EPA United States Environmental Protection Agency

USDA U.S. DEPARTMENT OF AGRICULTURE

Options for Clean Water Solutions

in Meadows Sewer District, Halifax County, North Carolina

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Closing America's Wastewater Access Gap Community Initiative

Contents

Meadows Sewer District's Options for Clean Water Solutions

The Meadows Sewer District (MSD) includes a 3-mile-radius area in Halifax County, North Carolina, with an estimated 1,033 homes. The area includes the unincorporated communities of Hollister and Essex and is home to many members of the Haliwa-Saponi Indian Tribe, whose headquarters are in Hollister. Many residents of the MSD currently have inadequate wastewater treatment services. For many years, community members have advocated to change this situation. The community remains hopeful despite unfulfilled previous efforts to provide wastewater solutions.

With the passage of the Bipartisan Infrastructure Law and new Water Technical Assistance services, there is momentum to bring wastewater treatment solutions to homes in the MSD. This document describes technical options and financial resources for wastewater treatment. It is the product of the work of many organizations and individuals and provides options for clean water solutions for the community.

Cover: 2023 Haliwa-Saponi Tribe Powwow (top). Photo by Ivan Richardson, Haliwa-Saponi Tribe. Medoc Mountain State Park (middle). NC State Parks photo by J. Shimel. Aerial view of a decentralized wastewater system in White Stone, Virginia (bottom). Photo by Aquapoint, LLC.

Closing America's Wastewater Access Gap Community Initiative Pilot: EPA/USDA-RD Partnership

Introduction

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture Rural Development (USDA-RD) partnered with six states and three Tribes (two federally recognized and one state-recognized) on the Closing America's Wastewater Access Gap Community Initiative. As a pilot program, this initiative was the first of its kind for EPA and USDA-RD. This initiative provides technical assistance to support capacity to improve wastewater management for the 11 participating communities. EPA and USDA have grant and loan programs to help pay for wastewater system improvements. Recent increases in federal funding offer an opportunity for communities to invest in septic upgrades, connect to nearby treatment systems, or build new sewer and wastewater treatment systems that meet their needs.

EPA offers a range of Water Technical Assistance (WaterTA) for communities to identify water challenges and solutions, build capacity, and develop application materials to access water infrastructure funding. EPA collaborates with states, Tribes, territories, community partners, and other stakeholders to implement WaterTA efforts. The result: more communities apply for federal funding to support quality water infrastructure and reliable water services. Communities can learn more about EPA WaterTA and how to indicate interest in receiving assistance by visiting EPA's WaterTA website.[1]

USDA offers a wide range of water and wastewater assistance for rural communities to obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. USDA's Water and Waste Disposal Technical Assistance and Training Grants program helps qualified, private nonprofits provide technical assistance and training to identify and evaluate solutions to water and waste problems. It also helps applicants prepare applications for water and waste disposal loans and grants, and it helps associations improve the operation and maintenance (O&M) of water and waste facilities in eligible rural areas with populations of 10,000 or fewer. Communities can learn more about USDA Water and Waste Disposal Technical Assistance and Training Grants and how to indicate interest in receiving assistance by visiting USDA's website.[2]

Purpose

EPA and USDA-RD pilot program staff members worked with the pilot program team—the Haliwa-Saponi Tribe; Halifax County's leadership, public utilities, and health department; EPA and USDA-RD state leadership; a local technical assistance provider, Southeast Rural Community Assistance Project, Inc. (SERCAP); and the North Carolina Department of Environmental Quality (NCDEQ)—to develop solutions for the MSD's wastewater issues. This document, *Options for Clean Water Solutions in Meadows Sewer District, Halifax County, North Carolina*, outlines potential solutions to address the needs for improved wastewater treatment approaches in the MSD. Residents and county leadership can use this information to help identify and select potential wastewater solutions that meet today's challenges and help the community thrive.

1 https://www.epa.gov/waterta

2 https://www.rd.usda.gov/programs-services/water-environmental-programs/water-waste-disposal-technical-assistance-training-grants

Over the past year, the pilot program team has:

1. **Conducted a community wastewater assessment.** The pilot program team reviewed existing information on wastewater systems in the MSD and found areas that need improvement. This review did not include collecting site information on soils or existing septic systems, but it did assemble information gathered during past assessment efforts.
2. **Identified wastewater solutions.** The team identified wastewater solutions and estimated their costs. They considered the community's long-term needs and outlined a path to apply for funding. State and local officials and community members played key roles in developing these options.
3. **Helped the community find and apply for funding opportunities.** This document outlines federal funding sources and how to apply for funding. It also shows how to pay for construction and long-term costs. Halifax County applied for and received a Special Evaluation Assistance for Rural Communities and Households (SEARCH) grant from USDA-RD to develop a Preliminary Engineering Report (PER) and Environmental Information Document.
4. **Developed a plan to pay for ongoing costs.** To install and operate the selected wastewater system, the appropriate management entity will have to develop a plan to pay for construction and ongoing costs. These ongoing costs could include management, O&M, and any potential construction loan repayments. This document offers ideas to get started, such as programs with low-income rate assistance and non-rate revenue programs that other utilities have used.

> *As citizens of the Haliwa-Saponi Tribe, we pride ourselves on being stewards of the environment. It is important to us that we prevent pollution into our water sources and keep our community healthy.*
>
> — Dr. Brucie Ogletree Richardson,
> Haliwa-Saponi Tribe Chief

Meadows Sewer District, Halifax County, North Carolina

The MSD, outlined in red in Figure 1, consists of the area within a 3-mile radius of the intersection of North Carolina Highway 561 and State Roads 1002 and 1324 in Halifax County. The district includes the unincorporated communities of Hollister and Essex and was established in 2004 for the purpose of performing a feasibility study for sewer infrastructure after the Halifax County Board of Commissioners determined a need for providing sewer services in the area.

The MSD is entirely within a State Designated Tribal Statistical Area, where many residents are members of the Haliwa-Saponi Indian Tribe, whose headquarters are in Hollister. The Haliwa-Saponi Tribe is the third-largest Tribe in the state, and the Haliwa-Saponi Powwow, typically held in April, is the oldest and largest in the state. Tribe members have expressed pride in being stewards of the environment, which is an important motive for their commitment to this project.

The MSD has an estimated 1,033 households and serves a population of approximately 2,500 residents. The area is partially served by a public water system, with approximately 34 percent of the parcels served by private well water supplies. The MSD is about 13 miles south of the Town of Littleton and 18 miles northwest of the Town of Enfield, both of which have municipal sewer systems.

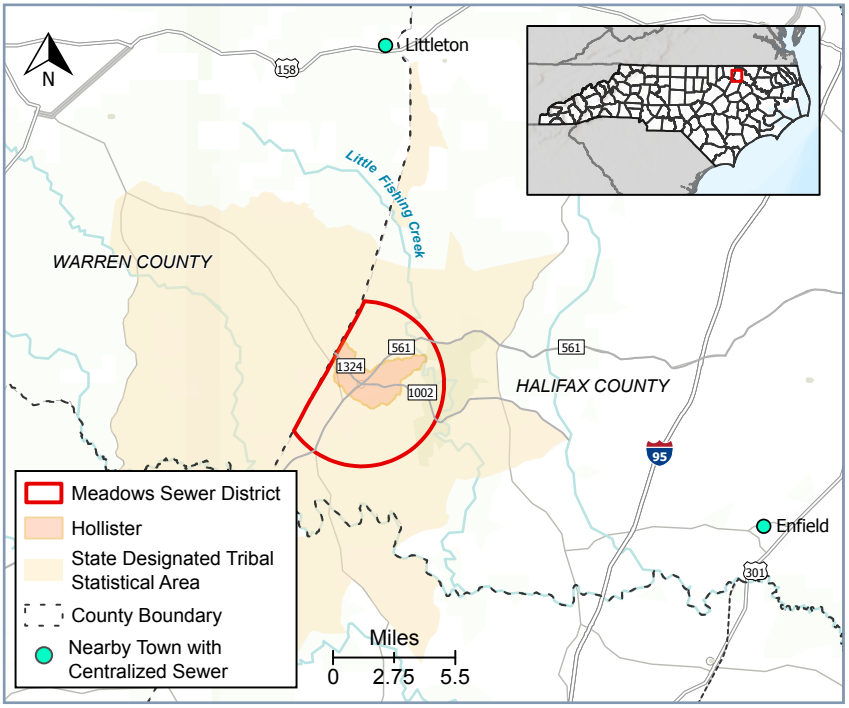

Figure 1. The MSD, which contains the Hollister community and is a State Designated Tribal Statistical Area.

The lot sizes in the area vary significantly; however, development patterns are typically small clusters of homes and buildings surrounded by open land. The land is mostly forested, with some agricultural cropland. Surface waters drain into the Little Fishing Creek, which is a high-water-quality resource flowing through Medoc Mountain State Park. Due to the soils in the area, there are some restrictions for installing conventional onsite or cluster system solutions, but they might be overcome by using alternative dispersal and advanced treatment to reduce separation distances between restrictive layers, and by locating larger (i.e., cluster) systems on the areas with better soil. A survey of sanitary risks conducted in 2009 evaluated approximately half of the individual onsite systems and found that over a third of those investigated were noncompliant with NCDEQ onsite water protection guidelines due to (1) surfacing effluent, blackwater or graywater straight pipes, or lack of indoor plumbing; or (2) occupant-identified difficulties, including problems during rain events, sewage backing up into houses, and failures due to vehicles, other equipment, or even heavy foot traffic denuding vegetation and compacting the dispersal field.

Previous efforts to provide centralized wastewater solutions have faced affordability challenges. According to local community leaders, an estimated 39 percent of residents are below the poverty line.

The Potential of Infrastructure Investment

Economic development in Hollister has been limited, which community leaders believe is primarily due to the lack of a community wastewater system to serve local businesses and public facilities. Many Hollister residents are employed in other towns and do much of their shopping outside of the community, with people traveling over 20 miles to complete many of their retail needs, according to a 2022 survey conducted by NCGrowth.[3] As part of the 2009 and 2022 surveys, residents expressed a desire for amenities such as broadband internet access, a grocery store, a pharmacy, banks, and restaurants but cited poor and wet soils as significant challenges to developing the community. One landowner living outside of Hollister expressed a desire to move back and build on the land but said that growth in the community had been stunted because much of the land would not support a septic system.

MSD residents have expressed support for capital investment in sanitation infrastructure, and they understand monthly bills are necessary to maintain infrastructure. They want a community where their children can safely play in their backyards without risking exposure to untreated wastewater. The ability to do laundry and take a shower at the same time, even during rain, is another basic need. An affordable wastewater system in the MSD is key to maintaining a vibrant, productive community.

Community Engagement Feedback

Leaders of the Haliwa-Saponi Tribe have been the main community representatives for this project and are very involved in engaging the community. They have been intentional about ensuring that residents who are not members of the Tribe are involved in community meetings and informational updates, including hosting meetings at non-Tribal locations.

County, Tribal, federal, and state representatives held monthly meetings to discuss community engagement efforts. SERCAP has helped lead the interactions with Halifax County staff and Tribal representatives. Their intention is to conduct public outreach meetings when more detailed options are available and financing is completed. Summaries of the meetings to date are below.

In October 2022, a kickoff meeting was held with federal, state, and local partners to establish a vision for success, field questions and feedback, and create a plan for achieving the project's goals. The following unique community challenges were identified:

> *Investing in wastewater infrastructure will support the development of local businesses and jobs, which has been hindered by the lack of a community wastewater system.*
>
> — Dr. Brucie Ogletree Richardson,
> Haliwa-Saponi Tribe Chief

3 NCGrowth. (2022). *Hollister market analysis.*

- Inability to afford the local costs associated with constructing and maintaining a centralized system.
- Hesitancy to request government assistance due to fears of having homes condemned and past experiences that have led to a distrust of government.
- Need for grant-writing assistance.

In April 2023, SERCAP attended the Haliwa-Saponi Powwow to share information about the project, and in July 2023, they attended a community meeting at Hollister Elementary school, which had about 100 attendees, including some from neighboring Warren County. During the community meeting, attendees expressed support for the project and interest in how decentralized systems operate. In response, SERCAP organized a tour of a decentralized cluster system in White Stone, Virginia, with a Tribal representative. They also met with the system operator to get an idea of how to operate a cluster system because the Tribe has expressed interest in operating and maintaining a community system in the future.

Representatives of Halifax County have noted a preference to wait until the updated PER is complete before presenting potential solutions to the Board of Commissioners or the community. As of April 2024, the project team was developing informational flyers to keep the community informed about progress and next steps. An earlier flyer was distributed in October 2023.

Wastewater Treatment Options for the MSD

The proposed wastewater management solutions (Figures 2 through 4) for the MSD range from onsite upgrades to a full sewer extension to the Town of Littleton. It is important to note, however, that these solutions options are not considered "either/or" alternatives. Regardless of the public option chosen (i.e., decentralized cluster or sewer extension), a percentage of residents live in lower-density parts of the MSD that cannot, at least initially, be cost-effectively served by community sewer. These outlier residents with failing septic systems will likely be served by advanced onsite upgrades (the Baseline Option). In addition, the cluster system solutions are presented as different options representing varying phases of implementation. Total cost estimates cannot be compared directly to other alternatives because they represent different service populations.

The following pages present a summary of the potential infrastructure options, including design, estimated costs, estimated monthly bills, key considerations, and sustainability factors. The proposed options are:

- **Baseline Option.** Engineered onsite septic system upgrades or repairs.
- **Option 1.** Community cluster system (Phase 1).
  - Includes Baseline Option.
- **Option 2.** Sewer extension to the Town of Littleton.
  - Includes Baseline Option.
- **Option 3.** Community cluster system (Phase 2).
  - Includes Baseline Option.

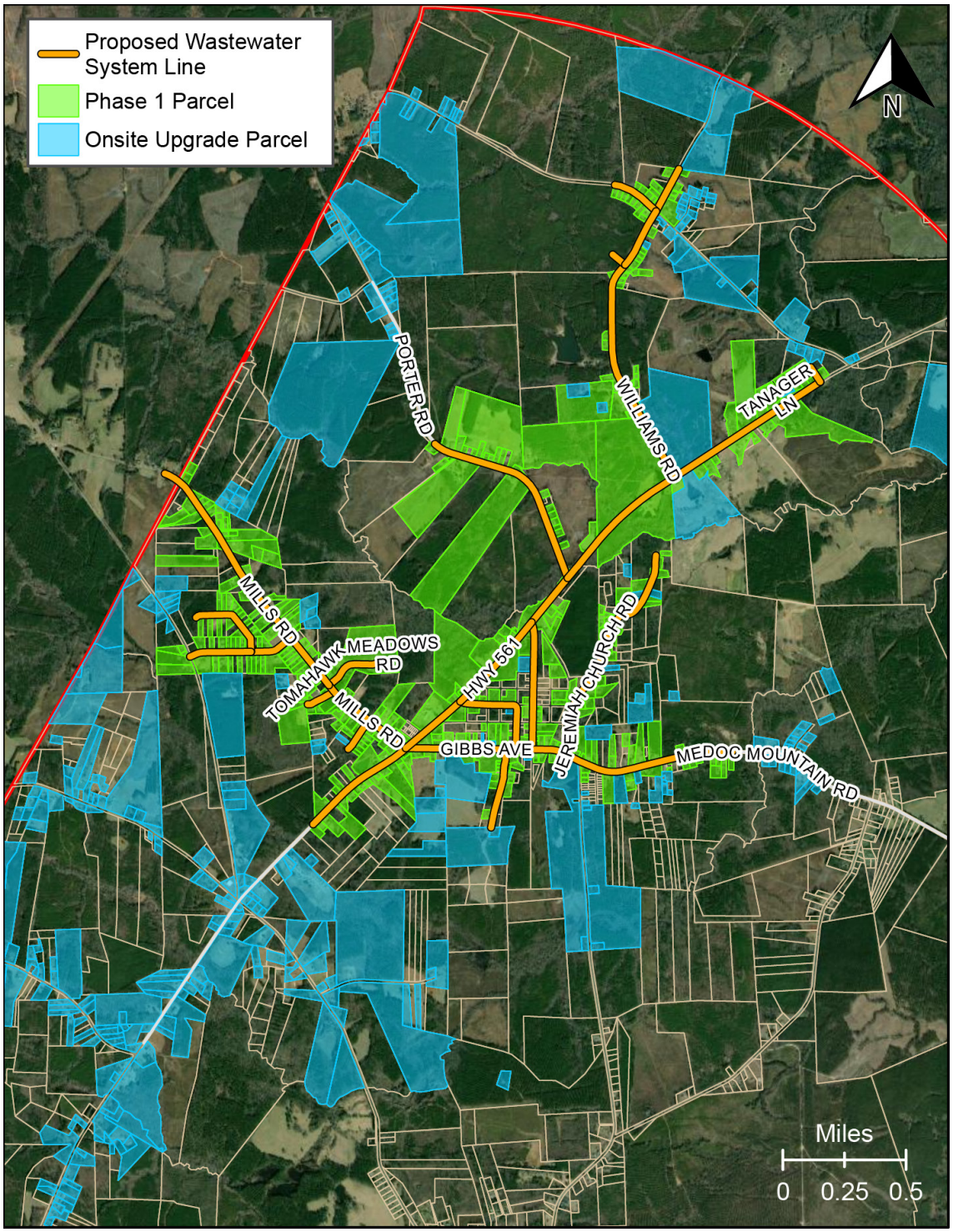

Figure 2. Proposed Phase 1 community cluster system. Phase 1 parcels would connect to the wastewater system line and onsite upgrade parcels would receive repairs and upgrades to their onsite systems where needed.

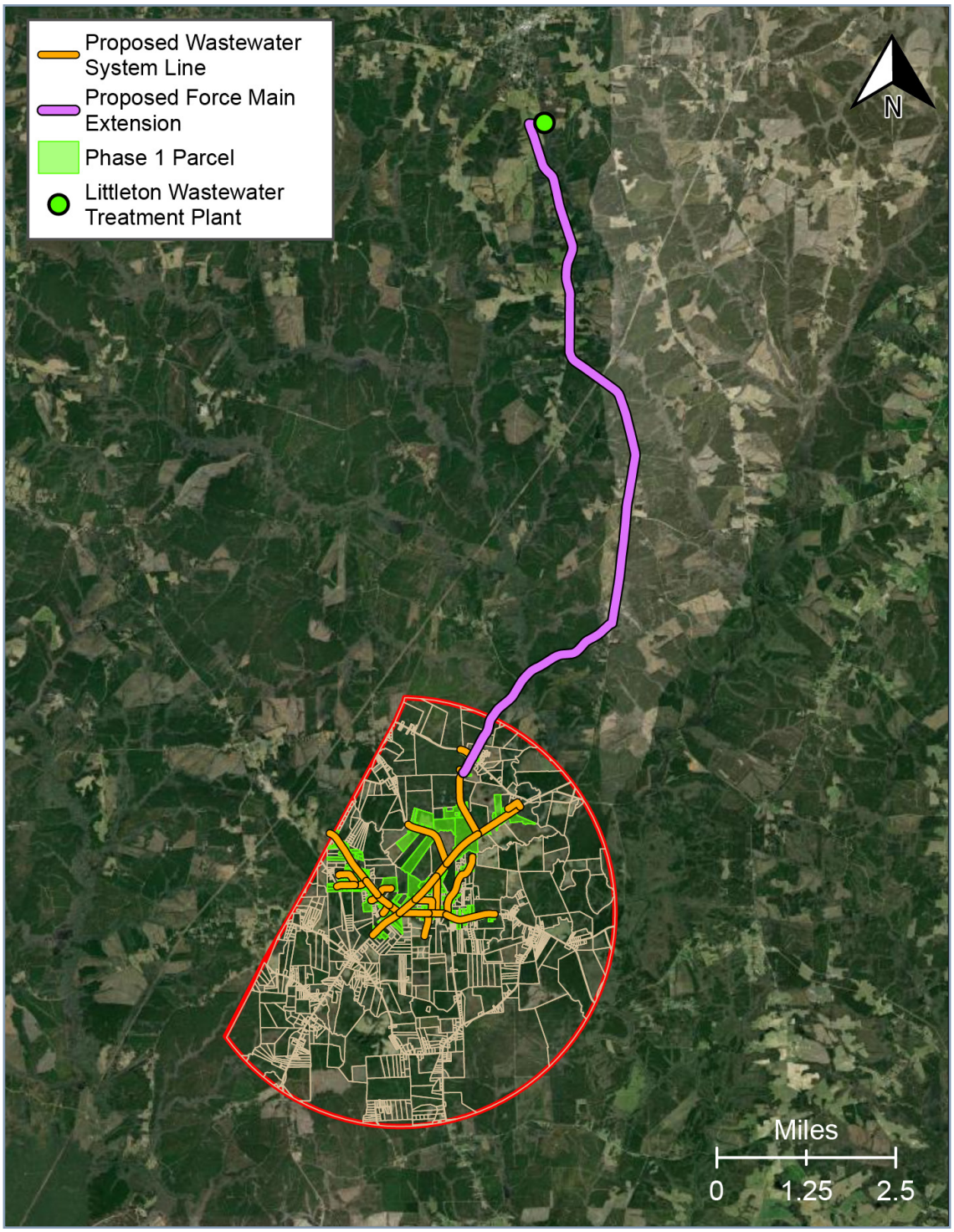

Figure 3. Proposed Phase 1 sewer extension option to the Town of Littleton wastewater treatment plant.

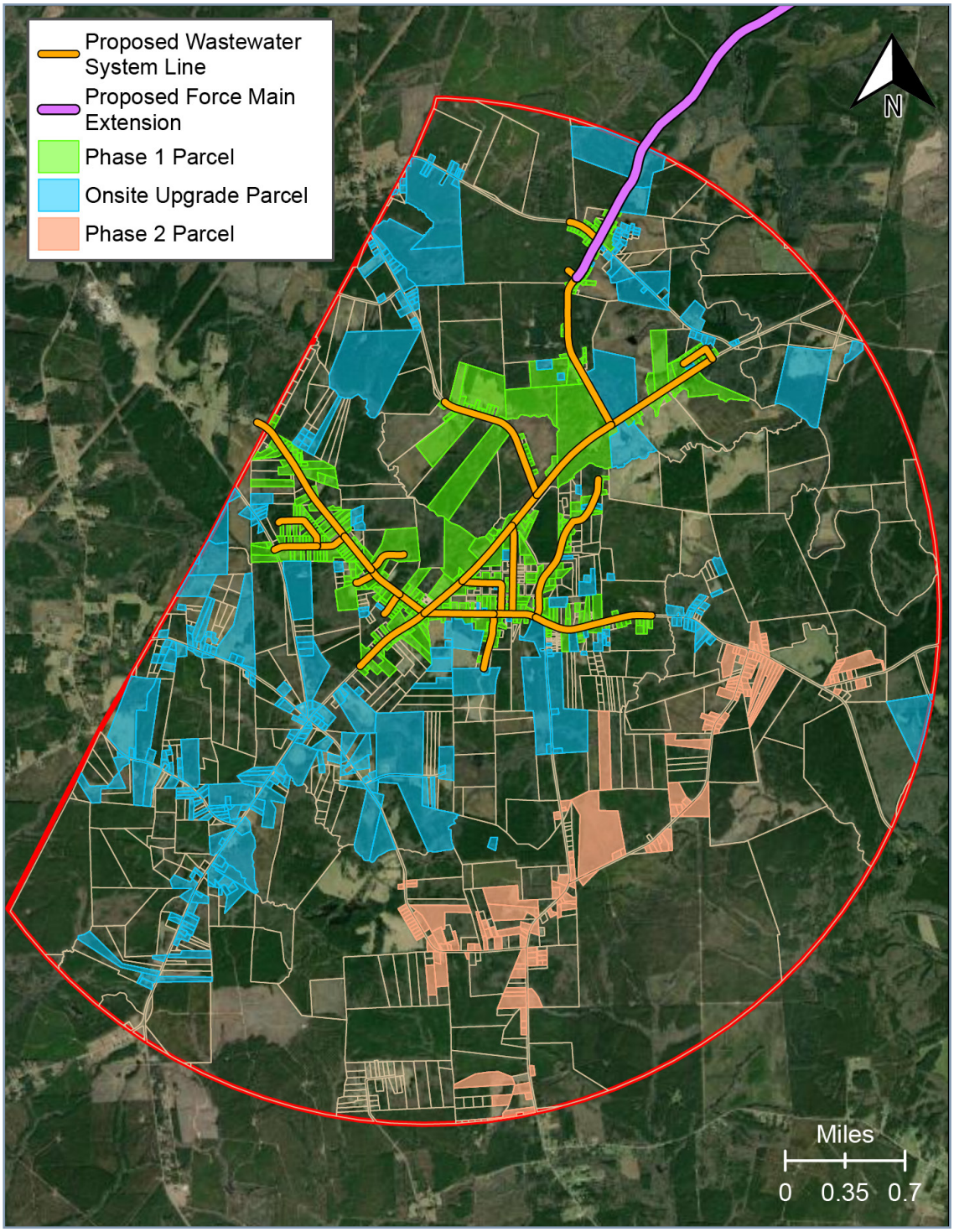

Figure 4. All proposed options for MSD.

Options for Wastewater Infrastructure Improvements

Baseline Option: Onsite/septic system upgrades and/or repairs

Option A. Homeowners are responsible for system maintenance and replacement.

Option B. The MSD forms a Responsible Management Entity (RME) responsible for maintenance.

This option applies to households within the MSD that most likely cannot be served by a centralized or cluster wastewater management option and will continue to depend on onsite septic systems for wastewater management. Although the final numbers will depend on site-specific soil conditions, the cost estimate assumes that one-third of the existing systems will need to be replaced by an engineered system (either a direct discharge system or Treatment Standard-1 [TS-1] treatment with single- or dual-zone drip dispersal), one-third of the systems can use a conventional system repair, and one-third of the systems won't need repair or replacement within the project planning period. Option A assumes that each homeowner is responsible for maintaining their septic system and replacing parts. Option B assumes that the MSD develops an RME program to maintain and periodically replace pumps, motors, and dispersal fields in septic systems. Replacing the septic tanks would be the responsibility of the homeowner and/or potentially facilitated through grants. O&M and replacement costs include pumping out the septic system every 10 years, replacing pumps and motors every 7 years, and replacing dispersal fields every 40 years. Responsibilities for the MSD and/or RME include planning, implementing, and tracking maintenance activities and equipment needs in Option B.

Expected Capital Cost Range: $25,000 to $48,000 per household for full system replacement.

A. Responsibility of individual residents.

B. Grant and loan funding is facilitated by the MSD.

Expected Annual Operating Costs: $650 to $750 per year per household.

A. Responsibility of homeowner and no monthly RME bill.

B. Approximately $810 per year per household for raw O&M costs; monthly RME fees may be higher.

Pros:

- Eliminates health and environmental hazards from overflowing and failing septic tanks.
- Is effective for large lots.
- Includes costs for periodic system maintenance (Option B).
- Should not require the MSD to purchase land.
- Allows for quickest implementation to address immediate needs.

Cons:

- High capital cost to homeowner (without grant assistance).
- Requires homeowners to maintain and replace systems, unless an RME is established for the community.
- Might not encourage economic growth, as most businesses prefer a public sewer system option.
- Includes higher maintenance costs if a certified operator is required for the system.
- May not be feasible for all lots due to space limitations, and thus is not proposed as a standalone solution.

Option 1: Community cluster system approach (Phase 1)

Building off the treatment clusters identified as part of the 2014 PER, a Phase 1 cluster was delineated to serve approximately 437 households. This system would include a pressure sewer that uses septic tank with effluent pump (STEP) systems, as well as a community treatment system with advanced pretreatment to TS-1 standards and subsurface dispersal fields. O&M and replacement costs for the community system include monitoring and reporting flow, performing routine maintenance, renewing pumps and motors every 7 years, and renewing the dispersal field every 60 years. O&M and replacement costs for the homeowner will include maintaining the STEP sewer system by pumping out septic tanks every 10 years, replacing pumps and motors every 7 years, and paying electric costs each month.

Expected Capital Costs: $38,000 per household ($16.5 million total).

Expected Annual Operating Costs: $680 per year per household.

Pros:

- Eliminates health and environmental hazards from overflowing and failing septic tanks.
- Provides consistent wastewater service throughout the community with professional operators.
- Allows for growth within the community, including for several commercial businesses (e.g., grocery store).
- Maintains more control of the wastewater system and fee structure within the MSD community.

Cons:

- Relies on residents to connect to the sewer system and public water, if not currently connected, for maximum cost-effectiveness.
- Requires ongoing STEP system maintenance and replacement that varies based on residents' use.
- Requires purchasing at least 60 acres of land for the treatment and dispersal system as part of capital costs.
- Requires a licensed operator for O&M of the community collection, treatment, and dispersal system.
- Requires the system be owned by a public entity (i.e., county, town, or sanitary or sewer district) so the project is eligible for funding through the Clean Water State Revolving Fund (CWSRF) program.

Option 2: Sewer extension to the Town of Littleton

This alternative would have the same pressure sewer and service area as the Option 1 (Phase 1) cluster system. But instead of treating the wastewater using a community treatment system, this alternative would use a lift station and an additional 56,900 feet of 6-inch force main to convey MSD wastewater to the Town of Littleton's wastewater treatment plant (WWTP). In lieu of STEP systems, this option would use grinder pumps at each household to eliminate maintenance of the septic tanks. The Town of Littleton has additional capacity in its WWTP to serve the Phase 1 design flow of 100,000 gallons per day (gpd). Littleton is in the process of implementing capital improvements in the town's sewer collection system and WWTP, which would help ensure capacity to provide out-of-town treatment of additional wastewater. This option would reduce the overall O&M burden of a community wastewater system for the MSD, although ownership of and maintenance responsibilities for the grinder pump systems will need to be determined during the subsequent PER process. Bulk sewer rates will also need to be determined.

Expected Capital Costs: $42,100 per household ($18.4 million total).

Expected Annual Operating Costs: $900 per household per year (excluding water usage fees).

Pros:

- Eliminates health and environmental hazards from overflowing and failing septic tanks.
- Leverages existing treatment system, technical staff, and programmatic operations.
- Reduces burden on residents for maintaining and replacing onsite septic systems.
- Encourages economic growth and development of existing parcels limited by septic feasibility.

Cons:

- Relies on residents to connect to the sewer system and public water, if not currently connected, for maximum cost-effectiveness.
- Requires ongoing grinder pump maintenance and replacement that varies based on residents' use.

Option 3: Community cluster system approach (Phase 2)

Building off the treatment clusters identified as part of the 2014 PER, a Phase 2 cluster treatment system is proposed for one or two higher-density areas within the MSD. Although the 2014 PER cluster service areas were delineated based on potential treatment sites with soil capacity to serve up to 116 households, additional site evaluation and design is needed to fully assess this option. Similar to Option 1, this alternative would include a STEP sewer and community treatment system with advanced pretreatment to TS-1 standards, as well as subsurface dispersal fields. O&M and replacement costs for the community system include monitoring and reporting flow, performing routine maintenance, renewing pumps and motors every 7 years, and renewing the dispersal field every 60 years. O&M and replacement costs for the homeowner will include maintaining the STEP sewer system by pumping out septic tanks every 10 years, replacing pumps and motors every 7 years, and paying electric costs each month.

Expected Capital Cost Range: $38,000 to $42,000 per household ($6.7 million to $7.4 million total).

Expected Annual Operating Costs: $680 per year per household.

Pros:

- Eliminates health and environmental hazards from overflowing and failing septic tanks.
- Allows for growth within the community.
- Maintains more control of the wastewater system and fee structure within the MSD community.
- Allows for phased implementation of community wastewater systems as resources and support develop.

Cons:

- Depends on acquiring suitable treatment sites, adding to capital costs and increasing uncertainty regarding feasibility.
- Relies on residents to connect to the sewer system and public water, if not currently connected, for maximum cost-effectiveness.
- Requires ongoing STEP system maintenance and replacement that varies based on resident use.
- Requires a licensed operator for O&M of the community treatment and dispersal system.
- Requires the system be owned by a public entity (i.e., county, town, or sanitary or sewer district) so the project is eligible for funding through the CWSRF program.

Table 1. Comparison of Wastewater Treatment Options

Evaluation Criteria	Onsite Upgrades (Baseline)	Community Cluster	Sewer Extension
Estimated capital cost (per household)	$25,000 to $48,000 (full system replacement)	$38,000	$42,100
Eliminates the current public health concern	Yes	Yes	Yes
Provides a long-term solution	Yes	Yes	Yes
Requires new local sewer management authority	• Option A: No (homeowner responsibility) • Option B: Yes (formation of RME)	Yes	No
Includes existing local sewer management authority	No	No	Yes

Financing Options

The financing options evaluated include:

- **North Carolina CWSRF.** Up to a $500,000 grant or principal loan forgiveness. Low-interest loans through NCDEQ.
- **Community Development Block Grant (CDBG).** Up to $3 million over 3 years for wastewater or water infrastructure projects. Eligibility includes residential areas that meet the U.S. Department of Housing and Urban Development's (HUD's) low- and moderate-income thresholds. This grant could help cover the costs of new water or wastewater service lines or extensions.
- **USDA-RD Water and Environmental Programs (WEP), Water and Waste Disposal Loans and Grants.** Low-interest, long-term loans up to 40 years. Grant funds may be combined with a loan to keep user cost reasonable.
- **USDA Single Family Housing Repair Loans and Grants.** For low- and very-low-income homeowners, up to a $10,000 grant (age 62 or older) and up to a $40,000 loan with a 1 percent interest rate and 20-year term. Grants should be used to remove health and safety hazards. Loans may be used for those purposes or to repair, improve, or modernize homes.
- **SERCAP's Individual Septic Loan Program.** Up to a $15,000 loan with a 1 percent interest rate for low-income residents of rural communities to pay for installing a new standard/alternative septic system or to repair an existing malfunctioning system.
- **Water Well Trust Loan Program.** Funding for well and/or septic system repairs for low-income families nationwide.

Capital and Financing Costs and Fees

Table 2 shows the options for constructing new wastewater infrastructure and the estimated capital costs for each option. The table also shows information on potential additional costs if the construction was partially or fully funded with a grant. For conventional onsite system repairs, estimated costs would be lower. However, given the prevalence of unsuitable soils and septic system failure in the MSD, this plan estimates that only one-third of the existing systems can be replaced with conventional-type solutions.

Table 2. Capital and Financing Costs for Wastewater Treatment Options

Option	Name	Percent of Residences Served within the MSD	Estimated Total Capital Cost	Estimated Average Capital Cost Per Connection	Monthly Bill Addition for Financing Options of Capital Costs *(CWSRF Principal Forgiveness Loan[a])*	Monthly Bill Addition for Financing Options of Capital Costs *(USDA-RD 25% Loan 75% Grant)*
1	**Phase 1 Community Cluster**	42%	$16.5M	$38.0K	$0	$29[b]
1	**Onsite System Replacement/ Upgrade**	58%	$14.6M	$36.5K	*Financing dependent on individual situations.*	*Financing dependent on individual situations.*
2	**Sewer Extension to Town of Littleton**	42%[c]	$18.4M	$42.1K	$0	$33[b]
2	**Onsite System Replacement/ Upgrade**	58%	$14.6M	$36.5K	*Financing dependent on individual situations.*	*Financing dependent on individual situations.*
3	**Phase 2 Community Cluster**	Up to 59% (including Phase 1)	$7.0M	$40.0K	$0	$20[d]
3	**Onsite System Replacement/ Upgrade[e]**	41%	$10.3M	$36.5K	*Financing dependent on individual situations.*	*Financing dependent on individual situations.*

a Full principal forgiveness is possible but not guaranteed. Funding availability depends on several factors. The MSD will need to engage with NCDEQ along the way to determine principal forgiveness funding availability.

b Assumes 75% of the total project cost is funded with a grant or forgivable loan, and the remainder is funded with a loan. Also assumes 437 existing developed lots repay the loan at a 2.375% annual interest rate and 40-year loan term.

c Could potentially include higher-density areas from Phase 2 cluster.

d Assumes 75% of the total project cost is funded with a grant or forgivable loan, and the remainder is funded with a loan. Also assumes 176 existing developed lots repay the loan at a 2.375% annual interest rate and 40-year loan term.

e Net remaining onsite systems in the MSD if Phase 2 cluster is implemented. No additional onsite systems from those proposed with Options 1 or 2 would be added during this phase.

Table 3 shows the estimated monthly costs for operating the various wastewater management options. Note that these costs should not be considered monthly bills, as some of them represent amortized costs to replace major system components (e.g., dispersal fields), pump septic tanks, or hire operators. The only mandatory monthly bills would be utility fees for Option 2 and monthly power bills that cover STEP or grinder pump energy consumption.

Table 3. Potential Monthly Costs for MSD Customers

Option	Name	Utility Fee	STEP or Grinder Pump System O&M[a]	STEP or Grinder Pump Energy Cost[b]	Annualized Septic Tank Pump Out[c]	Treatment/ Dispersal Field O&M Costs[d]	Annualized Dispersal Field Replacement[e]
Baseline	**Onsite System Upgrades**	$0	$0[f]	$4	$2.30	$64[g]	$50
1	**Phase 1 Community Cluster**	$0[h]	$26.80	$3	$2.30	$25.80	$14
2	**Sewer Extension to Littleton**	$51.20[i]	$23.50	$3	$0	$0	$0
3	**Phase 2 Community Cluster[j]**	$0[h]	$26.80	$3	$2.30	$28	$16

a Estimated raw O&M costs to maintain grinder or STEP pump systems. Final costs are to be determined by the MSD, county, or RME based on overhead requirements.

b Responsibility of homeowner. Assumes the pump runs 20 hours per day at $0.13 per kilowatt-hour.

c Could be managed by a homeowner association or RME if established for the community.

d Capital and O&M costs for onsite/septic systems and community cluster systems could be reduced based on soil testing results. Costs are based on unsuitable soils as noted in the USDA Web Soil Survey.

e Assumes 60-year lifespan for both advanced onsite systems and cluster drip system with pretreatment.

f Pumping system O&M included in treatment/dispersal field O&M costs.

g Only applies to engineered system replacements. Conventional septic system replacements will not have operator or pump replacement costs.

h Utility costs to maintain the community collection and cluster treatment system will need to be determined based on actual cost for O&M, inspections and permitting, dispersal field replacement, and overhead.

i Sewer fee estimate based on Littleton out-of-town rates for ¾-inch meter size and average monthly water usages of 3,400 gallons per residence ($51.20).

j Rough costs scaled from relative 2014 PER cluster system costs. A more detailed evaluation of future cluster alternatives will occur for the new USDA SEARCH grant PER.

Funding Opportunities

The Bipartisan Infrastructure Law provides additional funding to the CWSRF for loans and grants to small, rural, and disadvantaged communities that can be leveraged with USDA-RD funds to address inadequate water and wastewater systems. There are multiple potential funding sources for the MSD, including USDA-RD and the CWSRF administered by NCDEQ.

Overview of the CWSRF Program Administered by NCDEQ

- The CWSRF program provides low-interest loans (up to half the market interest rate) to finance public infrastructure improvements.
- The program can provide up to $500,000 in grants or principal loan forgiveness and up to $35 million in loans.
- Applications are evaluated based on the Priority Rating System, which awards points for project purpose, project benefits, system management, and affordability.
- Eligibility for grants or principal loan forgiveness is based on NCDEQ's affordability criteria, which include population trends, poverty rate, median household income (MHI), unemployment rate, and sewer bills.
- Loans are administered by NCDEQ and should be approved by the North Carolina Local Government Commission.
- Three years of financial audits are required for the application process.
- Construction should begin within 24 months of receiving the letter of intent to fund.
- Application forms[4] and application training[5] can be found on NCDEQ's website.

Overview of HUD's CDBG Program

- The CDBG program provides grants for states, cities, and counties to develop housing and certain public utilities, including water and sewer facilities.
- Funding from the North Carolina CDBG program is administered by the NCDEQ Division of Water Infrastructure. Maximum grant funding is $3 million over a 3-year period.
- The project area should have at least 51 percent low- to moderate-income persons, according to HUD's low- and moderate-income threshold.
- The CDBG Infrastructure program has one funding cycle per year, typically in September.
- Application forms[4] and application training[5] can be found on NCDEQ's website.

Overview of NCDEQ's Merger/Regionalization Feasibility Grants

- The Merger/Regionalization Feasibility grants provide up to $50,000 in grants from the Wastewater Reserve fund for studying the feasibility of regionalizing or extending wastewater sewer services.

4 https://www.deq.nc.gov/about/divisions/water-infrastructure/i-need-funding/application-forms-and-additional-resources

5 https://www.deq.nc.gov/about/divisions/water-infrastructure/application-training

Overview of USDA-RD's Water Programs for Septic System Upgrades

Single Family Housing Repair Loans and Grants

- The Single Family Housing Repair Loans and Grants program, also known as the Section 504 Home Repair program, provides loans to very-low-income homeowners to repair, improve, or modernize their homes, as well as grants to elderly, very-low-income homeowners to remove health and safety hazards, including septic systems.
- To qualify, applicants must be the homeowner and occupy the house, must be unable to obtain affordable credit elsewhere, and must have a household income that does not exceed the very-low income limit for their county. In Halifax County, the limit is $34,600 for households of four or fewer and $45,700 for households of five or greater.
- Grants go up to $10,000, specifically for those aged 62 and older. Grants can be combined with full loans.
- Loans go up to $40,000 and are termed for 20 years with a 1 percent fixed interest rate.
- Applications are accepted through the North Carolina RD office.[6]

Rural Decentralized Water Systems Grant

- The Rural Decentralized Water Systems Grant program helps qualified nonprofits create a revolving loan fund for eligible individuals who own and occupy a home in an eligible rural area (i.e., areas with a population of 50,000 or fewer). The fund may be used to construct, refurbish, or service individually owned septic systems.
- The nonprofit should contribute at least a 10 percent match.
- The maximum loan amount is $15,000 at a 1 percent fixed interest rate, repaid over a 20-year period.
- Applications for nonprofits to apply are accepted through Grants.gov (see USDA's website for current posting).[7] Nonprofits currently administering loans include SERCAP and the Water Well Trust Loan Program, listed below.

SERCAP's Individual Septic Loan Program

- SERCAP's Individual Septic Loan program offers loans of up to $15,000 to residents of rural communities to pay for installing a new standard/alternative septic system or to repair an existing malfunctioning system. The interest rate is locked in at 1 percent, and these loans are not readily available from other lending institutions.
- Applications are accepted on SERCAP's website.[8]

Water Well Trust Loan Program

- The Water Well Trust Loan program provides funding for wells and/or septic system repairs for low-income families nationwide who need safe drinking water or wastewater systems. This program primarily serves residents living in rural and unincorporated areas, as well as minority communities.
- To qualify, applicants must have a deed or mortgage in their name, occupy the property, and meet eligibility criteria for gross annual household income based on North Carolina's MHI.
- Applicants can fill out the information form[9] on the Water Well Trust website[10] to begin the application process.

6 https://www.rd.usda.gov/nc

7 https://www.rd.usda.gov/programs-services/water-environmental-programs/rural-decentralized-water-systems-grant-program

8 https://sercap.org/about/who-we-serve/programs-and-services-homeowners

9 https://www.waterwelltrust.org/online-app-info/

10 https://www.waterwelltrust.org/

Overview of USDA-RD's Other Water Programs

SEARCH Grant

- The SEARCH grant program helps very small, financially distressed rural communities with predevelopment feasibility studies, design, and technical assistance on proposed water and waste disposal projects.
- State and local government entities, nonprofits, and federally recognized Tribes may apply.
- The area to be served must be rural, with a population of 2,500 or fewer, and must have an MHI below the poverty line or less than 80 percent of the statewide MHI.
- Applications are accepted year-round through RD Apply.[11] Halifax County received SEARCH grant funding in March 2024.

WEP Water and Waste Disposal Loans and Grants

- Through the Rural Utilities Service WEP, this program provides funding to rural communities with populations of fewer than 10,000 to obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems.
- USDA-RD has long-term, low-interest loan financing programs to assist communities with infrastructure costs. Qualifying communities have opportunities for grants combined with loans.
- For communities receiving loans, the loan term can be up to 40 years based on the expected life of the system. The interest rate is adjusted quarterly.
- Borrowers must have the legal authority to construct, operate, and maintain the proposed services or facilities.
- USDA-RD loans and grants require financial audits, as well as a commitment to revenue collection during the life of the loan.
- USDA-RD accepts applications year-round on a rolling basis through RD Apply.[11]

11 https://www.rd.usda.gov/programs-services/rd-apply

Benefits of Investing in Adequate Sanitation Infrastructure

Public and Community Heath Improvement

Exposure to sewage can have negative health impacts and spread diseases such as salmonellosis, shigellosis, cholera, giardiasis, amoebiasis, hepatitis A, viral enteritis, and other diarrheal diseases.[12] There are many different types of microbes in wastewater, which makes it challenging to determine specific causes of illness. Detecting and identifying microbes in wastewater takes time and resources.[13] However, it is well known that exposure to untreated waste negatively affects residents' health and well-being.

Investing in adequate wastewater infrastructure creates a healthier environment for the residents of the MSD. Children can play outdoors, residents do not have to worry about their families and pets encountering raw sewage, household plumbing is more functional, and sewage odors are not persistently present. Well-maintained and properly built wastewater treatment systems protect residents from viruses and bacteria. They also reduce environmental pollution, function during rain and storms, and provide a foundation for economic development.

Economic Impact of Clean Water Infrastructure Investment

In January 2022, a nonprofit organization called Native Opportunity Way Community Development Corporation contracted with NCGrowth to conduct a market analysis study entitled Hollister Market Analysis. The study area encompassed a 5-mile radius around Hollister, which also included portions of Halifax County and Warren County. The goal of the study was to better understand business challenges and opportunities. Some of the key data points included:

- The overall population decreased from 2010 to 2019 by 11 percent, and the number of houses decreased by 10 percent.
- Native American residents made up 44 percent of the population in 2019, a slight increase from 2010.
- Black residents made up 35 percent of the population. There was a significant decrease in their population from 2010 to 2019 mainly due to general economic challenges.

The study evaluated retail activity for various industry groups and surveyed responses on what types of stores are most wanted by the community. Recommendations for the most wanted stores included:

- Auto-related stores.
- Health and personal care stores.
- Food-related stores.
- Clothing stores.

The barriers identified for achieving new or expanded retail services included:

- Competition and local support from customers and existing retailers.
- Financial issues.
- **Lack of a centralized sewer.**

12 World Health Organization. (2006). *WHO guidelines for the safe use of wastewater, excreta, and greywater* (Vol. 2). https://www.who.int/publications/i/item/9241546832

13 Kaushal, S., & Singh, J. S. (2017). Wastewater impact on human health and microorganism-mediated remediation and treatment through technologies. In J. Singh & G. Seneviratne (Eds.), *Agro-environmental sustainability*. Springer. https://doi.org/10.1007/978-3-319-49727-3_12

Finally, the study identified grant and loan opportunities for business developers and recommended the community develop “unique draws” to pull customers in, such as promoting local specialty products and holding outdoor events.

In conjunction with the Hollister Market Analysis document, NCGrowth completed an Economic Development Strategy for the Haliwa-Saponi Tribal Council in June 2022. This report begins with a history of accomplishments, including obtaining state Tribal recognition and completing several economic development projects in Hollister. NCGrowth held a visioning session with the Tribal councilmembers to discuss the vision for and barriers to successful economic development. The primary barrier to success in the past was the lack of adequate wastewater infrastructure. However, the council was excited about the potential for several future development projects. A project list was developed, and the study researchers used a matrix of projects sorted into four categories: traditional retail, health and housing, local amenities, and community gathering. Each project was then ranked as low, medium, or high for enthusiasm, cost, community benefit, Tribal revenue, and complexity of implementation. The study describes responses to a community survey questionnaire, as well as the overall economic and demographic status of the area. The Tribal council prioritized grocery stores, restaurants, and health and personal care services. The report’s final recommendations included the following:

- Establish a clear vision statement for economic development.
- Review the project list and matrix and identify the highest priority projects for the next 1–5 years.
- Identify needs for increasing local capacity for management and governance.
- Work with partners like NCGrowth to develop budgets, feasibility assessments, and other documents.
- Work with residents to build interest and support.

The community is interested in the capacity of a new wastewater system to support future growth, including more commercial businesses (e.g., grocery stores) as well as new residences on parcels that previously would not support onsite septic systems (without expensive advanced treatment and dispersal systems).

Sustaining the Investment Through Operations and Maintenance

Baseline Option: Engineered Onsite/Septic System Upgrades or Repairs

Onsite upgrades to advanced pretreatment with drip dispersal or discharge (via a general permit for a single-family discharge system, administered by NCDEQ) would require the most O&M for the MSD community. Under this option, property owners would retain ownership of their household septic system and be responsible for its maintenance. A licensed operator would be required to maintain the system and provide permit reporting. The county could provide homeowner education and outreach to help the homeowners protect their new assets. This option will be required for a portion of the more remote parcels in the MSD regardless of the community option selected for the higher-density areas.

Potential options for O&M include:

- An RME could be established to oversee management of the engineered onsite systems, including regular inspections and as-needed O&M to provide economy-of-scale cost benefits to individual owners. An RME may be created for the community option (cluster system or sewer extension), as described below.
- The Halifax County Environmental Health Section of the Division of Public Health can provide additional education and outreach regarding preventative maintenance and O&M of onsite systems.
- Low-flow fixtures can improve onsite system longevity and reduce stress on its components.

Options 1 and 3: Community Cluster System

A cluster system alternative would likely require Halifax County (through the MSD) to own and operate the collection sewer and cluster treatment system. Residents would be obligated to pay monthly fees (in addition to water bills) to cover O&M, which could be provided by county staff, contracted to certified contractors, or covered by establishing a new private or public RME. Both the Haliwa-Saponi Tribe and the Town of Littleton mentioned potential interest in serving as the operator for the cluster treatment system, although these options would require additional administrative procedures and staff training/certification as neither the Tribe nor Littleton currently operates onsite wastewater treatment and dispersal systems.

Potential options for O&M include:

- The county could collect sewer fees as part of the water bill for all customers. Sewer fees would be transferred to the MSD (or other ownership entity) for collection sewer and cluster system O&M.
- For Option 1, the county could maintain ownership via the MSD. O&M services would be provided by county staff or contracted to a private operator.
- For Option 3, the county could establish a cost-effective, public ownership and management entity (e.g., RME) consistent with North Carolina law and local ordinances. This entity could be set up for both system ownership and O&M or just to perform O&M.
- Advanced technology, such as remote monitoring and reporting, in community systems or a WWTP can help reduce O&M.
- Reduced fees can also be applied to residents for completing training on STEP system preventative maintenance.

- The Town of Littleton could potentially be contracted to manage both the STEP and cluster treatment system. If so, town water/sewer staff would need to obtain the appropriate certifications to operate onsite wastewater systems.
- The Halifax County Environmental Health Section can provide additional education and outreach regarding preventative maintenance of STEP systems.

Option 2: Sewer Extension to the Town of Littleton

The Town of Littleton owns and operates a WWTP with a capacity of 280,000 gpd and a collection sewer that currently uses approximately 20 percent of its permitted capacity during dry-weather periods. Littleton is currently undertaking significant capital improvements to both its WWTP and collection system to reduce inflow and infiltration during rain events and provide additional flow equalization storage—both of which help reduce O&M issues and allow for treating out-of-town wastewater. Through preliminary discussions, town staff have indicated interest in treating wastewater from the MSD for the proposed Phase 1 design flow of 100,000 gpd. The town currently purchases bulk water from Halifax County and resells it to their customers along with sewer service fees. A bulk sewer rate would likely need to be negotiated between the MSD and the Town of Littleton to make the sewer extension option economically feasible for MSD residents.

Because the Town of Littleton does not currently own or maintain individual grinder systems within their collection network, further discussion and analysis would be needed to determine what additional fees should be charged to MSD sewer customers to cover maintenance of this asset beyond the town's baseline out-of-town sewer fees. This alternative would leverage the existing O&M resources of the town's water and sewer department without requiring new operator certifications or specialty equipment/training, while also providing justification for the town's part-time operator to transition to full-time employment.

Although specific details need to be worked out during the next phase of the PER, below is a list of potential options for O&M:

- Halifax County and the Town of Littleton could establish an interlocal agreement to handle sewer billing through the county's water meter billing because the county currently provides public water within the MSD.
- The Town of Littleton could maintain ownership of the pressure sewer collection system, lift station, and force main to the WWTP:
    - The town could charge additional fees (beyond its out-of-town sewer rates) to MSD customers to cover the additional grinder pump system maintenance. However, a fee structure could be developed to incentivize preventative maintenance of the grinder system, with a potential "three-strike" clause that would cause customers with repeat pump damage to pay for full O&M costs of the grinder system.
    - Town staff could provide O&M for the MSD grinder pumps or contract O&M to a private entity.
- The MSD could maintain ownership of the pressure sewer collection system, lift station, and force main to the WWTP:
    - The MSD could charge fixed monthly fees to its customers for grinder system O&M.
    - Halifax County could bill customers separately for their water usage and sewer service fees.
    - Grinder system O&M could be contracted to a private entity that would manage all the grinder pumps and pressure sewer maintenance within the MSD community.
- Regardless of ownership, reduced fees or rebates could also be applied to residents for completing training on grinder system preventative maintenance (e.g., awareness of what they are flushing down their drains).

Homeowner Responsibility for O&M

All these wastewater management options would require the homeowners to accept responsibility for proper O&M of their wastewater system or connections. As such, it will be critical to educate homeowners on how to maintain their systems. For sewer connections, the utility would perform O&M and charge monthly rates for this service. This solution could be the most sustainable one because the sewer system would be operated by a functioning utility with an active asset management program. For onsite replacements where the homeowner would be solely responsible for O&M, homeowners would have an opportunity to remove any current health or environmental hazards, improve how they use their property, and have a reliable property asset, which would help maintain property values. The Halifax County Environmental Health Section would be responsible for addressing any future health or environmental violations that could occur due to system misuse or lack of maintenance.

Paying for O&M and the Affordability Challenge

Across the United States, utilities use sewer bills to pay for management, O&M, and loan repayments for wastewater systems. The MSD, Halifax County, or another management entity will need to keep rates affordable for low-income customers but high enough to collect funds to operate and maintain the system. This challenge is a key obstacle for utilities across the United States. Traditionally, wastewater-only projects are considered "affordable" if the sewer bill is 2 percent of MHI or less. Given the MHI of $32,805 for the MSD census tract,[14] a wastewater fee of $54 per month would represent approximately 2 percent of MHI. Although this rate might be affordable for some households, a portion of the population has an income less than the MHI. The monthly rates would also increase if there were loan repayment costs. Because low-income residents struggle more with paying utility bills than high-income residents do, using MHI as an indicator can make it challenging to understand the community's affordability needs.

Table 4 shows the financial impact of O&M costs at various household income levels and the percentage of income that would be spent on each of the wastewater infrastructure options. All options will have a high financial impact on the lowest-income residents of the MSD. Additionally, many homes that are not currently connected to the public water system would have to connect, which would add another monthly fee for some households that cannot meet the affordability index. This water connection requirement would exist for the sewer extension option and likely be required for the cluster system option as well.

14 U.S. Census Bureau. (2021). Median household income in the past 12 months (in 2021 inflation-adjusted dollars). American Community Survey 5-Year Estimates. data.census.gov/table/ACSDT5Y2021.B19013

Table 4. Percent of Household Income Spent on Wastewater Services for MSD Options (Considering O&M Costs and Assuming 100 Percent Principal Forgiveness for Capital Costs)

Income Range	$0–$14,999	$15,000–$34,999	$35,000–$49,999	$50,000–$74,999	$0–$32,805 (MHI)
Percent of Households in Income Bracket[a]	**23.9%**	**27.9%**	**15.5%**	**16.0%**	**50.0%**
Onsite System Upgrades	9.6%	4.1%	2.9%	1.9%	4.4%
Phase 1 Community Cluster	5.8%	2.5%	1.7%	1.2%	2.6%
Sewer Extension to Littleton	6.2%	2.7%	1.9%	1.2%	2.8%
Phase 2 Community Cluster	6.1%	2.6%	1.8%	1.2%	2.8%

Households spending 2% or more of household income on sewer bills are considered "high financial impact."

a Based on 2021 American Community Survey 5-year estimates.

If a partial loan is part of the funding solution, an additional monthly cost would further challenge the affordability of all options for low-income residents, as shown in Table 5.

Table 5. Percent of Household Income Spent on Wastewater Services for MSD Options (Considering O&M and Potential USDA-RD Loan Repayment Costs)

Income Range	$0–$14,999	$15,000–$34,999	$35,000–$49,999	$50,000–$74,999	$0–$32,805 (MHI)
Percent of Households in Income Bracket	**23.9%**	**27.9%**	**15.5%**	**16.0%**	**50.0%**
Onsite System Upgrades[a]	23.0%	9.9%	6.9%	4.6%	10.5%
Phase 1 Community Cluster	8.1%	3.5%	2.4%	1.6%	3.7%
Sewer Extension to Littleton	8.9%	3.8%	2.7%	1.7%	4.0%
Phase 2 Community Cluster	7.7%	3.3%	2.3%	1.5%	3.5%

Households spending 2% or more of household income on sewer bills are considered "high financial impact."

a Based on USDA Single Family Housing Repair Loan.

Addressing the Affordability Challenge

It is possible to lower the financial burden of these investments, especially for low-income households. Some local communities and states are developing affordability programs to provide rate assistance to low-income customers. The Low Income Household Water Assistance Program, created in response to the COVID-19 pandemic, was the first program of its kind in the United States, but it is only authorized by Congress through 2024. It is unclear whether Congress or the state of North Carolina will continue this program.

The MSD, like other local governments and utilities, can build local affordability programs by charging different rates to commercial accounts, new customers, or other customer bases that incorporate funding for a local affordability program. This rate structure would create a pot of money to help other customers during times of need. Customers who have a temporary medical issue or qualify for assistance based on income guidelines can take advantage of this rate structure to pay for water and wastewater services. However, this solution might not work if the MSD does not have many commercial or industrial accounts to pay extra to fund it.

The MSD will need multiple approaches to address the financial burden of water utilities for low-income residents, beyond just the programs discussed above. For example, the MSD could consider non-rate revenue opportunities such as leasing space on water towers or offering non-traditional services. Halifax County could also provide construction services to new projects related to the utilities connections and charge for the time, although this option would require contract documents with the private sector.

Key Takeaways on Affordability

All the wastewater treatment options have a high financial impact on the lowest-income residents living in the MSD. **Rate assistance programs may be necessary for some households in the MSD.**

Loan repayments will cause any option to have a high financial impact on residents of the MSD. The MSD of Halifax County will need to work with the funding agencies to **maximize the amount of grants** for construction of their system.

Economic growth can lower monthly user costs of central treatment systems; therefore, **the community should carefully weigh multiple factors in deciding on a system.**

Partners and Roles

The path to clean water is not an easy one. The MSD has many options to choose from when it comes to new wastewater systems. Many partners in this pilot program will continue to support the MSD along this journey (Figure 5), including:

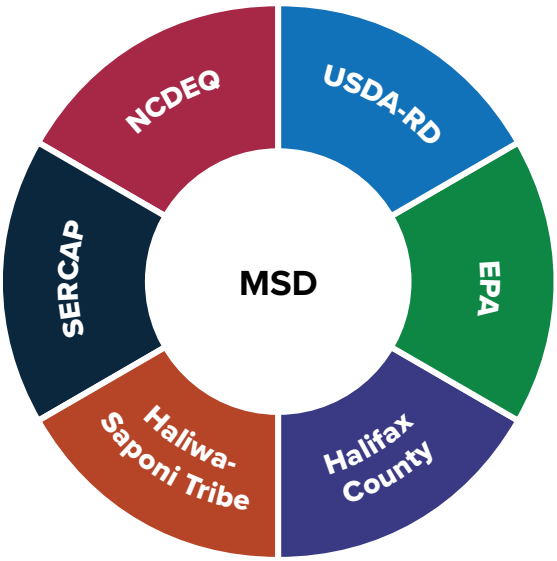

Figure 5. Partners to the MSD.

- **U.S. Department of Agriculture Rural Development (USDA-RD).** Lead agency (with EPA) providing jointly leveraged technical assistance resources in this pilot program. Funding partner.
- **U.S. Environmental Protection Agency (EPA) Headquarters and Region 4.** Lead agency (with USDA) providing jointly leveraged technical assistance resources in this pilot program.
- **Halifax County.** Applicant for USDA SEARCH grant funding and entity providing support for wastewater service options. Its Board of Commissioners oversees the MSD.
- **Haliwa-Saponi Tribe.** State-recognized Tribe providing community engagement support.
- **Southeast Rural Community Assistance Project, Inc. (SERCAP).** Program providing technical assistance and community engagement support. Assisted with USDA SEARCH grant funding application.
- **North Carolina Department of Environmental Quality (NCDEQ) Division of Water Infrastructure.** State agency overseeing funding programs such as CWSRF, CDBG, and Merger/Regionalization Feasibility grants.

Technical Assistance and Support for Meadows Sewer District Moving Forward

Both EPA and USDA-RD fund technical assistance programs that support small, rural, and disadvantaged communities and help them navigate the CWSRF, Drinking Water State Revolving Fund (or DWSRF), and USDA-RD funding programs. The ultimate goals of the technical assistance (e.g., WaterTA) programs are to help communities identify water challenges and solutions, build capacity to address those needs, and develop application materials to access water infrastructure funding. Technical assistance providers can help Halifax County and the MSD understand the funding available through the SRF and USDA-RD programs, as well as deadlines and application requirements. **EPA WaterTA and USDA-RD technical assistance can also help prepare and submit funding applications.** The North Carolina Rural Water Association, SERCAP, and the North Carolina Environmental Finance Center can assist with community outreach, education, training of professionals, and utility rate studies. These providers can offer advice as the community considers infrastructure options, financing, and rate structures. Their connections with EPA, USDA-RD, and NCDEQ can help the community successfully complete projects and programs. Other technical assistance support for the MSD can include:

- **Developing a wastewater rate program to build a local "affordability assistance" and asset management program.** Halifax County or the MSD could establish a rate program where new, commercial, or industrial customers contribute to an affordability assistance program for low-income residents. EPA's network of Environmental Finance Centers partners with technical assistance providers that specialize in these types of rate programs.
- **Supporting workforce development and staff training.** The MSD will need operations staff for a new system. The technical assistance providers have staff training programs available.

- **Engaging residents in the needs and benefits of a wastewater treatment system.** Customers play a large part in the success of a wastewater treatment system. Technical assistance providers can help engage and educate residents on topics such as "What Not to Flush," "Management of Fats, Oils, and Greases," why having a wastewater system is important, and how to maintain a septic system. Educational materials are available for residents.

More information can be found at EPA's WaterTA website.[15]

Road Map for Implementation

Halifax County has committed to continuing with planning and preliminary design of a wastewater solution for the MSD community. This detailed planning, in addition to community engagement, is required to achieve a successful outcome. Advancing a large wastewater infrastructure project to full implementation (as well as sustained O&M) takes time and commitment from all parties and is typically best achieved by evaluating all feasible options using a triple-bottom-line framework (i.e., considering social, environmental, and economic outcomes). Formal community engagement (e.g., public listening sessions) should be conducted after this document is finalized to solicit input from MSD residents on the various wastewater management alternatives evaluated. Further details on proposed next steps for project implementation are described below.

Immediate Next Steps Ongoing Through 2024

Halifax County received a SEARCH grant from USDA-RD to fund a formal PER and the supporting environmental documentation. This step is necessary for soliciting funding for design, permitting, and construction from the CWSRF and USDA's other programs. Extending beyond the scope of this document, the PER will likely include the following tasks as part of the scope of work:

- Individual parcel evaluations to determine the condition of existing septic systems, as well as verification of occupied status.
- Refinement of design flow for preliminary solutions design and cost estimation.
- Advanced soil mapping and hydraulic capacity testing at the Phase 1 cluster treatment site.
- Parcel screening and identification for other potential cluster treatment areas, followed by preliminary soils investigation to assess suitability for onsite wastewater disposal.
- Refinement of Phase 1 sewer service area for the sewer extension alternative.
- Evaluation of a sewer extension to the Town of Enfield, in addition to the Town of Littleton.
- Refinement of all cost estimates for selected alternatives.
- Further engagement (e.g., holding community meetings, creating a community advisory committee) with the Hollister community to select a preferred system option. Topics to consider include:
    - The future: how can this investment shape the next 20 years for the community?
    - Monthly bills:
        - Do the potential grants and low-interest loans make monthly bills affordable enough for the community?
        - If not, are there programs like the Low Income Household Water Assistance Program that could make them affordable?

15 https://www.epa.gov/waterta

Ideally, the PER will yield a proposed solution that has been vetted and supported by the MSD community and the involved stakeholders, and that is affordable to MSD residents with or without 100 percent grant funding. Once this solution is selected, the next step will be selecting one or more funding sources to move the project to detailed engineering design, permitting, and construction. These funding sources and their eligibility and application requirements are detailed above in the "Financing Options" section.

Activities After Alternatives Selection

Figure 6 provides a general flow of major project milestones for each of the alternatives evaluated. Note that the sequential order is typical and subject to change based on the funding source used.

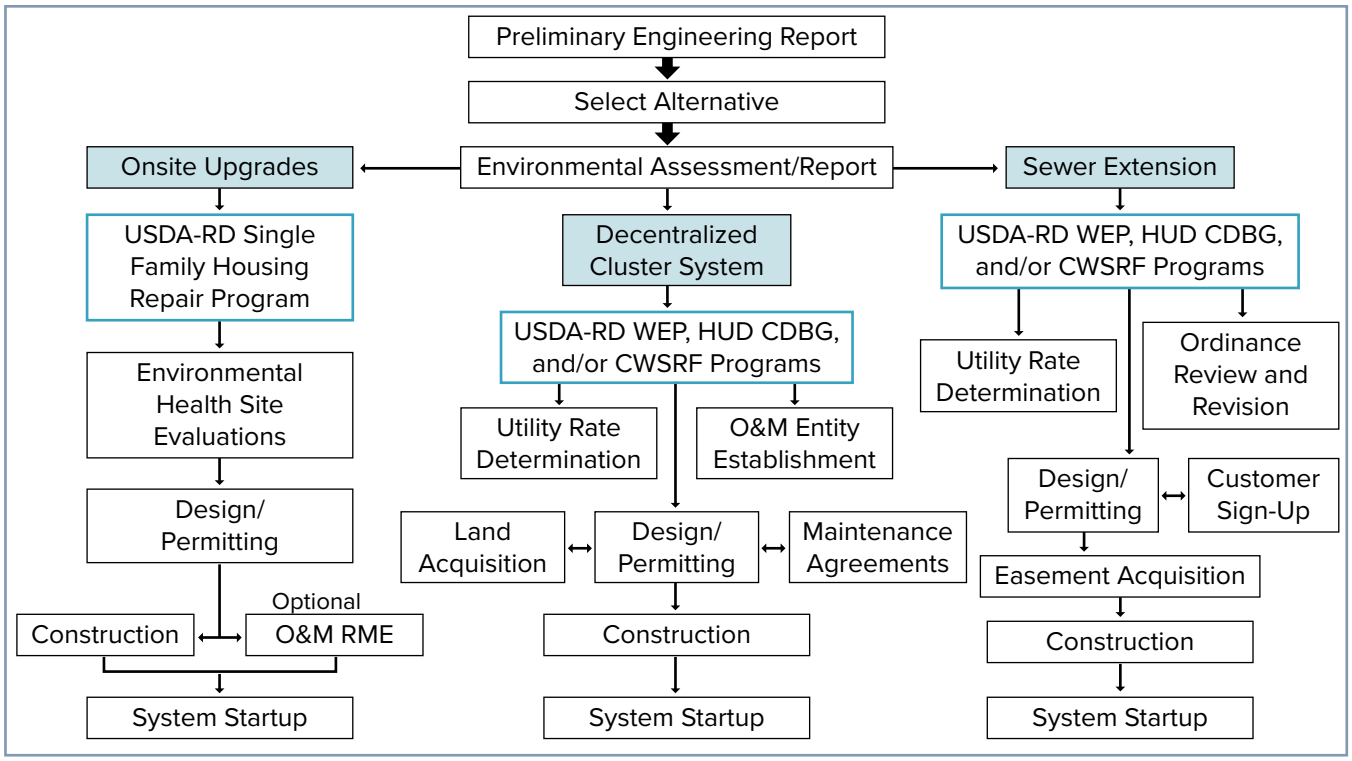

Figure 6. Major project milestones for each option.

Potential Project Timeline

The schedule in Figure 7 is estimated and subject to change once a specific alternative is selected and the overall project progresses.

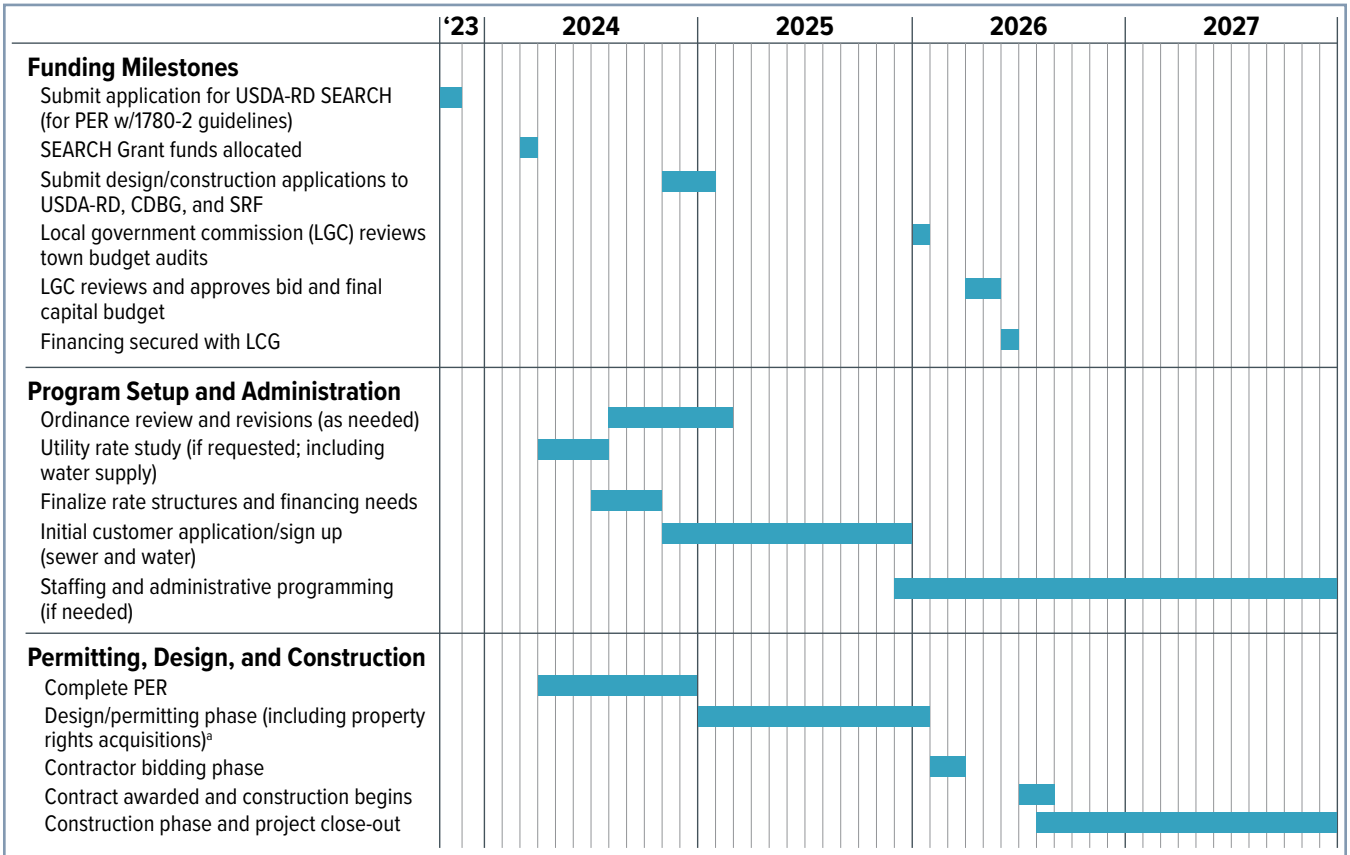

Figure 7. Potential timeline for project completion.

Concluding Thoughts

As Halifax County and the MSD move forward with an in-depth analysis of their options for wastewater service, EPA, USDA-RD, and NCDEQ staff and technical assistance providers are ready to support the community with funding opportunities through the Bipartisan Infrastructure Law and other funding sources. This is a historic time for water and wastewater infrastructure funding for small, rural communities such as the MSD. New funding can help the MSD community address their current and persistent health challenges and build a prosperous future.

Definitions

Central wastewater treatment facility. A wastewater treatment system that is larger than 15,000 gallons per day and permitted through Halifax County or the North Carolina Department of Environmental Quality. It usually has a surface water discharge permit to discharge treated water into a surface water source. Certified operating staff and monitoring are required for these systems.

Community or cluster treatment system. A small wastewater treatment system of less than 15,000 gallons per day with a dispersal field for subsurface or surface discharge. These systems are permitted either through the Halifax County Health Department (subsurface) or the North Carolina Department of Environmental Quality (surface).

Grinder pump. A type of sewage pump designed to handle solids without pretreating the raw wastewater. Grinder pumps contain cutter blades that pulverize wastewater solids into a slurry that can easily be pumped through smaller-diameter discharge pipes (e.g., 2 inches or less). Grinder pumps typically cost more to purchase and operate than effluent pumps but do not require a septic tank.

Onsite/septic system. A traditional system includes a settling (i.e., septic) tank and dispersal field. Advanced or engineered systems can include media filtration systems, aeration systems, disinfection (chlorination or UV), and pressure dispersal for the dispersal field.

Pressure sewer system. A system that uses effluent or grinder/sewage lift pumps to convey wastewater to a treatment system and/or disposal system and different from gravity sewer systems, which use larger pipes. Effluent pumps typically follow septic tank treatment, while grinder pumps can handle raw wastewater before discharging to pressurized, small-diameter pipes.

Responsible Management Entity (RME). A legal entity responsible for providing various management services, with the requisite managerial, financial, and technical capacity to ensure the long-term, cost-effective management of decentralized onsite and/or cluster wastewater treatment facilities in accordance with applicable regulations and performance requirements.

Septic tank effluent pump (STEP) sewer system. A sewer system with a septic tank and pump at the customer's building. Effluent from the septic tank is pumped through a pressure sewer system to a treatment facility. Septic tanks need to be pumped out periodically. This system is the responsibility of the homeowner, utility, or common Responsible Management Entity depending on ownership and the operations and maintenance model.

Limitations

Any systems and associated cost estimates discussed in this draft analysis are preliminary and not intended to serve in lieu of a Preliminary Engineering Report prepared by a professional engineer licensed in the relevant jurisdiction.

Alternatives have been developed at a high level with desktop tools and have not been informed with survey data or field reconnaissance work. Further field evaluation is needed to verify these alternatives in subsequent work following this assessment and solutions plan.

Treatment and dispersal systems designed by licensed design professionals are based on soil evaluations, flood elevation evaluations and variances, permitted discharge limit determinations, and unforeseen factors that cannot be determined without onsite field surveys and evaluations beyond the scope of this draft assessment.