

VTM ENGINEERING, PLC

2941 Shelburne Falls Road, Hinesburg, Vermont 05461
spalmer@vtengineering.com (802) 233-7531

May 18, 2023

Ms. Valerie Capels, Town Administrator
Town of Bristol
1 South Street
Bristol, VT 05443

RE: Town of Bristol, Vermont
STEP 2 - Engineering Design Services Proposal
Bristol West, 1905 Waterline Replacement Project
VTM Proposal No. 22.1.3

Dear Ms. Capels:

Thank you for the opportunity to provide a proposal for engineering services for the Town of Bristol. The project under consideration is referred to as the “Bristol West – 1905 Waterline Replacement Project”. The scope of work includes the replacement of 1905 cast iron waterline on 12 separate street segments totaling approximately 10,000 lineal feet of water main as well as the majority of approximately 170 water services to the residential homes and businesses located on these streets.

The enclosed proposal includes a detailed scope of work based upon the information known to date, anticipated project costs as well as a schedule for completion.

Please feel free to contact me if you have any questions.

Sincerely,
VTM ENGINEERING, PLC

Steven Palmer

Steven Palmer, P.E.
President

enc.

Town of Bristol, Vermont
STEP 2 Engineering Design Services Proposal
Bristol West - 1905 Waterline Replacement Project

BACKGROUND

The Town of Bristol, Vermont has been experiencing high water loss in their municipal water distribution system for a number of years. Bristol contracted with Green Mountain Engineering in 2021 to complete a Preliminary Engineering Report for the Town of Bristol’s entire water distribution system with the primary goal of determining the cause. The PER was completed in August of 2021 and approved by the State of Vermont in September of 2021. The PER identified approximately 30,000 lineal feet of 1905 cast iron waterline that was still in service. The 1905 waterlines were identified within the PER as the areas with the highest potential for leakage.

Bristol enlisted the assistance of VTM Engineering, PLC (VTM) in 2023 to assist with developing a “Master Plan” to replace the 1905 waterlines. A Master Plan was subsequently developed and approved by the Bristol Selectboard in March of 2023. As outlined in the approved Master Plan, replacement of the 1905 waterlines was split into three separate, but manageable geographic areas where the 1905 waterlines existed. Breaking down the project into manageable chunks was necessary as the Town recognized that it would not be feasible to design, build or finance all of the required work at one time. The three areas identified within the Master Plan for waterline replacement are referred to as “Bristol West”, “Bristol East” and “Rockydale/Slopeside”. Each of the three areas contains approximately 10,000 lineal feet of 1905 cast iron waterline. The Bristol Selectboard prioritized the three areas in terms of replacement and identified “Bristol West” as the first priority. The Bristol West area consists of 12 separate street segments totaling just under 10,000 lineal feet of pipe as identified in Table 1.

The Bristol Selectboard recognized that the majority of the service lines to each of the houses and businesses along these streets are also likely 1905 vintage as well. These service lines are long past their useful life expectancy and many of these service lines are likely leaking and contributing to the overall water system losses. The Selectboard subsequently requested that a “Service Line Inventory” be completed and that those service lines consisting of lead or galvanized piping be replaced as part of this project to the extent that funding could be found to assist in conducting this work. Based on conversations with the Bristol water system operator (VTUMS), it is VTM’s understanding that VTUMS will be conducting a town wide water Service Line Inventory starting in the fall of 2023 as a separate project. Based upon the anticipated Bristol West Waterline Replacement Project, VTUMS has committed to making the approximately 170 residences and businesses within the Bristol West area the first priority. The information obtained by VTUMS pertaining to the Service Line Inventory will be used to determine which service lines are in need of replacement. Assuming full or partial funding of the service line replacements can be found, it is VTM’s understanding that the Town will work with each of the residents (who are eligible and who would like to complete their service line replacements) to execute standard replacement agreements and temporary construction easements to do so. VTM would then incorporate that information into the project design.

**TABLE 1
PROPOSED WATERLINE REPLACEMENT
BRISTOL WEST – 1905 WATERLINE REPLACEMENT PROJECT**

Street Segment	From	To	Size (In)	Type	Approx. Length (Ft)	Year	Future Size (In)
Munsill	West St.	Pleasant St.	4	Cast Iron	600	1905	8
Maple St.	West St.	Pine St.	6	Cast Iron	1760	1905	8
Pleasant St.	Maple St.	North St.	8	Cast Iron	1210	1905	8
Pleasant St.	Munsill Ave.	Maple St.	6	Cast Iron	606	1905	8
Pleasant St.	Liberty St.	Munsill Ave.	6	Cast Iron	468	1905	8
Church St.	North St.	Maple St.	6	Cast Iron	1200	1905	8
Elm St.	North St.	Taylor Ave.	4	Cast Iron	785	1905	8
Taylor Ave	Pleasant St.	Pine St.	6	Cast Iron	1020	1905	8
West St.	Maple St.	School St.	8	Cast Iron	750	1905	12
West St.	School St.	North St.	8	Cast Iron	470	1905	12
Park Pl.	School St.	North St.	6	Cast Iron	570	1905	8
School St.	West St.	Park Place	6	Cast Iron	220	1905	8

The current approach for construction of new waterlines within the Bristol West area is to design, permit and bid this as one complete project with construction occurring over two construction seasons (roughly 5,000 lineal feet per year) to limit the overall disruption to residents and businesses.

SCOPE OF WORK – STEP 2 DESIGN

VTM personnel have met and collaborated at length with the Bristol Town Administrator, Water Operator (VTUMS) as well as the Bristol Selectboard in developing this Scope of Work. It is VTM’s understanding that Bristol intends to utilize DWSRF funds for design and construction level services for this project. Use of SRF funds requires that projects be developed in three separate phases (STEP’s) as follows:

- STEP 1- Planning
- STEP 2 – Design
- STEP 3 – Construction

The Preliminary Engineering Report completed by GME in 2021 completed the requirements of the STEP 1-Planning phase. This proposal focuses specifically on the STEP 2 Design services for the “Bristol West” area, as defined in Table 1. Once the STEP 2 Design services are complete, the Town will be eligible to request STEP 3 Construction funding through the SRF program.

This proposal for STEP 2 Design Services for Bristol West project will consist of the following scope of work:

1. Master Plan Development – VTM will assist the Town of Bristol with developing a “Master Plan” for replacement of the remaining 1905 Waterline Town wide.
2. DWSRF STEP 2 Funding Application – VTM will assist the Town of Bristol with preparation and submittal of the DWSRF STEP 2 Design Phase Funding Application. This includes the preparation of this proposal to include the scope of work, anticipated schedule and engineering cost estimate. If the Funding Application is approved, the Town of Bristol will prepare and execute a loan agreement with DWSRF.
3. STEP 2 Engineering Services Agreement (ESA) – VTM will prepare a “draft” ESA in conjunction with the Town of Bristol. The draft ESA will be presented to DWSRF for review and approval prior to execution.
4. Research – VTM will research Bristol’s existing files for relevant survey’s/Right of Way information as well as waterline as-built information. VTM hopes to also obtain the mapped locations of all valves and curb stops within the project area. This phase of work will have added focus on recent design or as-built information where the waterlines have already been replaced and detailed as-built information is available. This information can be extremely helpful in designing the connections to the existing streets.
5. Existing Watermain Layout and Markings – This work will be conducted by VTUMS as a subcontractor to VTM. VTUMS has provided VTM with a budget and anticipated level of effort to complete this work. VTUMS level of effort includes locating and marking the existing watermains, valves and curb stops within the proposed Bristol West replacement area. Individual services to each house will also be located by VTUMS as part of a separate service line inventory project discussed previously. The Service Line Inventory is not included within VTM’s scope of work.
6. Private Utility Location Services – Although the Town of Bristol does not have significant underground utilities other than water, a handful of underground electric and communications lines have been noted on most streets. These are predominately road crossings for individual residential electric/communication services. These services need to be identified and placed on the design drawings. VTM has provided a budgetary cost estimate for this work. A private utility location company will be subcontracted at a future date and tasked with this work. The work will be conducted on a cost-plus basis.

7. Baseline Survey – VTM will first establish control points at various locations around the project area. These control points will be based on State Plane Coordinates and will include both horizontal and vertical control. Subsequently, VTM will survey each of the twelve street segments identified in Table 1. This information will be utilized to complete the new water system design. All relevant and known above ground as well as below ground features will be included in the baseline survey. Relevant features include but may not be limited to: centerline and edge of pavement; existing waterlines; valves; curb stops; hydrants; valve pits; blowoffs; power poles; driveways; culverts, ditches; topography, etc. It is VTM Engineering’s understanding from VTUMS that approximately 170 residential properties exist within the Bristol West project area. The baseline survey will also include locating the individual water services that Bristol and VTUMS determine need to be replaced within the Bristol West project area. Additional survey information will be necessary at each residence where service line replacement is envisioned. Relevant information will include items that may impact the design or cost of replacing private service lines such as: service line entrance locations; building outlines; trees; shrubs; gardens; sheds; walls; etc. Where information is available, existing street rights-of-way will be located and depicted on the drawings. VTM will also include approximate individual property line locations from the existing tax maps. However, this scope of work does not include conducting meets and bounds surveying of individual property lines. If it is deemed necessary in specific circumstances to conduct legally binding meets and bounds surveying of individual property boundaries, a licensed land surveyor will be brought on board. These services are not currently envisioned and costs for such services are therefore not included within this proposal. Both horizontal and vertical control, including benchmarks will be based on the Vermont State Plane Coordinate System.

VTM shall use existing ROW information or surveys and plans found during plan research, Town Right of Way books, previous boundary surveys or otherwise provided to them by the Bristol that may assist in defining rights of way for each street segment.

Sources for all survey information, including control points utilized for the design will be shown on the plans. All plans will be prepared in AutoCAD® format, but also provided in PDF for review.

8. Subsurface Investigation – The geology in the project area is extremely uniform and has been identified through years of local construction to be primarily sand and gravel. As a result, no additional geotechnical subsurface investigation is proposed.

9. Service Line Inventory – This scope of work will be conducted by VTUMS outside of the scope of work for this project. However, the completion of this work is critical to the overall project schedule and is therefore noted in VTM’s project schedule. VTM will coordinate with VTUMS regarding the schedule, format and completeness of this information. It is assumed that the Town of Bristol and/or VTUMS will be responsible for obtaining written Agreements from individual property owners to access their property for survey purposes. Obtaining formal construction easements and installation/ownership agreements for service lines on private property is also not included within VTM’s scope of work.

10. Design - VTM will develop a comprehensive set of design drawings for the project that will meet the requirements in Chapter 21 of Vermont's Water Supply Rules. VTM will work collaboratively with VTUMS and the Town of Bristol on the design. The project design will be presented to the Town at the 60% and 90% level for review and comment. The design drawings will include all relevant existing features and topographic information, the proposed waterline design as well as profiles and details. The final design drawings will also incorporate information specifying which private water service lines will be replaced within the project area as defined by VTUMS and the Town of Bristol.

11. Archeology - VTM proposes to subcontract with Hargen Environmental Services to perform an archeological review of the project area. An archaeological assessment is required when using SRF funding. Hartgen will provide a final report which meets the requirements of Section 108 of the National Historic Preservation Act. If and where areas with high archaeological potential are identified within the project area, VTM will incorporate that data into the design and work with Hargen to develop a plan on how to address these areas during construction. VTM has included a copy of Hartgen's proposal. VTM proposes to conduct this work on a cost plus basis.

12. Environmental - VTM proposes to subcontract with LE Environmental to complete an Environmental Assessment for the project area. An environmental assessment is required when using SRF funding. This assessment will follow the current Vermont DEC Liner Assessment guidelines which were developed for utility projects of this nature. The goal of this assessment is to determine if (and where), areas of potential environmental contamination may exist within the project area. If contamination is confirmed, a plan will be developed on how to deal with the contamination as part of the project design. LE Environmental had to make assumptions regarding how much initial subsurface investigation may be required in order to develop their proposal. It should be noted that these assumptions may be subject to change based on the findings. If additional work is deemed necessary as part of their scope of services, VTM will work with Bristol to define the additional services and adjust the scope of work accordingly. VTM has included a copy of LE Environmental's proposal. VTM proposes to conduct this work on a cost plus basis.

13. Material Take-Off's/Engineers Opinion of Probable Construction Costs – Following the 90% completion drawings, VTM will conduct detailed material take-off's for each street segment. This information will be utilized to develop the Engineers Opinion of Probable Construction Costs for the project. VTM will utilize recent local project bid information and construction industry averages in producing the Engineers Opinion of Probable Construction Costs.

14. Town Attorney ROW Certification – VTM will provide the Town attorney with the final design drawings for use in providing his/her ROW certification. VTM's scope does not include providing private easements obtained by VTUMS or the Town of Bristol for the purpose of replacing individual services.

15. Contract Documents – VTM Engineering will develop a detailed set of project Contract Documents in EJCDC format. This format is a requirement for using DWSRF funding. VTM envisions producing a 90% set of contract documents for review and comment by WID and the Town of Bristol prior to finalizing.

16. Permitting - VTM will identify all relevant permits required for this project. Based on a review of the PER conducted by GME, VTM anticipates that the only permit required for this project will be a "Permit to Construct" from the Vermont Agency of Natural Resources. If other permits or requirements are determined to be necessary during the design phase, VTM will work with Bristol to define those specific services and adjust the scope of work accordingly. VTM will complete and submit the Permit to Construct which will include the 90% project design drawings to the Agency of Natural Resources. Applicable comments from ANR will be incorporated into the final design.

17. Environmental Information Document/Environmental Report - VTM will prepare the Environmental Information Document/Environmental Report for submittal to the Agency of Natural Resources.

18. Bond Vote – The Town of Bristol will conduct a Bond Vote based upon the Engineers Opinion of Probable Construction Costs. VTM will assist the Town by attending and assisting with conducting public informational meetings regarding the project.

19. Project Administration/Coordination/Management – VTM will assist the Town of Bristol with planning, organizing and accomplishing the tasks necessary to achieve the proposed project goals. This includes overall project scheduling, managing and attending regular team meetings, contracting with and coordination with all subcontractors, ensuring completion of VTM's internal team tasks, assisting Bristol with coordination between WID and DWSRF. This item encompasses keeping work tasks on schedule, managing and tracking deliverables, keeping all team members updated on progress and changes, planning, scheduling, documenting team meetings, invoicing as well as monitoring the project's budget, resources and schedule.

20. Step 3 DWSRF Priority List Application Preparation/Submittal (Construction) – VTM will prepare and assist the Town of Bristol with submittal of the STEP 3 DWSRF Priority List Application.

**ANTICIPATED PROJECT SCHEDULE
BRISTOL WEST – 1905 WATERLINE REPLACEMENT PROJECT**

<u>Project Milestone</u>	<u>Date</u>
1. Master Plan Development	Apr. 23'
2. Bristol Selectboard Approval to Apply for STEP 2 DWSRF Funding	May 22
3. DWSRF STEP 2 Funding Application Preparation/Submittal (90-day review)	June 23'
4. DWSRF Step 2 Funding Agreement (Town/DWSRF)	Sept. 23'
5. Draft STEP 2 Engineering Services Agreement (Submitted for DWSRF Review)	Sept. 23'
6. File Research - Water system as-builts and ROW information	Sept. 23'
7. Mark out Existing Watermain & Appurtenances (VTUMS)	Sept. 23'
8. Private Utility Marking (Entity TBD)	Sept. 23'
9. Establishing Survey Ground Control (Townwide)	Sept. 23'
10. STEP 2 Engineering Services Agreement Execution (Town/VTM)	Nov. 23'
11. Baseline Surveying (Items within ROW)	Oct. – Dec. 23'
12. VTUMS Service Line Inventory (Note this is outside of VTM's Scope of Work)	Nov 23'-March 24'
13. Baseline Layout & Design (Watermains & Other Items within ROW)	Jan. – March 24'
14. Service Line Replacement Agreements & Easements (Not in VTM's scope of Work)	April - May 24'
15. Archeology - Research/Field Work & Report (Hartgen)	March - May 24'
16. Environmental – Research/Field Work & Report (LE Environmental)	May - July 24'
17. Service Line Surveying & Field Work (Per VTUMS Serv. Line Inventory)	June 24'
18. Service Line Layout & Design	July 24'
19. 60% Design Review – Bristol/WID	Aug. 24'
20. 90% Design Review – Bristol/WID	Sept. 24'
21. Material Take-Off's/Engineers Opinion of Probable Cost Development	Sept. 24'

22. Preparation of the 90% Bid Specifications for review - Bristol/WID	Oct. 24'
23. Town Attorney ROW Certification	Oct. 24'
24. 100% Drawings	Oct. 24'
25. Bristol to Pursue Additional Grant Funding Opportunities (Not in VTM's Scope of Work)	Oct. 24'
26. Permit to Construct Application Submittal (60 Days)	Nov. 24'
27. Town Bond Vote	Nov. 24'
28. 100% Bid Documents	Dec. 24'
29. Environmental Information Document/Environmental Report Submittal	Dec. 24'
30. STEP 3 – DWSRF Funding Application Submittal (Construction)	Feb. 25'

**STEP 2 ENGINEERING COST ESTIMATE
BRISTOL WEST – 1905 WATERLINE REPLACEMENT PROJECT**

<u>TASK</u>	<u>DESCRIPTION</u>	<u>NOT-TO-EXCEED BUDGET</u>
A.	Project Administration/Project Management	\$40,300
B.	Design Services	\$157,800
C.	Surveying	\$48,809
D.	Special Services	<u>\$32,500</u>
	Total	\$279,409

**ATTACHMENT 4A
LEVEL OF EFFORT
Task Outline and Fee Estimate Worksheet
Bristol West - Waterline Replacement Project
VTM Project No: 22-1.3**

Revised: 5/22/23
Prepared By: SLP

Item	Code	Description	Principal Engineer	Project Engineer	Field Data Collection & Survey	Expenses & Subcontracts	Labor Costs	Total Costs
STEP II - Final Design Phase Services								
I Final Design Phase Engineering Services								
1	PA	Master project planning & scheduling (25 streets + cross country lines)	40	3			\$5,300	\$5,300
2	PA	Project Management/Coordination (4 hrs wk x 60 weeks)	240				\$30,000	\$30,000
3	PA	Step II Funding Application (Bristol West)	16				\$2,000	\$2,000
4	PA	Step II Engineering Services Agreement	24				\$3,000	\$3,000
5	D	Layout/Drawing Preparation (Estimate 31 sheets, 4 iterations)	200	744			\$99,400	\$99,400
6	D	60% Drawing Preparation/Review with Client (12 Street Segments)	16				\$2,000	\$2,000
7	D	Addition of Private Service Lines (Est. 120 of 170 Possible)	0	40			\$4,000	\$4,000
8	D	90% Bid Document Preparation	40				\$5,000	\$5,000
9	D	90% Drawing Submittal/Review Process with Client	16				\$2,000	\$2,000
10	D	Preparation/Public Review Meetings & Presentation with Selectboard & Public	20				\$2,500	\$2,500
11	D	Permit to Construct Preparation/Submittal/DEC Review	8				\$1,000	\$1,000
12	D	Final Internal Engineering Review & 100% Completion of Drawings & Specifications	40				\$5,000	\$5,000
13	D	Material Takeoffs/Cost Estimates	24	60			\$9,000	\$9,000
14	D	Environmental Documentation - SHPO, Env., Act 250, NEPA	60				\$7,500	\$7,500
15	D	ROW Certification Town Attorney Coordination	16				\$2,000	\$2,000
16	D	Step 3 Priority List Application	16				\$2,000	\$2,000
17	D	Private Utility Marking				\$5,000	\$0	\$5,000
18	D	Construction Permit Fees (Cost)				\$900	\$0	\$900
19	D	VTUMS - Utility Location Services (Cost + 8%)				\$10,000	\$0	\$10,000
20	D	Supplies (Cost + 8%)				\$500	\$0	\$500
Subtotal			776	847	0	\$16,400	\$181,700	\$198,100
II Field Survey								
1	S	Topo Survey/Field Reconnaissance & Coordination (12 street segments)	8		288		\$47,080	\$47,080
2	S	Travel (2 people x 30 days x 44 miles@\$0.655) = \$57.64/day				\$1,729	\$0	\$1,729
Subtotal			8	0	288	\$1,729	\$47,080	\$48,809
III Special Services								
1	SS	Hartgen Archeological Services - Sect. 106 Nat. Hist. Preservation Act (Cost + 8%)				\$6,000	\$0	\$6,000
2	SS	LE Environmental Services - DEC Linear Assessment (Cost + 8%)				\$26,500	\$0	\$26,500
Subtotal			0	0	0	\$32,500	\$0	\$32,500
SUBTOTAL (hours)			784	847	288			
HOURLY RATE (\$/hr)			\$125	\$100	\$160			
Subtotal Expenses (\$)						\$50,629	\$228,780	\$279,409
TOTALS BY WORK TYPE:								
Water System Improvements - Final Design			\$246,909					\$246,909
Special Services (Archeology & Environmental)			<u>\$32,500</u>					\$30,093
Total			\$279,409					\$279,409
						DESIGN RELATED LABOR & FEES:		\$246,909
						TOTAL SPECIAL SERVICES EXPENSES:		\$30,093
						ALLOWABLE MARK-UP (8% on subs only):		<u>\$2,407</u>
						TOTAL COST		\$279,409

** Estimates assume only replacement of infrastructure within the ROW.

Budgetary Construction Cost =	\$5,094,100
VT Eng. Fee Curve (Large Proj.)=	\$304,361

5.5% Total Eng. Cost as % of Const.

PA = Project Administration
D= Design
S= Survey
SS= Special Services

Bristol West - Waterline Replacement Project
Summary of 1905 Waterline Segments To Be Replaced
VTM Project No: 22-1.3

Date: 5/22/23
 Prepared By: SLP

Bristol West - Water Main Replacement

Street Segment	From	To	Size	Type	Approximate Length	Year Installed	Future Size	Budgetary Construction Cost
Munsill Ave.	West St.	Pleasant St.	4"	C.I.	600	1905	8" *	\$240,000
Maple St.	West St.	Pine St.	6"	C.I.	1760	1905	8" *	\$704,000
Pleasant St.	Maple St.	North St.	8"	C.I.	1210	1905	8"	\$484,000
Pleasant St.	Munsill Ave.	Maple St.	6"	C.I.	606	1905	8" *	\$242,400
Pleasant St.	Liberty St.	Munsill Ave.	6"	C.I.	468	1905	8" *	\$187,200
Church St.	North St.	Maple St.	6"	C.I.	1200	1905	8" *	\$480,000
Elm St.	North St.	Taylor Ave.	4"	C.I.	785	1905	8" *	\$314,000
Taylor Ave.	Pleasant St.	Pine St.	6"	C.I.	1020	1905	8" *	\$408,000
West St.	Maple St.	School St.	8"	C.I.	750	1905	12" *	\$318,750
West St.	School St.	North St.	8"	C.I.	470	1905	12" *	\$199,750
Park Pl.	School St.	North St.	6"	C.I.	570	1905	8" *	\$228,000
School St.	West St.	Park Place	6"	C.I.	220	1905	8" *	\$88,000
Subtotal					9,659			\$3,894,100

Bristol West - Private Water Service Replacement

Est. # Services	Budgetary Cost Estimate Per Service	Total Est. Cost
120	\$10,000	\$1,200,000
Subtotal		\$1,200,000

Total Estimated Construction Cost = \$5,094,100

Budgetary Costs

8" Diam. Line \$400.00
 12" Diam Line \$425.00

Note: VTUMS estimates Bristol West to have private 170 Services in Bristol West and that 2/3 of those will require replacement (roughly 120).