

Town of Sterling Preliminary Engineering Report

for

Proposed Water District #2

in the

Town of Sterling
Cayuga County, New York

July 2021

Prepared by:



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1. PROJECT PLANNING

The Town of Sterling has retained the services of Capital Consultants Architecture and Engineering, Inc. (C2AE) to evaluate the potential of developing a public water system to serve the project area identified as Water District #2. This area was considered as a result of interest expressed by the property owners to the Town Board in a recent questionnaire. This area has also been targeted to provide the best funding opportunity for the least amount of cost.

A. Location

This area includes portions along State Route 104A, School Craft Road, Laxton Road, King Road, Maroney Road, MacNiel Road, McIntyre Road and other local side streets. See map in Appendix A.

The Town of Sterling is located in the northern section of Cayuga County and borders Lake Ontario to the north, Oswego County to the east and Wayne County to the west.

All of the residents in the planning area primarily rely on private residential wells to meet their domestic water needs. Having experienced problems with their own wells and knowing of problems with many area wells, the Town Board looked into the potential for providing affordable municipal water to areas of the Town in need.

B. Environmental Resources Present

Federal Wetlands – A preliminary review of records indicate that the project area is adjacent to federal wetlands. Proposed piping would be installed within the road shoulder and right of way; therefore any impact can be mitigated. Stream crossings will be constructed using trenchless methods. All Federal permits including Army Corps of Engineers would be secured, if required, prior to any construction. See attached Federal Wetland Map in Appendix D.

New York State Wetlands - A preliminary review of records indicate that the project area is adjacent to New York State wetlands. Proposed piping would be installed within the road shoulder and right of way; therefore any impact can be mitigated. Stream crossings will be constructed using trenchless methods, thereby mitigating any wetland or stream disturbance. All State permits, including New York State DEC permits, would be secured prior to any construction. See attached New York State Wetland Map in Appendix D.

Agricultural Districts - A preliminary review of records indicate that the project area is adjacent to Ag District parcels. The Town understands that this project could impact these parcels and will make every effort to minimize any impact to those parcels. For example, all the proposed piping will be installed within the road right of way and should not disturb or impact any agricultural parcels. The construction will comply with the guidelines entitled "Guidelines/Special Permit Conditions for Water/Sewer Transmission Mains Located Partially or Wholly in an Agricultural District". See attached Ag District Map in Appendix E.

Flood Insurance Rate Maps - A preliminary review of records indicate that the project area is not in a flood hazard area except at a creek or drainage crossing. See attached flood maps in Appendix F.

Archaeological: The New York State Office of Parks, Recreation and Historical Preservation (SHPO) has reviewed the project area and has determined that no historic properties will be affected by this project.

C. Population Trends

The population of the Town of Sterling, based on the 2010 Census, is 3,116. In 2000 it was 3,432. The 1990 Census listed a population of 3,210. Growth in the Town is minor at best.

In the project area, very little growth is anticipated. Like most towns in Cayuga

County, growth is dependent on employment, and most recent employment is new business outside of the Town.

The project area presently contains 114.5 equivalent dwelling units (EDU's) of which 22.5 are from 45 vacant parcels, which are considered 0.5 EDU's each.

D. Community Engagement

Prior to beginning the process of developing a public water system in the Town of Sterling, a questionnaire was sent out to property owners that were not on public water. This was driven by the written and verbal requests received by the Town to pursue future public water systems. As a result of the surveys received by the town, the proposed Water District #2 project area has been determined to be a viable option. Approximately 56% of the property owners in this area responded. Of the respondents, approximately 71% were interested in pursuing a public water system.

2. EXISTING FACILITIES

A. Community Engagement

Presently, the Town of Sterling has one (2) existing water districts (Water District #1 and Water District #3). District #1 is located in the northern part of town near the Oswego County border. Water is currently provided to that District by the Onondaga County Water Authority (OCWA). Water District #3 is located throughout the “downtown” portion of the Town and is currently under construction. Water is provided by the Village of Fair Haven for this District.

Due to the location of the proposed Water District #2, it is proposed that water be provided from the Village of Fair Haven for this District.

B. History

Within the Town of Sterling, many documented well water problems exist which has stimulated the pursuit of public water service. Over the past several years, federal and state funding became available and the Town has started developing new water districts.

C. Condition of Existing Facilities

The residents in the proposed project area presently obtain their water supply from groundwater sources. Many use dug wells, which are shallow and tend to be subjected to surface water infiltration. Residents have complained about low flow periods and poor water quality issues.

D. Financial Status of Existing Facilities

The proposed Water District #2 has no existing financial obligation.

E. Water Audits – not applicable.

3. NEED FOR PROJECT

A. Health, Sanitation and Security

As part of our questionnaire, numerous respondents stated the water obtained from their wells is of poor taste/quality or that they have had contaminated wells in the past. Several stated they have had issues with their wells running dry during summer months. A number of respondents indicated they have been required to purchase bottled or bulk water due to these issues.

There are also many dug wells found in the project area. Dug wells are no longer appropriate unless designed and operated as required by NYSDOH with proper treatment (NYSDOH Fact Sheet #5). See Appendix H.

B. Aging Infrastructure

Not applicable – new water system.

C. Reasonable Growth

By designing this project using Department of Health standards, it will support reasonable future growth.

4. ALTERNATIVES CONSIDERED

A. The proposed water district is intended to provide an acceptable water supply to a new area of the Town. Three alternatives were considered for the proposed project area. A summary of these alternatives are discussed below:

1. Purchase Water From the Village of Fair Haven:

This alternative involves installation of a municipal water system in the areas shown on the General Plan included in Appendix A. This area includes, but is not limited to: the State Route 104A corridor, parts of School Craft Road, Laxton Road, King Road, Maroney Road, MacNiel Road, McIntyre Road and other local side streets. The proposed project includes a total of 92 EDU's which are currently developed, 45 vacant parcels (0.5 EDU's each), for a total of 114.5 EDU's.

Connection would be made to the existing Water District #3 public water supply along State Route 104A. Water mains would be installed along the State Route 104A corridor and associated side streets to provide water service to the required properties. Shutoffs and meter pits would be installed for each service at each property line at locations agreed to by each property owner. A new water tank, well, and pumping system would be required for this alternative.

This alternative would have little impact on the environment due to the type of work. No land purchase would be required and disturbance would be in the road rights-of-way. Construction would be straight forward in concept with the contractor dealing with glacial till and cobble rich subsoils in many areas.

Operation and maintenance (O&M) costs would be minimal for the Town of Sterling for this alternative. The Town would enter into an inter-municipal Agreement (IMA) with the Village of Fair Haven to operate and maintain the distribution system. The Town of Sterling would own the new well and associated pumps, but the Village of Fair Haven would operate and maintain via the IMA. The Town would own and maintain the new tank. The Town intends to include a charge of \$50/EDU/year to help pay for O&M required to be performed by the Town.

The projected cost for this alternative is as follows:

CAPITAL - \$6,236,000

O&M costs including water usage - \$18,960/year

Based on preliminary calculations, the estimated O&M fees for developed properties will be \$252/EDU/year. Please note that a full breakdown of the capital and user costs for this alternative is included as Appendix G.

2. Purchase Water from the Onondaga County Water Authority (OCWA):

This alternative would include connection to OCWA's existing water main on State Route 104A at the Cayuga/Oswego County line. A booster pump station would be required at this location. A new water storage tank would also still be required to serve the project area. The distribution system would be required to be Ductile Iron Pipe due to OCWA requirements the same with the exception of an additional +/- 4,000 ft of water main required to make the connection at the County line on 104A.

The projected cost for this alternative would be:

CAPITAL - \$7,045,000

O&M costs including water usage - \$36,660/year

Both capital and O&M costs would be greater than Alternative No. 1. OCWA's O&M rates for water usage are higher than that of the Village of the Fair Haven. In addition, OCWA requires the use of DIP for systems they intend to operate and maintain. This results in an additional approximate \$10/LF material cost over PVC.

3. Install a Water Treatment Plant System:

This alternative would include the installation of a water treatment plant at or near Sterling Creek. The Town would have to purchase land for the plant, install a new intake pipe, build the water treatment plant and install an approximate 5,000' transmission main to the distribution system.

The projected costs for this alternative would be as follows:

- Distribution System	\$4,854,800
- Water Storage Tank	\$1,000,000
- Land Purchase	\$50,000
- Water Treatment Plant	\$1,000,000
- Transmission Main – 5,000 feet	<u>\$500,000</u>
	\$7,405,000 (rounded)
Engineering, Legal & Administrative	<u>\$1,000,000</u>
TOTAL	\$8,405,000

O&M Costs:

- Electrical & Chemicals	\$12,000 per year
- Labor	\$32,000 per year
- Equipment & material	<u>\$6,000 per year</u>
	\$50,000 per year

This alternative results in a substantial capital cost to produce water for the proposed project area. It also results in a much higher O&M cost due to labor and materials required to operate a treatment plant.

5. SELECTION OF AN ALTERNATIVE

After a preliminary evaluation, it is apparent one reasonable alternative is available for this project. Alternative #2 and #3 results in a substantial capital cost to produce water for the proposed project area. Alternative #3 results in a much higher O&M cost due to labor and materials required to operate a treatment plant.

The table below provides a life cycle cost comparison of each alternative evaluated. Life cycle costs are based on using the real federal interest rate from Appendix C of OMB Circular A-94:

Sterling (T)	Alternative #1 - Water from Village of Fair Haven	Alternative #2 - Water from OCWA	Alternative #3 - New Water Treatment Plant
Capital Costs	\$6,236,000	\$7,045,000	\$8,405,000
Total Annual O&M	\$18,960	\$36,660	\$50,000
Life Cycle Analysis			
30 Yr OMB Circular Discount Rate	1.5%	1.5%	1.5%
Planning Period YR's	30	30	30
Present Worth Calculation	\$455,340	\$880,421	\$1,200,792
Salvage	\$0	\$0	\$0
30-year Life Cycle Analysis	\$6,691,340	\$7,925,421	\$9,605,792

Based on the evaluation of alternatives discussed in Chapter 4 and the information presented above, Alternative #1 – Purchase water from Fair Haven is the most economically feasible and viable option and is therefore recommended for the proposed project area.

Several different tank alternatives were considered for this project. The table below provides a life cycle cost analysis of the various tank alternatives:

Sterling (T)	Glass-Lined Standpipe Tank	Glass-Lined Composite Elevated Tank (CET)	Multi-Column Elevated Tank (LEG)	Pedesphere Elevated Tank (PED)
Capital Costs	\$800,000	\$1,380,000	\$1,035,000	\$1,200,000
Total Annual O&M (Minor maintenance and inspections)	\$1,000	\$1,000	\$1,000	\$1,000
Life Cycle Analysis				
Use 30 Yr OMB Circular Discount Rate	1.5%	1.5%	1.5%	1.5%
Planning Period YR's	40	40	40	40
Present Worth Calculation	\$29,916	\$29,916	\$29,916	\$29,916
Salvage	\$0	\$0	\$0	\$0
*Paint tank at year 35	-	-	\$675,000	\$675,000
40-year Life Cycle Analysis	\$829,916	\$1,409,916	\$1,739,916	\$1,904,916

Based on the alternatives evaluated, a glass-lined standpipe tank is proposed for this project.

6. PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

As discussed in Chapters 4 and 5, it is recommended that the Town of Sterling proceed with Alternative No. 1 – Purchase water from Fair Haven.

The proposed project includes installation of approximately 56,200± linear feet of 4", 6", 8", 10", and 12" distribution water main. The project will consider using Ductile Iron pipe, PVC pipe or HDPE pipe. The material used will be based on the lowest bid price. Water mains will generally be installed 6-8 feet off of pavement or within road shoulders within the existing cleared road rights-of-way. All stream crossings will be performed by directional drilling. Disturbance would be kept to a minimum. All disturbed areas will be restored to an equal or better condition following installation. New fire hydrants and gate valves will be installed along the water main approximately 600 and 800 feet apart respectively, as required by Ten States Standards. A construction period of 9 months is anticipated for this project.

The projected average daily flow (ADF) for the project area is 15,980 gpd (11.1 gpm). This is based on a flow of 170 gpd per EDU. Peak daily flows of approximately 31,960 gpd (22.2 gpm) could be expected, as well as a peak hour flow of 63,920 gpd (44.4 gpm). Should the fifty-two (52) vacant parcels be developed, additional average daily flows of 8,840 gallons could be expected.

The Village of Fair Haven's current water source is groundwater drawn from two groundwater wells (Well #1 and Well #2). These wells are located within the Town of Sterling adjacent to the proposed new water district. Water is drawn from these wells and is chlorinated on-site prior to distribution.

Based on evaluation of flow data provided by the Village of Fair Haven, a peak daily flow of 264,200 gpd (183 gpm) is expected for use within the Village. This equates to an estimated peak hourly flow of 528,400 gpd (367 gpm). Adding the estimated current and future peak flows for Water District No. 3 (currently under construction), the total peak daily flow for the system is estimated to be 294,800 gpd (204 gpm) and the peak hourly flow is estimated to be 589,600 gpd (409 gpm).

Including the estimated flows for Water District #2, peak daily flows of 326,080 gpd (226 gpm) are expected. This equates to an estimated peak hourly flow of 652,160 (453 gpm).

The pumps for Well #1 and Well #2 have a maximum combined pumping capacity of approximately 835,200 gpd (580 gpm). The existing pumps do not have the required capacity to provide redundancy in the system should one pump/well fail. Therefore, a new well supply is required as part of this project. In addition, a new pumping system is required to supply water to the new proposed water storage tank. It is proposed this well/pump system will be installed at the Village's existing well site. A hydrogeologic study will be performed as part of design to verify optimal location and associated output for the proposed well. We will consider two ten (10) horse power pumps with radio telemetry control based on the water level in the tank. The pumps would operate in a lead and lag mode. A chlorine booster system will be installed to help maintain chlorine residuals in the distribution system.

The Village of Fair Haven is permitted a maximum withdrawal of 750 gpm by their NYSDEC water withdrawal permit. The Village is permitted to provide adequate flow to both the existing and proposed systems. The Town of Sterling will own the well and pumping system, however operation and maintenance will be the responsibility of the Village via an IMA.

The new well system will pump water to the proposed Sterling water tank to be located on School Craft Road. The Town of Sterling owns this site and it is one of the higher elevations in the project area (ground 408'). The proposed water storage tank will be approximately 110' to the high water line with a diameter of 25' as manufactured by Statewide Aquastore. The actual capacity will be approximately 403,919 gallons. The high water level (HWL) will be 518'.

The hydraulic model for the proposed project was established considering the entire Town of Sterling. We wanted to insure that what was being proposed as part of this project would be reasonably usable in the future if additional water projects are considered. Maintaining a static pressure of 35 psi and fire flows of 500+ gpm were the objectives.

With the HWL, pressures within the distribution system will range from 47 psi to 118 psi. The tank is sized to provide adequate fire flows to the proposed system. The projected available fire flow would range from 548 to 3,000 gpm. A tank mixing system may be required to assist with chlorine residuals and freezing concerns. A potential solar array system will be looked at as part of this project to offset future power costs at the Water Tank and Well Site. A copy of the hydraulic modeling map and associated data is included as Appendix B.

As discussed in Chapter 4, it is anticipated that an approximate water usage cost of \$252/year will be assessed to each EDU. The projected capital cost for the project is \$5,331,000.

The Village of Fair Haven, via an IMA, will obtain water service charges from each user. Fair Haven's charges will be based on water meter readings at each connection.

A list of short lived assets for the proposed water district is provided below:

Short Lived Assets	
Equipment	Estimated Replacement Cost at Year 20
Pumps (including motors)	\$50,000
Pump Controls	\$15,000

Telemetry	\$30,000
Water Level Sensors	\$5,000
TOTAL	\$100,000

As discussed previously a maintenance charge of \$50/EDU/yr will be charged and put into a reserve fund for repair/replacement of short lived assets.

7. CONCLUSIONS & RECOMMENDATIONS

With the continuation of federal funding for small, rural populations, it is apparent that expansion to select areas within the Town is possible to assure that residents have a safe and adequate water supply plus firefighting capabilities. It is also evident that due to the costs of such an undertaking, the residents in the Town of Sterling will require the available financial assistance to consider any of these planned improvements. Based on these considerations, C2AE would recommend that the Town of Sterling take the following steps when pursuing this project.

- Prepare and submit a Preliminary Application for Financial Assistance for the project from the U.S. Department of Agriculture Rural Development.
- The results of the findings documented in this report should be presented to the residents of the project area. It is the opinion of the board that it would be appropriate to await the outcome on potential funding prior to presenting the project to the residents. An area-wide survey (questionnaire) was conducted several years ago and it shows good support for an affordable water system.

The proposed improvements discussed in this report are directed towards providing an adequate water distribution system and supply in areas designated.

The project area includes parts of State Route 104A and associated side streets. See drawing in Appendix A.

- The distribution system will be designed to the latest engineering standards and to the standards of the reviewing agencies involved.
- The distribution system will be designed to meet the immediate needs of the Town of Sterling and will consider the possible needs of the future.

Due to the increase in the construction costs, the town will need to obtain a substantial grant to make the project affordable. USDA-RD has provided a preliminary funding offer for the project including a grant. Information has been updated with the increase in estimated project costs.

Potential Project Costs:

Total Project Cost Estimate	=	\$6,236,000
USDA RD Grant	=	\$3,323,000
Outside Contribution	=	\$438,000
USDA RD Loan	=	\$1,570,000 at 2-1/8% for 38 years
Remaining project cost	=	\$905,000

Estimated EDUs = 114.5

Annual Debt Cost:
 $(\$1,570,000 + 905,500) \times .03862 = \$95,584/\text{year}$

Cost per EDU = $\$95,584 / 114.5 = \$835/\text{year}$

Projected User Cost/EDU = $\$252/\text{year}$
 (See Appendix G)

Projected Total Costs (without Grant) = **$\$1,087/\text{year}/\text{EDU}$**

Vacant Projected Total Costs (without additional funding) = $\$1,087/2 + \$50/2 = \$568.50$

Appendix A General Plan

Appendix B
Hydraulic Model Area Map

Appendix C
EDU List

Appendix D
Federal & State Wetland Maps

Appendix E
Ag District Map

Appendix F Floodplain Map

Appendix G Cost Tables

Town of Sterling – Water District #2
Projected User Costs

Water from Fair Haven:

Typical usage = 170 gallons/household/day

≈ 94 households = 15,980 gpd = 486,058 gallons per month

Rate = \$3.25/1,000 gallons plus \$50 per EDU base rate maintenance charge

O&M:

\$3.25/1,000 gallons x 486,058 gallons = \$1,580/month = \$18,960/year

Water Usage Charge = \$202/EDU/year
EDU/year Maintenance Charge = \$50/EDU/year

Estimated Annual Cost \$252/EDU/year

Appendix H
Health and Sanitation Documentation

Appendix I
Questionnaire Responses