 is typical of problems at Plymouth Beach after storms. During this event Route 3A had to be closed due to flooding and waves overtopping the seawall washed sand and gravel into the Eel River. It took five days to dredge out the river with a large backhoe. The dredged material is typically put back on the parking lot area and used in reconstruction of the parking area. Dredging is done under emergency permits. Storm damage and the failure of an approximate 200-foot length of seawall after a February 2015 nor'easter is documented in Figures 2 and 3.



Figure 2. Failed section of seawall following a moderate nor'easter in February 2016 (view towards the south).



Figure 3. Failed section of seawall following a moderate nor'easter in February 2016 (view towards the north). Excavation equipment is shown in the background performing emergency dredging of the Eel River blockage.

From a historical perspective, in 1969, the State constructed a 1,050-foot concrete seawall running northerly from the end of the 1958 wall to the Federal stone dike at the Manters Point footbridge over Eel River at a cost of \$106,000. As stated in a 1977 Memorandum from the Engineering Division, “upon completion of the construction this [the seawall/revetment] was turned over to the Town of Plymouth to maintain.” The elevation of the top of this seawall was 20 feet above mean low water. On the bay side of this wall and 5 feet below its crest, a stone apron was built extending towards the ocean. A more complete description of the shore protection efforts on the seawall fronting the beach parking lot is shown below:

- Pre-1943: A concrete seawall was constructed some time prior to 1943, extending from the Plymouth Beach bathhouse south approximately 1,820 feet (555 meters). This seawall protected numerous private properties and was constructed either by private interests or the Commonwealth of Massachusetts, or a combination thereof.

- 1958-1969: The Commonwealth of Massachusetts completed a concrete seawall with stone apron in the vicinity of the Town Beach, extending from the Plymouth Beach bathhouse to the Federal stone dike at the Manters Point footbridge over the Eel River. Sometime between 1951 and 1965 a single groin was constructed in front of Bert's Restaurant. During the Fall of 1969, two stone groins 180 feet (55 meters) long and spaced 460 feet (140 meters) apart were constructed on Plymouth Beach, to the north of the pre-existing groin at Bert's Restaurant.
- 1972-1978: Two additional groins were installed on Plymouth Beach to the north of the pre-existing groins. The addition of these two groins made a total of five groins between Bert's Restaurant and the Manters Point footbridge over the Eel River.

Although much of the 900-foot seawall section that is the subject of this proposal has remained intact, numerous repairs to both the fronting revetment and seawall have been required over the past 10 years, including re-casting portions of the wall that have sheared off (see Figure 4), placement of flowable fill and revetment construction to prevent wall undermining/failure (see Figure 5), and emergency placement of boulders against failed sections of the seawall to prevent collapse.

The 2007 "South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project" by Bourne Consulting Engineers identified the wall as #057-039-000-010B-100 and gave it a Condition C (Fair) rating. The report assigned a Priority II (Low) rating stating "inshore structures present with limited potential for significant infrastructure damage". An excerpt from the report is included as Attachment B. Based on more recent failures of the structure, it is clear that the condition should be degraded to an F, as demonstrated in Figures 2 and 3. In addition, the inventory tends to focus upon infrastructure immediately landward of the coastal structure without assessing the wider flood plain influence of the structure. Along this portion of Plymouth Long Beach, structural failure of the seawall could lead to complete blockage of Eel River (and the associated upstream flooding), as well as increased flood damage to Warren Avenue (Route 3A), which is a critical evacuation route.

The overall goal for a redesigned seawall is to provide appropriate longevity of the combined seawall and revetment over the next 50 years. The design will evaluate increased structure height necessary to achieve long-term coastal resiliency goals.



Figure 4. Failed section of seawall following a moderate nor'easter in early 2011 showing area that had been sheared off from the top of the seawall. This portion of seawall had the cap recast in late 2011, as part of emergency repairs.



Figure 5. Undermining of seawall as beach erosion causes lowering of the seaward beach profile and exposing the foundation. This undermining required emergency repairs in 2009.

Section B: Environmental Concerns

As mentioned, Warren Avenue serves as a primary evacuation route from the Pilgrim Nuclear Generating Station. In addition, emergency response time to the Plymouth homes south of this overwash area is substantially increased when the road is impassable due to flooding.

At present, the low elevation fronting beach is a sand/gravel/cobble material that is completely submerged at high tide. Groins constructed along the shoreline prevent alongshore movement of littoral sediments. The long-term effect of this highly armored shoreline has been a loss of sediment supply to the beach; however, the existence of the seawall is critical to sustaining upland infrastructure. A separate project through the MCZM Coastal Resilience Grant Program is evaluating the enhancement of shore protection through placement of a cobble berm; however, reconstruction of the seawall will still be required. When combined with the cobble berm project, the proposed

seawall improvements and cobble berm will increase storm damage protection and re-establish the depleted littoral drift.

The proposed seawall and revetment reconstruction will occur within the same footprint as the existing structures; therefore, the environmental concerns are limited. There are no endangered species mapped within the project limits. The proposed project is not anticipated to adversely impact ecological health of this high-energy coastal beach system. In addition, a reduction in wave overtopping will prevent storm-induced blockage of Eel River, an anadromous fish passage. Therefore, the project will provide an overall ecological benefit to the barrier beach system by providing long-term protection to the Eel River habitat.

Section C: Project Plan

Due to the condition of the seawall and the demonstrated structural failures over the past decade, it is clear that the structure has exceeded its serviceable life. Emergency work in 2009 was performed to prevent undermining of the seawall. In 2011, the Town of Plymouth performed emergency repairs to the upper half of the seawall and reconstructed the revetment along an approximate 100-foot section near the southern limits of the proposed project. However, based on more recent failures, the structural integrity of the seawall along this entire ±900-foot section is compromised and requires replacement.

It is anticipated that the updated design will be based on the 100-year storm conditions. In addition, sea-level rise will be accounted for by assuming an increase in tide elevation of 2 feet over the next 50 years (i.e. the planned serviceable life of the new structure). Wave analyses will be performed to optimize both the vertical wall height, as well as the fronting revetment height. As described above, a concurrent effort to provide a cobble berm fronting the seawall also is planned; however, reconstruction of the seawall will still be required to ensure long-term sustainability of the landform. The approximate areas where the reconstructed revetment and seawall are required is shown on the attached existing conditions plan (Attachment A).

The proposed seawall and revetment will be designed to structurally withstand the 100-year storm wave condition. In addition, the rough-faced configuration of the proposed revetment repairs will reduce wave overtopping volumes. Wave overtopping runoff and debris that flows onto Warren Avenue and across the parking lot into the Eel River channel is expected to be modestly reduced by proposed design.

To a limited extent, sea level rise projections will be accounted for in the proposed design. Specifically, armor stone size will be established based on future depth-limited wave conditions. However, due to the relatively low-lying nature of the historic barrier beach, the structure will not eliminate storm wave overtopping either under existing or future storm conditions.

The required environmental regulatory permits for the proposed seawall/revetment reconstruction effort are shown in Table 1. Chapter 91 public access is provided along the entire length of the project, as the structure fronts Town-owned land.

Table 1: Required environmental regulatory permits for reconstruction/upgrading of approximately 900 linear feet of revetment and seawall fronting the Plymouth Long Beach Parking Lot and Route 3A

1	Notice of Intent under the MA Wetlands Protection Act (state DEP and local)
2	Chapter 91 License (eroded beach causes structure to fall below MHW)
3	U.S. Army Corps 404 Permit (Category I)

Part II: Proponent Qualifications

The Project proponent is the Town of Plymouth, in Plymouth County, Massachusetts. The Town was officially incorporated in 1620.

The primary contact for the project will be David Gould, Director of the Department of Marine and Environmental Affairs. The secondary contact will be Kerin McCall, Environmental Technician. Copies of the resumes for these key personnel are attached.

Engineering and design of this project will be performed by Applied Coastal Research and Engineering, Inc. (Applied Coastal) in association with Sullivan Engineering (survey) and CLE Engineering (structural/geotechnical design). Resumes for the primary Applied Coastal engineers (John Ramsey, P.E. and Sean Kelley, P.E.) are provide in Attachment D.

Part III: Project Schedule and Cost Estimates

The estimated commencement date for the Project is October 2016 with completion of environmental permitting in June 2017. It is anticipated that the design would be completed by January 2017, allowing approximately 5 months for the environmental permitting effort. The total requested EOEEA Grant Funding is \$93,563, with Town Match totaling an additional \$31,188 (25% of the total project cost). A detailed cost estimate is provided in Attachment C.

Part IV: Ongoing Operations and Maintenance Plans

Because the coastal structure in the Project Area plays such an important role by protecting both upland property and critical infrastructure, the Town of Plymouth is committed to ongoing care and maintenance of the Plymouth Long Beach revetment/seawall. The Town has been proactively maintaining this structure since 1969.

As part of the project, the Town and Applied Coastal will develop an operations and maintenance plan for the structure that will include a routine inspection component. The engineering inspection process will utilize a methodology consistent with the Massachusetts South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project as Applied Coastal was one of the collaborators with Bourne Consulting Engineers on this project.

LIST OF ATTACHMENTS

Attachment A: Project Existing Condition Plans

See attached permitting plans by Applied Coastal and Sullivan Engineering.

Attachment B: Planning Report(s) used as project basis

See attached excerpts from Bourne Engineering.

Attachment C: Detailed Cost Estimate

See attached cost estimate.

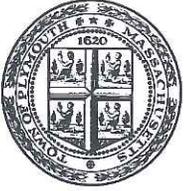
Attachment D: Resumes

Resume of David Gould, Kerin McCall, John Ramsey, and Sean Kelley

**Seawall at Plymouth Long Beach Fronting Parking Lot and Route 3A
 Cost Estimate for Design and Permitting Services**

Item No.	Item	Total
1	Design Analysis and Optimization	\$19,000
2	SPT Borings (11 @ \$3,250 each)	\$35,750
3	Structural Design Analysis/Cross-Section Drawings	\$15,000
4	Site Plans and Typical Cross-Sections (Permit Format)	\$14,000
5	Environmental Permitting	\$41,000
		\$124,750

Total Design/Permitting Cost	\$124,750
Design/Permitting Cost (Town)	\$31,188
EEA Grant	\$93,563
Percent Town Funding	25%



TOWN OF PLYMOUTH

Department of Public Works
Engineering Division
11 Lincoln Street
Plymouth, Massachusetts 02360

To: ADVISORY AND FINANCE COMMITTEE

From: Sid Kashi, P.E., Town Engineer ✓ S.K.

Through: Jonathan Beder, Director of Public Works

CC: Melissa Arrighi, Town Manager
Dennis Westgate, Asst. DPW Director

Date: September 7, 2016

Subject: 2016 Fall Annual Town Meeting
Article 4G
Replace GPS Field Survey Grade Equipment

We were able to find out after experiencing poor performance/inconsistent data logs and trouble-shooting/ research that the GPS Equipment we have been using for 16 years is officially obsolete. The receiver unit is permanently unable to interpret satellite data and the manufacturer (Trimble) refers to this equipment as “long obsolete and end of service” (see attached). Our surveying instrument needs to be replaced. The manufacturer is recommending replacing the equipment since there is no technical solution available to correct the problem. The surveying instrument will replace existing one that we have now.

Encl. : Support Note from Manufacturer

SUPPORT NOTE

JANUARY 2016

TRIMBLE EMPLOYEE CONFIDENTIAL

TRIMBLE 4700/4800 GPS RECEIVERS WILL STOP WORKING PROPERLY STARTING FEBRUARY 14, 2016

Summary

On February 14, 2016, Trimble 4700 and 4800 GPS receivers, that are long obsolete and end of service, will start experiencing erratic and unreliable behavior for time and date reporting. As those receivers will interpret the GPS time in error by 1024 weeks, receiver data outputs will have the wrong time reference. This will negatively impact subsequent systems that are communicating with that receiver, including the rejection of data packages. Real-Time Kinematic operation (RTK) operation is not expected to continue working properly.

Newer Trimble GPS/GNSS receivers types, including Trimble 5700/R5/R7/NetR9 Geospatial/NetRS/NetR5, Trimble 5800/R2/R4/R6/R8/R8s/R10/R10LT with current firmware are not impacted by this.

Resolution

Unfortunately, there is no technical solution available for for Trimble 4700 and 4800 GPS receivers to correct this issue. For Trimble 4700/4800 GPS receivers still in use, please work with the end-user on a receiver replacement solution towards a new or more recent GNSS receiver system.

This document is for informational purposes only and is not a legally binding agreement or offer. Trimble makes no warranties and assumes no obligations or liabilities hereunder.

Geospatial Division, 10368 Westmoor Drive, Westminster, CO 80021, USA

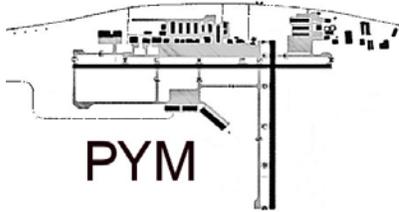
© 2016, Trimble Navigation Limited. All rights reserved. Trimble and the Globe & Triangle logo are trademarks of Trimble Navigation Limited registered in the United States and in other countries. All other trademarks are the property of their respective owners.



<http://surveypartners.trimble.com>

508-746-2020

508-747-4483 fax



Plymouth Municipal Airport

To: **Advisory and Finance**From: **Thomas Maher, Airport Manager**

RE: Fall Annual Town "Delta" Taxiway Capital project Date: September 8, 2016

The Plymouth Airport Commission is requesting support at the Fall Annual Town meeting regarding the completion of "Delta" taxiway here at the Plymouth Municipal Airport. The project is 1.7 million total, with \$85,000 being from airport enterprise free cash or airport enterprise borrow and the balance of \$1,615,000 from FAA and MassDOT grants.

This project would connect the existing "Delata" taxiway to the runway 24 end and would correct an existing safety concern where currently aircraft based on the south side of the airport have to cross the active runway, to taxi and takeoff on runway 24. This extension would eliminate this need and allow aircraft to taxi directly to the runway 24 end without having to cross the active first. This project has been on our capital program for several years. The reason this is coming up at Fall Town meeting is that FAA just contacted us that they anticipate funding the project in Federal FY 17 which starts on 10/1/16 and we would go out to bid and have to award the bid over this Winter and in turn Spring ATM would not allow us to be under grant before April 1, 2017.

