Water and Wastewater Capacity Evaluation for Huntington's Villages

FINAL REPORT

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Prepared for:
Town of Huntington, Water and Wastewater Working Group
4930 Main Road
Huntington, VT 05462
Tel. / 802.434.4779
Fax / 802.329.2013
E-Mail / huntingtonwwwgroup@gmail.com

Prepared by:
Stone Environmental, Inc.
535 Stone Cutters Way
Montpelier, VT 05602
Tel. / 802.229.4541
Fax / 802.229 5417
E-Mail / amacrellis@stone-env.com

STONE ENVIRONMENTAL INC

EXECUTIVE SUMMARY

With support from the Huntington Selectboard, the Water and Wastewater Working Group was formed in January 2011. The Town secured a planning advance from VT Department of Environmental Conservation (VT DEC) to conduct a water and wastewater capacity assessment for Huntington's three villages—including all of the land within the Lower Village, Huntington Center, and Hanksville village zoning districts, as well as a 50-foot buffer zone outside each district.

The objectives of the study were to:

- Identify current water and wastewater issues and needs of residential, public, and commercial structures in the three village districts;
- On a village district level, identify current water and wastewater capacity; and
- Assess options for expanding water and wastewater capacity for each village district, along with the scale/quantity of additional capacity (build out scenarios) and associated costs.

Huntington has two significant natural resources: a high-yielding gravel groundwater aquifer beneath portions of the Lower Village and Huntington Center that is generally protected from sources of contamination by a thick layer of silt, and a series of sandy, gravelly deposits near the modern ground surface that are often suitable for in-ground wastewater treatment systems.

Properties in the villages currently are served primarily by individual, on-site water supplies and wastewater treatment systems. There are a few shared water and wastewater systems, like the drilled gravel well that serves the Huntington Fire District No. 1 (Roberts Park Road and Huntington Woods area), and the in-ground leachfields that serve houses on Agnes Drive in the Lower Village and Sunrise Drive in Huntington Center.

The primary water supply issues identified in this study were low-yielding bedrock wells (especially in the Lower Village), along with scattered reports of water quality issues that included aesthetic (color, taste, smell) or bacteria (coliform) contamination concerns, affecting about 20% of the wells in all three villages. The primary wastewater capacity issue identified in this study was space-related limitations for the replacement of existing wastewater treatment (septic) systems—especially on the small parcels near the Main Road-Bridge Street intersection in the Lower Village and the Main Road-Camels Hump Road intersection in Huntington Center. Property owners in these space-limited areas would need access to additional wastewater capacity, and sometimes to additional water capacity, to change the uses or their properties or expand current uses. Owners who need to replace their current systems, but lack sufficient space to do so, will likely be limited to the current use of their property. Lack of wastewater capacity due primarily to small lot sizes and wastewater system/water supply buffer conflicts is the over-riding infrastructure issue from a future planning perspective, especially for small parcels in the Lower Village

and Huntington Center. It affects a larger proportion of properties than any of the other issues identified (40-45% of properties in these two villages), and is a more challenging and costly issue to address.

The study confirmed that a range of community water supply and wastewater treatment options can be constructed in the village districts to address existing issues and needs, and to support future development. Both water and wastewater options can rely on conventional technologies, such as gravity-based community water distribution and in-ground (though large-scale) community leachfields, for wastewater treatment. These systems generally have minimal visual impacts (no large structures or water towers) and maintain open space. In all cases, the most passive, lowest-impact technologies feasible were used in developing the water and wastewater options. Alternative treatment systems were considered, but given the feasibility and availability of lower cost conventional options, scenarios using alternative systems were not developed. Three build-out scenarios were developed to illustrate how differing water and wastewater management options may impact land use and development densities in the villages—a soils-up, rather than zoning-down, approach. Each of the build-out scenarios were assumed to occur over roughly the next fifty years:

- ***Do Nothing***: Continue one-acre minimum lot size in the village zoning districts; rely primarily on individual property owners to pay for and take care of water and wastewater systems; maintain existing water and wastewater infrastructure as it is, with the potential for future development limited to the estimated water and wastewater capacity available on each individual property.
- ***Solve Existing Village Problems Only***: Continue one-acre village zoning; provide Town-owned water and/or wastewater capacity to support current property uses in areas where water or wastewater issues are currently identified but with no allowance for additional capacity to accommodate future growth in these areas.
- ***Provide for Village Centered Vitality***: Implement smaller minimum lot size requirements, or perhaps even remove minimum lot size restrictions, in portions of what are now the village districts; provide Town-owned community water and/or wastewater infrastructure to support a denser development pattern in village core areas, to the extent this is possible given the carrying capacity of nearby soils and streams.

Each scenario results in different impacts on the number of new residences which may be built and where development in the village districts occurs. If the Town continues with current zoning and relies on individuals to take care of their water and wastewater systems ("Do Nothing" scenario), the total number of residences in all three villages could increase from 356 to 666, and commercial/municipal units could increase slightly (from 12 to 15). Nearly all future development would occur on the larger lots located near the edges of the villages, rather than in or near the core areas of the Lower Village and Huntington Center. The estimated cost for individuals to construct or replace water supplies over a 50-year period is $5,288,000, and for wastewater systems it is $9,179,000.

If the Town continues with current zoning but addresses some existing areas of need ("Solve Problems" scenario), the total number of new residences in all three villages could increase from 356 to 625 and commercial/municipal units could increase slightly (from 12 to 16). This scenario provides environmental benefits by addressing the needs of certain areas, such as Huntington Acres and Roberts Park, but nearly all future development would still occur on larger lots near the edges of the villages. The estimated cost range to construct the community water supply systems which would last for a 50-year period is $2,855,000 to $4,907,000, and for wastewater systems it is $6,232,000 to $9,058,000.

If the Town changes or removes lot size requirements in portions of what are now the village districts and provides community water and/or wastewater infrastructure ("Village Vitality" scenario) it can support a denser development pattern in village districts. Under this scenario the total number of new residences in all three villages could increase from 356 to 687 and commercial/municipal units could increase from 12 to 22. The additional commercial capacity, in particular, could be used to serve future uses like restaurants, which would otherwise be very challenging to build or attract. The estimated range of costs to construct water supply systems which would last for a 50-year period is $7,190,000 to $8,164,000, and for wastewater systems it is $6,913,000 - $10,461,000, depending on the systems selected.

The options the Town chooses will impact how the villages develop. Continuing with current zoning ("Do Nothing") or implementing options only to address water quality or wastewater issues ("Fix Problems") result in the vast majority of new residential development on larger lots near the fringes of the village zoning district. They do not provide capacity for future growth or development in the historic core centers of the Lower Village or Huntington Center. If more compact development in these centers is desired, adjustments to zoning and water/wastewater infrastructure will be needed to allow this.

While project costs and ongoing expenses are significant considerations in making decisions about any municipal infrastructure project, they are not the only criteria which should be considered. Often, qualitative considerations (such as quality-of-life for residents, ease of project implementation, ease of maintenance, whether the project implements or impedes local planning goals, etc.) can have a significant impact on the decision making process. The report includes a matrix which ranks the relative advantages and disadvantages of different options for the Lower Village and Huntington Center.

There are several common sources of grant and loan funding for municipal water supply and wastewater projects. The Water and Wastewater Working Group has already begun involving the Vermont Department of Environmental Conservation (DEC), Facilities Engineering Division in this project--Mr. Don Robisky of the Wastewater Management Division is currently working with the Town's consultant and is providing coordination with DEC's Facilities Engineering staff. The DEC and USDA Rural Development (RD) have programs that can provide grants or loans for eligible municipal water or wastewater projects, providing the various funding program requirements are satisfied. The Town of Huntington has received a "planning advance" loan to fund the current project. The planning advance does not have to be repaid to the State if the project is not constructed. If a project is constructed, the amount of repayment will be prorated based on the number of projects and areas served.

This study has shown that a range of community water supply and wastewater treatment options can be constructed, under current zoning bylaws and water and wastewater system regulations, which sustain the current development trends of Huntington's villages but allow little expansion or change within the historic "core" areas of the Lower Village and Huntington Center. Sufficient community water supply and wastewater treatment capacity exists near the Lower Village and Huntington Center that an alternate future path, in which zoning bylaws are modified to encourage smaller lot sizes and foster a development pattern of compact villages surrounded by open land while also providing infrastructure that conforms with modern regulations, is not only possible but feasible and achievable.

This report contains information that can now be considered by the Selectboard and town staff, residents, and business owners in Huntington for implementation. While the consultant can recommend one scenario or set of alternatives over another, the real decisions lie with the community.

Highlights and Project Results by Village

Lower Village

Huntington's Lower Village is the largest of the three village centers, and is primarily residential with 244 single-family homes, and a few multi-family homes or apartments. The Lower Village also contains several commercial properties, including Beaudry's, the Fuller House offices and post office, Jacques' former general store, the Huntington Public Library, and the Huntington Garage.

Water Supply

Properties in the Lower Village are mostly served by onsite and small shared water supplies. About 65% (149) of the properties for which information is available are served by individual or private, shared drilled wells. A much smaller number of properties use shallow wells or springs (14 properties). In addition, the Roberts Park Road and Huntington Woods neighborhoods are served by the Huntington Fire District No. 1 public community water system. A total of 47 properties are connected to the Huntington Fire District No. 1 water system, which is served by a gravel well located along Roberts Park Road. No information about the type of water supply serving the property was available for the remaining 42 developed property locations.

Water supply issues in the Lower Village include low-yielding bedrock wells and problem with water quality. There were a few reports of periodic or annual water quantity issues associated with gravel wells, mostly within the Huntington Fire District No. 1 service area. Two areas of low-yielding bedrock wells were identified that generally corresponded with current or past reports of water quantity problems.

With respect to water quality, less than 20% of properties reported issues related to existing water supply systems. The majority of these reports were reports of aesthetic issues (color, taste, or smell; particularly hardness, iron/manganese staining, or sulfur odors), and were reported predominantly for drilled gravel

and bedrock wells. There were three geographic clusters of aesthetic issue reports in the Lower Village, while sporadic coliform contamination issues were reported to be scattered throughout the village.

Wastewater

All properties in the Lower Village are served by onsite or small shared wastewater treatment systems. Nearly half of these properties are known to have conventional, in-ground, septic-tank-leachfield systems. A few systems also have drywells. There are a limited number of raised systems or advanced treatment/best-fix situations, but the best-fixes are due to small lot size rather than unsuitable soil conditions. There is one community leachfield for seven properties, and there are a few smaller leachfields shared between two or three properties. No information is available for about 40% of the properties in the Lower Village regarding current wastewater infrastructure.

The main wastewater issue in the Lower Village is limitations on replacing existing septic systems, with the most prevalent reasons being small lot sizes and conflicts between water supplies and leachfield locations. About 40% of the properties in the Lower Village were characterized as having potential limitations if the existing onsite wastewater treatment were to need replacement in the future, mostly clustered near Huntington Acres, around the Main Road-Bridge Street intersection, along Bridge Street to the east of the Huntington River, and along Roberts Park Road near the river.

Residents' Future Plans

Twenty property owners in the Lower Village indicated that they either had future plans and adequate capacity to implement them, or had ideas or plans that would need additional capacity for successful implementation. Half of these instances, where future plans could be implemented without additional capacity are located near the edges of the Lower Village, while the other half, where additional capacity is needed in the future, are clustered closer to the core of the village near the Main Road-Bridge Street intersection.

Future Scenarios

All three build-out scenarios ("Do Nothing", "Fix Existing Village Problems Only", and "Provide for Village Centered Vitality") were applied for the Lower Village. The potential future development pattern in the Lower Village under the "Do Nothing" build-out scenario would result in up to 146 new single-family homes being constructed on the roughly 36 parcels available for development in the Lower Village –resulting in an increase of the overall number of residential units from 244 to 395. The estimated cost for new and replaced water and wastewater systems would be $8,641,000. Under this scenario, nearly all future subdivisions and new construction occur outside the historic "core" at the intersection of Main and Bridge Streets, and the end result may look more like village-scale sprawl than like an extension of the village core's historic development pattern. No lots in the "core" area can be subdivided given a minimum lot size of one acre for new subdivisions in the Village zoning district.

The "Fix Existing Village Problems Only" build-out scenario in the Lower Village results in a slightly smaller but still significant increase in overall number of residential units in the village from 244 to 373—still a substantial increase in total residential units—but does not significantly affect where future development would be located. Shared wastewater treatment capacity is provided for three main areas of demonstrated need at their current wastewater design flows:

- The Huntington Acres vicinity
- The village 'core' area (Main Street near Bridge and East Streets, including Bridge Street on both sides of the Huntington River)
- The Huntington River bank along Roberts Park Road and East Street

In this scenario, the locations of shared water supply systems depend primarily on which community wastewater system option or options are chosen. Up to 122 new single family homes could likely be developed on roughly 30 current parcels under this scenario, increasing the number of single family residences from 244 to 373, with a range of estimated construction costs from $10,984,000 to $14,509,000. Properties within the areas served by community water and/or wastewater systems would gain some flexibility to change uses, and possibly to expand a little—but since the one-acre minimum lot size would still be in force, all new subdivisions would occur and nearly all new residences would be built outside the "core" area of the Lower Village.

The "Provide for Village Centered Vitality" scenario is intended to illustrate infrastructure requirements for the Lower Village and Huntington Center consistent with historic land uses—while also meeting current regulations. In the Lower Village, after consultation with Working Group members, it was decided to first develop wastewater alternatives could that support a doubling of wastewater treatment capacity in historic "core" areas—and to strategically support capacity-limited areas outside those "core" areas if feasible. The second priority was to develop water supply alternatives that would enable densely spaced development and maximum flexibility to change property uses in the historic "core" area, and to support limited growth in adjacent areas by providing community water supply – but not community wastewater collection and dispersal. Finally, the carrying capacity scenario includes community water supply for the Huntington Fire District No. 1 service area at its current water use. Up to 201 new single family homes could likely be developed under this scenario, increasing the number of single family residences from 244 to 445, with a range of estimated construction costs from $14,335,000 to $18,866,000.

In the Lower Village, the most significant differences between the alternatives include:

- The "Do Nothing" scenario allows for development in areas along the borders of the village district but not in the center of the Lower Village.
- While all of the "Fix Problems" alternatives address existing capacity issues, they do not provide significant capacity for future growth or development. Thus, the vast majority of

new residential development will occur on larger lots near the fringes of the village zoning district.

- The "Village Vitality" scenario permits new development in the village core, and existing properties in the core will have maximum flexibility to subdivide or change uses.
- If community water systems are preferred for both the Lower Village and Huntington Center, it is likely more cost effective from the perspective of both construction and operational costs, to serve both villages from a single source, control building, and reservoir—especially if the location approximately halfway between the two villages proves to have sufficient water supply capacity.

Huntington Center

Huntington Center is primarily residential, with 62 single-family or multi-family residences. The Center hosts most of the town's municipal facilities, including the Town Office, Fire Department, Town Garage the old Fire Station, Town Hall, and the Brewster Pierce Memorial School. The Community Church of Huntington is also located in Huntington Center. A significant planning effort is underway surrounding the Town Hall.

Water Supply

Most properties are served by drilled wells (55 properties), including the public Non-Transient Non-Community well serving the Brewster Pierce Memorial School. Only five locations in Huntington Center use shallow wells or springs, and no information about water supply type was available for the remaining seven developed locations. All well yields reported for known, drilled gravel wells were above 10 gallons per minute; a few drilled wells that terminated in bedrock in Huntington Center, located north of Shaker Hill Road and near the Main Road- Trapp Road intersection, had well yields of 2.5 gallons per minute or less. A limited number of properties had indications of current or past issues with adequate water quantity for supplying existing property uses, but there were no reports of periodic or annual water quantity issues from the property owner survey.

Water supply issues in Huntington Center include low-yielding bedrock wells and problem with water quality. Less than 20% of properties in Huntington Center reported water quantity or quality issues related to existing water supply systems.

Wastewater

All properties in Huntington Center are served by onsite or small shared wastewater treatment systems. About a third of these properties are known to have conventional, in-ground, septic-tank-leachfield systems. Again, a few systems also have drywells. There is one community leachfield for 10 properties, and there are a few smaller leachfields shared between two or three buildings or properties. No

information regarding current wastewater infrastructure is available for about 44% of the properties in this village.

The main wastewater issue in Huntington Center is limitations for replacing existing septic systems, with the most prevalent reasons being small lot sizes and conflicts between water supplies and leachfield locations. About 30% of the properties in Huntington Center were characterized as having potential limitations if the existing onsite wastewater treatment were to need replacement in the future. Most of the properties with potential limitations are located along Main Road, with small clusters near the Camel's Hump Road and Trapp Road intersections. The remaining properties either appear to have some capacity to expand or change the current property use, or are undeveloped.

Residents' Future Plans

Three instances where property owners' existing plans could be implemented without additional capacity were located near the edges of the village on larger lots, while four instances where additional capacity may be needed in the future are clustered near the Main Road- Camel's Hump Road intersection.

Future Scenarios

All three build-out scenarios ("Do Nothing", "Fix Existing Village Problems Only", and "Provide for Village Centered Vitality") were applied for Huntington Center. In Huntington Center, the potential future development pattern under the "Do Nothing" scenario is similar to that observed for the Lower Village. In this case, the "Do Nothing" scenario would result in as many as 109 new single-family homes being developed from what are now about 18 parcels of undeveloped land, increasing single family residences from 62 to 171. The estimated cost for new and replaced systems would be $3,657,000. Again, much of the future development would occur on the fringes of the historic "core" area—but in this case, the number of residential units could nearly triple as compared to current conditions, based on the land area available for development in Huntington Center. A few lots immediately adjacent to the "core" area would be able to subdivide under the current one-acre Village zoning, but the overall pattern of development at build-out would still be more like village-scale sprawl than an extension of the Center's existing development pattern.

The "Fix Existing Village Problems Only" scenario in Huntington Center results in a smaller but still significant increase in the total number of residential units. The locations of shared wastewater options are targeted to properties on Main Road from the Brush Brook Bridge to Trapp Road, where a demonstrated need for wastewater treatment capacity was observed. Two wastewater alternatives were developed. Up to 96 new single family homes could likely be developed on roughly 16 parcels under this scenario, increasing the number of single family residences from 62 to 158, with a range of estimated construction costs from $4,668,000 to $4,777,000. Properties within the areas served by community wastewater systems would gain some flexibility to change uses, and possibly to expand—but the one-acre minimum lot size would force most new subdivisions to be built outside the "core" area of Huntington Center. More

than doubling of the number of new residential units currently located in the village district could occur under this scenario.

The "Provide for Village Centered Vitality" scenario is intended to support doubling of existing capacity in the historic "core" area. Since the "core" area includes all of the parcels identified as having limited capacity for replacement of existing systems, the service area is simply an extension of the area identified in the Fix Problems alternatives. The wastewater flow projections indicate continued development in outlying areas. Up to 84 new single family homes could likely be developed under this scenario, increasing the number of single family residences from 62 to 146, with a range of estimated construction costs from $6,559,000 to $11,765,000.

In Huntington Center, the most significant differences between the alternatives, and those that could most influence community decision making, include:

- The "Do Nothing" scenario allows for development in areas along the borders of the village district but not in the historic core area.
- The "Fix Problems" scenario alternatives address existing capacity issues, but do not provide significant capacity for future growth or development. Thus, the vast majority of new residential development will still occur on larger lots near the fringes of the village zoning district in Huntington Center.
- The "Village Vitality" scenario alternatives permit new development focused in the village core, and existing properties will have maximum flexibility to subdivide or change uses.
- Again, as in the Lower Village, it is likely more cost effective to serve both villages from a single source water system, control building, and reservoir.

Hanksville

Hanksville, the southern-most of Huntington's villages, is residential (46 homes and one home with a commercial greenhouse). A general store historically operated near the Main Road – Beane Road intersection.

Water Supply

The properties in Hanksville are served by individual drilled wells (26 properties) or individual shallow wells/springs (11 properties). Water supply type information was not available for the remaining 10 developed properties in the village.

Water supply issues in Hanksville include isolated problems with low-yielding bedrock wells, and isolated water quality problems primarily associated with shallow wells and springs. Small areas of low-yielding drilled wells terminating in bedrock are located near the Main Road-Carse Road intersection.

Wastewater

Hanksville is served mostly by in-ground septic tank and leachfield systems, with a very small proportion of advanced treatment systems. There are no known shared leachfields, and no information was available for about 40% of the properties in the village.

The main wastewater issue in Hanksville is limitations on replacing existing septic systems, should they malfunction in the future. Although the primary limitation is small lot size and conflict between water supplies and leachfields, there are also a few isolated areas where the soils on a property may require a performance-based or "best-fix" solution due to shallow seasonal groundwater or bedrock. Of the three village areas, Hanksville has the highest proportion of properties (23 properties, or 44%) that may face limitations with replacement of their existing wastewater treatment systems if needed in the future.

Residents' Future Plans

No property owners in Hanksville indicated that they had future plans, regardless of whether they had capacity on-site to implement those plans.

Future Scenarios

Unlike the other two villages, the projected development pattern for Hanksville under the "Do Nothing" scenario—of residences scattered throughout the village—is remarkably similar to the development pattern that already exists. The "Do Nothing" build-out scenario would result in up to 55 new single-family homes being developed on what are now about 11 parcels of undeveloped land, increasing single family residences from 46 to 101. The estimated cost for new and replaced systems would be $2,180,000. This would represent approximately a doubling of the village's current number of residential units.

The "Fix Existing Village Problems Only" scenario in Hanksville results in a smaller but still significant increase in overall development density—still a near-doubling of the existing residential units in the village. The locations of shared wastewater options are targeted to properties on Main Road, where a demonstrated need for wastewater treatment capacity was observed. A wastewater treatment alternative was developed for a series of capacity-limited properties along Main Road in Hanksville. The community wastewater dispersal site did not have any mapped water supplies or other restrictions located down-gradient. The majority of future development, up to 50 new single-family homes being developed on what are now 10 parcels of undeveloped land, would remain scattered across the district, increasing the number of single family residences from 46 to 96, with estimated construction costs of $3,530,000.

An infrastructure alternative past the "Do Nothing" scenario is not recommended for Hanksville. The major factors in this recommendation include the distributed nature of existing development in the village, the limited number and capacity of potentially suitable shared wastewater dispersal sites, the high construction cost of any improvements relative to the small number of properties that would share the

costs and benefits, and the lack of stated interest from property owners in making changes to their properties that would require additional wastewater treatment capacity.

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1. INTRODUCTION

The Water and Wastewater Working Group of the Town of Huntington, Vermont received a planning advance from the Vermont Department of Environmental Conservation (VT DEC) to conduct a water and wastewater capacity assessment for Huntington's three villages, located along Main Road (Figure 1). The areas studied include all of the land within the Lower Village, Huntington Center, and Hanksville village zoning districts, as well as a 50-foot buffer zone outside each district.

The objectives of the study are to:

- Identify current water and wastewater issues and needs of residential, public and commercial structures in the three village districts;
- On a village district level, identify current water and wastewater capacity in the three village districts; and
- Assess options for expanding water and wastewater capacity for each village district, along with the associated cost and scale/quantity of additional capacity (build out scenarios).

Stone Environmental Inc. (Stone) and Green Mountain Engineering (GME) were hired to conduct the study. This final report provides information on each of the objectives listed above.

2. EDUCATION AND OUTREACH

Education and outreach efforts were a key component of this project, and were particularly important in the early phases of our effort. Owners with onsite water supply and wastewater disposal systems are sometimes not aware of what type of system they might have, and what is needed to properly use and maintain their infrastructure. Beyond that, they may not know that since older properties were developed, scientists, engineers, and regulators have learned more about how wastewater systems, in particular, function—and about how, if installed in the wrong conditions or under the wrong design specifications, they can negatively affect both public health and groundwater and surface water quality. Finally, maintaining open lines of communication between the project team and local landowners is of key importance for the success of both the current study, as well as for the success of any recommendations for future work stemming from this initial planning effort.

The Town of Huntington's Water and Wastewater Working Group acted as an advisory committee for this project. The members of the Working Group are listed in Appendix A. The committee met several times leading up to the initiation of this project, and members were active participants in the project start-up meeting held on August 3, 2011. The Working Group continued to meet during the project to take part in more detailed discussions on the study scope, progress, and results.

A handout describing this study and some basic information was developed for use throughout the project; copies were distributed at the 30th Annual Huntington Chicken BBQ (held at the Brewster Pierce School in Huntington Center) and the Town Hall open house on September 18, and remain available at the Town Office (Appendix B). Working Group members and the project consultants are both active in writing news releases for the Times Ink! of Richmond and Huntington. Working Group members actively provided updates about the project via the electronic Front Porch Forum established for Huntington.

A property owner survey questionnaire was developed and distributed to property owners in the Huntington Lower Village, Huntington Center, and Hanksville village areas. The survey asked for basic information about property use, existing water and wastewater systems, and about the property owners' plans (or desires) for the future.

The results of the surveys are summarized in Table 1. The overall response rate for the surveys was 37%, or 148 out of 398 surveys attempted or mailed. Details of the survey responses are described further in Sections 4 and 5 of this report.

3. STUDY AREA DESCRIPTION

The areas described and studied during this project include all of the land within the Huntington Lower Village, Huntington Center, and Hanksville village zoning districts, as well as a 50-foot buffer zone outside each district. All three village areas are located along Main Road in the Town of Huntington, in Chittenden County in the northwest portion of the state. Figure 1 shows the Town and the study areas in their wider geographical context. Table 2 includes a list of properties within each study area including parcel ID numbers, street address (E911) locations, property uses, and category of water supply and wastewater system if known.

3.1. Community Profile

Huntington is a rural residential and agricultural community located in northwestern Vermont. The Town is bordered by Richmond and Bolton to the north, Duxbury and Fayston to the east, Buels Gore to the south, and Hinesburg and Starksboro to the west.

Huntington's Lower Village is the largest of the three village centers, and is primarily residential with 244 single-family homes and five multi-family homes or apartments. The Lower Village also contains several commercial properties, including Beaudry's, the Fuller House offices and post office, Jacques' former general store, and the Huntington Garage, which are mostly located near the Main Road-Bridge Street intersection in the center of the Huntington Lower Village zoning district. The Huntington Public Library is located in the historic Union Meeting House in the Lower Village. There are also two parcels with cemeteries, four parcels with sheds or small garages with no water or wastewater service, and 16 undeveloped parcels.

Huntington Center is also primarily residential, with 59 single-family homes and three multi-family homes. The Center also hosts most of the town's municipal facilities, including the Town Office, Fire Department, Town Garage the old Fire Station, Town Hall, and the Brewster Pierce School. The Community Church of Huntington is also located in Huntington Center, and there are five properties that are either undeveloped or have only sheds or small machine shops with no water or wastewater service. A significant planning effort is underway surrounding the Town Hall. The Town Hall Committee was formed in 2001 to "ensure that the building is maintained and to develop plans for the future use of the building. The Committee is developing a long-term maintenance and renovation plan for the building and fundraising for repairs and renovations" (Town of Huntington website, 2011). This project is an extension of the Town Hall Committee's work to ensure a viable future for the Town Hall building, as a means to pro-actively consider more broadly both the capacity and potential needs of properties in the Town's villages.

Hanksville, the southern-most of Huntington's villages, is almost entirely residential (46 homes and one home with a commercial greenhouse, along with five undeveloped parcels), although a general store historically operated near the Main Road – Beane Road intersection.

The Town of Huntington's population has grown from 1,861 in 2000 to 1,938 in 2010 (US Census, 2000 and 2010), which represents approximately a 4% population increase in this ten year period.

3.2. Natural Resources

Natural features can pose both opportunities for and limits on the construction and successful operation of potable water supplies and soil-based wastewater systems. These features, such as topography, surface waters, and soils, are described below with particular attention to their impact on the potential for onsite water supply and wastewater treatment in Huntington's villages. Figures 2, 3, and 4 identify environmental sensitivities within the Lower Village, Huntington Center, and Hanksville areas, respectively.

3.2.1. Topography

Huntington's villages lie in a broad valley, dominated by the steep slopes of the Green Mountains to the east. The villages themselves lie close to the Huntington River, along the gently rolling terrain of the river valley (Figures 1 and 2-4). Along the river, elevations range from around 920 feet above mean sea level (AMSL) at the southern end of Hanksville, to a low of 600 feet AMSL to the north where the Huntington River leaves the Lower Village. The river valley is relatively wide in the area of the two northern villages, but is narrower and has more steeply sloping sides in the Hanksville area.

3.2.2. Surface Water and Wetlands

The Huntington River is by far the most significant water feature in the Town of Huntington; all three village areas are linked by the river, and nearly the entire land area of the Town is within the Huntington River's watershed (Figures 2-4). The Huntington River's watershed is primarily forested, with diversified agricultural use (dairy farming, hay, corn, and pasture fields) and residential development concentrated in the river valley. Aside from the Huntington Lower Village and Huntington Center, which are relatively densely developed, low-density residential development is scattered throughout the watershed.

The 2010 Vermont Significant Wetlands Inventory includes nearly 160 acres of wetland area in the Town, which is closely associated with the Huntington River and its tributaries. A few of these wetland areas appear to overlap with existing development, particularly in the vicinity of Lavallee Road and portions of Bridge Street in the Lower Village.

The Huntington River's 100-year floodplain has been mapped by FEMA, and a digital version of the 100-year floodplain for the river is shown on Figures 2-4. Much of the historic development in the villages is above the 100-year flood elevation, but there are a few pockets of development that fall within the floodplain—particularly in the Huntington Acres area at the north end of the Lower Village (Figure 2), along Hinesburg Hollow Road at the south end of the Lower Village, near the intersection of Main Road and Shaker Mountain Road in Huntington Center (Figure 3), and along Main Road in Hanksville (Figure 4). The Town of Huntington has implemented a Flood Hazard Overlay District in its zoning regulations to minimize hazards to life and property due to flooding, discourage future incompatible development in flood-prone areas, and to enable property owners within designated flood hazard areas to purchase flood insurance (see Section 3.3).

The Huntington River is designated as a Class B water by Vermont DEC, meaning that the river's water should meet water quality standards for swimming and boating. Class B waters are also considered drinkable, if they are first filtered and disinfected. However, water quality monitoring conducted by the Huntington Conservation Commission from 2001-2005, and the Huntington River Conservation Partnership from 2006-2010, has detected periodic, high levels of the indicator bacterium *E. coli* in the river, particularly after rain events. In 2009, VTDEC and USGS conducted a microbial source tracking study to investigate sources of fecal contamination in the Huntington River (Matthews et al., 2011). Preliminary results from this work indicate that during wet weather, ruminants and canids were the most common potential sources of fecal contamination in the river; while a base-flow sample showed no evidence of major fecal contamination in the Huntington River from humans, ruminants, or canids.

Due to consistently elevated *E. coli* measurements at three stations in Huntington's Lower Village (at the East Street bridge, the Bridge Street bridge, and a location due east of the Cemetery), the river in the vicinity of Bridge Street in Huntington (from East Street to approximately 0.7 miles downstream) was identified as impaired and was placed on the 303(d) list (VTDEC, 2008). The Clean Water Act requires that all 303(d) listed waters undergo a Total Maximum Daily Load (TMDL) assessment that describes the impairments and identifies measures needed to restore water quality; the Vermont DEC completed a draft TMDL for all bacterially impaired Vermont waters in the spring of 2011 (VTDEC, 2011).

None of the tributaries to the Huntington River, or other water bodies in the Town, are currently listed on the state's impaired waters list (also known as the "303(d) list") (Vermont DEC, 2010).

3.2.3. Soils

There is a range of soil types in each project area. Soils vary based on geologic material, slope, hydrology, human disturbance (e.g., cut and fill), and other factors. The best generalized source of soils data for this area is the *Soil Survey Report of Chittenden County* prepared by the Natural Resource Conservation Service (NRCS). The NRCS data was derived by mapping the landscape with spot field

checks to arrive at an approximate level of resolution of 3 acres, with acknowledged inclusions of other soils. This report describes the soil series, or groups of soils with common properties, found within and near each of the three village areas in Huntington.

The NRCS soils information is planning-level data, and the 3-acre resolution means that it is not very precise for small parcels of land. Site-specific testing, including backhoe test pits and/or percolation tests, would be required to determine the best wastewater treatment options for an individual property.

For the purposes of this assessment, the primary interest is in the properties of the soils that determine suitability for the siting of onsite septic systems: depth to seasonal high groundwater, depth to bedrock, soil permeability, and slope. Figure 2 shows the soils in and near the Lower Village, and classifies the soils according to the type of onsite wastewater system the soil is likely to support under current regulations. Figures 3 and 4 show the same information for Huntington Center and Hanksville, respectively. Soil characteristics are summarized in Table 3.

A significant proportion of the soils within the Lower Village (about 37% of the land area within the village) appear to be suitable for conventional subsurface wastewater disposal systems (Figure 2 and Table 3). The largest land areas of these soils, from north to south, include the area near Chalet Heights Road, the Bridge Street-Mayo Road intersection, Main Road near Bridge Street and Raven Ridge, near Johns Drive, and a large area surrounding Cummings Drive (Figure 2). Many—but not all—of these areas are already occupied by relatively recent single family residential development (or, in the case of the Bridge Street vicinity, by both historic and newer development). A few areas (about 7% of the village area) have similar soils, portions of which may be limited by steep slopes. A portion of land in the Lower Village (about 14% of the village land area), mostly located near the Huntington River and overlapping with the 100-year floodplain, may require either an at-grade leachfield or a filtrate system with an in-ground leachfield to overcome slight limitations associated with shallow seasonal groundwater (Figure 2). A few small areas (2% of the village area), primarily located along Main Road between Bridge Street and Cummings Road, may require a mound system or a filtrate system with an at-grade leachfield, again, to overcome shallow seasonal groundwater limitations. About 24% of the Lower Village's land area, the largest portions of which underlie the Huntington Woods area and the large-lot development north of the Mayo Road-Pond Road intersection on the northeast edge of the village, may require either mound systems with curtain drains or filtrate systems with mounds (and possibly also curtain drains) to overcome shallow seasonal groundwater limitations (Figure 2). Finally, there are several pockets of soils (about 16% of the village area), mostly along small streams, where a performance-based system or a 'best fix' solution may be required—or where the NRCS soil information is not sufficient to make a determination. 'Best fix' means that if the property is already developed and its wastewater treatment system stops functioning, it may not be possible to construct a replacement system that meets all of the conditions of Vermont's current wastewater treatment rules. If a property with these difficult soils is undeveloped, it may not be developable.

As in the Lower Village, a significant proportion of the soils within Huntington Center (about 34% of the land area within the village) appear to be suitable for conventional subsurface wastewater disposal systems (Figure 3 and Table 3), with another 2% having similar soils which may be limited by steep slopes. The largest land areas of these soils, from north to south, include the open field at the north end of the village area, the Camel's Hump Road/Main Road intersection, and the open field along Shaker Hill Road (Figure 3). In contrast to the Lower Village, a larger area of land (about 28% of the village land area), mostly located near the Huntington River , may require either an at-grade leachfield or a filtrate system with an in-ground leachfield to overcome limitations associated with shallow seasonal groundwater (Figure 3). A few small areas (10% of the village area), primarily located along the northern edge of the village and at the Main Road-Trapp Road intersection, may require varying combinations of mound systems, filtrate systems (with at-grade or mound leachfields), or mounds with curtain drains to overcome more serious shallow seasonal groundwater limitations (Figure 3). Another 10% of Huntington Center's land area, the largest portions of which underlie the southeastern edge of the village area and the area north of Shaker Hill Road, may require either mound systems with curtain drains or filtrate systems with mounds (and possibly also curtain drains) to overcome shallow seasonal groundwater limitations (Figure 3). Finally, there are several pockets of soils (about 16% of the village area), in the same areas described in the previous sentence, where a performance-based system or a 'best fix' solution may be required. However, in the case of the soils underlying the Shaker Hill Road development, site-specific evaluations completed in preparation for development suggest that at least portions of these soils may be less limited than depicted by the NRCS mapping (Section 3.2.3.1)

The majority of the soils within Hanksville (about 38% of the land area within the village), in a wide band running from north to south along Main Road, also appear to be suitable for conventional subsurface wastewater disposal systems (Figure 4 and Table 3). However, due to the steep-sided nature of the river valley in Hanksville, an additional 15% of similar soils are too steeply sloping for successful siting and operation of conventional onsite wastewater systems. As in the other villages, a band of soil (about 7% of the village land area), located near the Huntington River , may require either an at-grade leachfield or a filtrate system with an in-ground leachfield to overcome slight limitations associated with shallow seasonal groundwater (Figure 4). A few areas (16% of the village area), primarily located along the eastern edge of the village, may require varying combinations of mound systems, filtrate systems (with at-grade or mound leachfields), or mounds with curtain drains to overcome more serious shallow seasonal groundwater limitations (Figure 4). A few small, wooded areas (about 4% of Hanksville's land area) may require either mound systems with curtain drains or filtrate systems with mounds (and possibly also curtain drains) to overcome shallow seasonal groundwater or shallow bedrock-related limitations (Figure 4). Finally, there are several pockets of soils (about 20% of the village area), the most significant of which is located west of Main Road and north of Carse Road, where a performance-based system or a 'best fix' solution may be required due to the steeply sloping soil and perched water table.

3.2.3.1. Prior Hydrogeologic Capacity Studies

Several studies of the capacity of soils on a property to accept and treat significant volumes of wastewater have been completed for specific properties in the Lower Village and in Huntington Center in conjunction with new development or the expansion of existing development. In the Lower Village, a site-specific capacity analysis was completed in preparation for permitting and construction of the Agnes Mitchell Family Trust development along Agnes Road in 2002 (Wagner, Heindel, and Noyes 2002). The soils in the area of the proposed dispersal fields were medium and coarse sands, and fine to medium gravels with very high permeability values to depths of at least 14.0 feet below ground surface. Although soil characterization from test pits excavated in 1998 and 2002 showed possible indications (mottles, orange staining) of seasonal high water table at depths of 0.8 to 1.7 feet below ground surface, springtime groundwater monitoring conducted in 1997 proved that these indicators do not reflect current groundwater conditions—the shallowest groundwater measurements at nine wells ranged from 5.9 to 7.6 feet below ground surface, and the water table sloped gently to the north across the site. A predictive mounding analysis was completed for the proposed leachfields using Glover's Solution of Hantush's Method, and an induced groundwater mound of 0.33 feet in height was predicted beneath the center of the three disposal fields. After taking into account the induced groundwater mound, 3.3 to 4.3 feet of unsaturated soil remained beneath the disposal trenches. At the time, at least 3.0 feet of unsaturated soil was required to be maintained between the bottom of the leachfield and the water table. It was concluded that this requirement would be met by the proposed design, if constructed and operated as designed.

In Huntington Center, a desktop hydrogeologic capacity analysis was completed when two residential lots were added to the existing eight-lot Lassiter subdivision on Shaker Hill Road (Wagner, Heindel, and Noyes, 1992). A Darcy's Law estimation, completed using pre-existing test pit logs and conservative assumptions, indicated that at a design flow of 4,746 gallons per day, an induced groundwater mound of 1.4 feet in height would occur beneath the center of the shared leachfield. This induced groundwater mound height would leave an unsaturated thickness of 3.6 feet between the bottom of the shared leachfield and the seasonal high water table—more than the minimum 3.0 feet of unsaturated soil required. A similar evaluation was completed for Phase II of this development (which had a permitted design flow of about 6,150 gallons per day), although these homes, located along Sunrise Drive, are outside the study area (Wagner, Heindel, and Noyes, 1995).

3.2.4. Surficial and Bedrock Geology

Huntington’s surficial geology is dominated by erosional and depositional forces associated with the retreat of ice sheets starting around 13,000 years ago (Bierman et al., 2001). The Huntington River itself is bordered by 10 levels of terraces, representing a steady fall in the river’s base level, its incision into glacial and post-glacial valley fill. The highest and oldest terraces represent early stream deposits associated with a glacial lake impounded in the southern Huntington River Valley by ice to the north.

As the ice retreated north, a spillway formed where Hollow Brook runs today, and water in the Huntington River valley flowed west into Lake Vermont, dropping the level of the Huntington River over 700 feet and shrinking the lake dramatically. Once the ice retreated as far north as Gillette Pond, the direction of water flow in the Winooski River valley reversed, such that the isolated, local lake in the Huntington River valley now received water and sediment from the entire upstream Winooski River watershed. Water from the Winooski valley continued to flow south through the Huntington River valley until the ice margin melted back far enough to allow the lake in the Winooski River valley and the lake in the Champlain valley to merge; after this, the Hollow Brook spillway was abandoned, and water in the Huntington River Valley flowed north once again.

This glacial history is preserved in the thick, interbedded lake bottom and outwash-related sand and gravel sediments that underlie the soils of the Huntington River valley. Beneath the Lower Village along the Huntington River, the surficial geology consists mostly of river-related (fluvial) sands and gravels (Doll, 1970). To the west of Main Road, between Raven Ridge and approximately Cummings Road, the soils are underlain by lakeshore-related (littoral) sediment, predominantly sands and pebbly sands, while from north of Raven Ridge to the Lavallee Road area, the soils are underlain by littoral, horizontally bedded gravels. Along the eastern side of the river, the area stretching from Roberts Park and Huntington Woods north along Bridge Street is underlain by ice contact outwash gravel. Only a small portion of the Lower Village, located north of the Pond Road-Mayo Road intersection, is underlain by compact, glacial till. In Huntington Center, fluvial gravels underlie the central area of the village, surrounded by ice contact outwash gravel terraces to the east and west. A relatively small area of pebbly littoral sand stretches from the Brewster Pierce School northward along the eastern edge of the village. Nearly all of Hanksville is also underlain by either fluvial gravels near the river, or ice contact outwash gravel terraces to the east and west of the river. A small area of Hanksville, mainly north of the Main Road-Beane Road intersection, is underlain by glacial till.

In the area of Huntington's villages, the valley's glacial and riverine deposits are underlain by the bedrock of the Cambrian-age Underhill Formation, consisting of silvery, gray-green schist with abundant lenses of white quartz (Doll et al., 1961). Near the Huntington River and in the village areas, this formation extends to depths of approximately 2,500 feet below mean sea level, so all water supply wells within the villages that are drilled into bedrock are likely drawing water from the Underhill Formation.

3.3. Zoning Districts

The study areas are confined to and fall entirely within the Village zoning district. Huntington's 2009 Zoning Regulations state that

> The purpose of the Village District is to: (1) encourage a mix of higher density residential, commercial and civic development on suitable land immediately adjacent to

> Huntington's traditional village centers, and to (2) protect agricultural land and open space areas, especially those that functionally and visually define village boundaries.

The minimum lot size for most property uses within the Village district is 1 acre. Multi-family units are allowed at densities of up to four units per acre, and planned residential and planned unit developments are allowed and encouraged within this district.

Portions of each of the three villages located close to the Huntington River are also included in the Flood Hazard Overlay District. The purpose of this district is to

> maintain eligibility of citizen participation in the National Flood Insurance Program; promote the public health, safety and general welfare; prevent increased occurrences in flooding through regulation of land development in flood hazard areas; minimize losses due to flooding, and to protect watercourses and flood plains and important natural resources contained therein.

The Flood Hazard Overlay District covers all Special Flood Hazard Areas identified on the most current flood insurance studies and maps published by the Federal Emergency Management Agency (FEMA) (Figures 2-4). The Special Flood Hazard Area is defined as "the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year…labeled Zone A or AE in the most current flood insurance studies and maps" (Huntington Flood Hazard Regulation, 2011). The current 100-year floodplain for the Huntington River is illustrated on Figure 2. New development or substantial alternations to existing development within the Flood Hazard Overlay District is strictly limited, and if completed, must adhere to both the Zoning Regulations and the special requirements of the overlay district.

Although it is not included in the 2009 Zoning Regulations, Huntington's 2007 Town Plan describes a Groundwater Protection Overlay, whose purpose is "to protect public health and safety by minimizing contamination of vulnerable aquifers; and by preserving and protecting existing and potential sources of drinking water supplies". The Groundwater Protection Overlay as described in the Town Plan appears to apply primarily to public water systems (described further in Section 4), although all of Huntington's residents rely on groundwater for potable water supply. The current Town Plan states that the Town "may enact ordinances to further protect the water supply within a Source Protection Area in future land use regulations".

4. HISTORIC AND CURRENT WATER SUPPLIES

The majority of properties in the village areas are served by individual and shared potable water supplies. Information on the existing water supply systems was gathered from state Regional Office files, the property owner survey questionnaires, interviews, and area site visits. General information regarding potable water supply systems and how they function, as well as information about the current rules and regulations governing potable water supply systems in Vermont, is included in Appendix C.

4.1. Water Supply Types and Locations

The types and sources of information available for potable and non-potable water supply wells in the project areas are shown in Figures 5, 6, and 7 for the Lower Village, Huntington Center, and Hanksville, respectively. In order to construct this figure, we compiled information from Vermont DEC potable water supply and wastewater system permits, water supply locations and associated information available from the Vermont DEC's database of private wells, and information provided by respondents to the property owner surveys. Wherever a permit or other information relevant to water supply could be reliably matched with a property location, we digitized that information from drawings or permit files and included it in our analyses. Although all available information was digitized and utilized, only a summary of the types of information available for each property location is displayed on the maps in this report to protect the confidentiality of the survey responses we received.

In Huntington's Lower Village, properties are served by a variety of onsite and small shared water supplies (Figure 5). In addition, the Roberts Park Road and Huntington Woods neighborhoods are served by the Huntington Fire District No. 1 public community water system (Section 4.1.1). About 65% (149) of the properties for which information is available are served by individual or private, shared drilled wells (Table 1, Table 4, and Table 5). A much smaller number of properties use shallow wells or springs (14 properties). A total of 47 properties are connected to the Huntington Fire District No. 1 community water system, which is served by a gravel well located along Roberts Park Road. No information about the type of water supply serving the property was available for the remaining 42 developed property locations (Table 5).

Figure 6 displays water supply and wastewater system information sources for Huntington Center. A co-operative water supply system once served a number of properties in Huntington Center, but this system was decommissioned in the early 1990s, and all developed properties now are served by individual or private shared water supplies. Most properties for which information is available are served by drilled wells (55 properties, see Tables 1, 4, and 6), including the public Non-Transient Non-Community well serving the Brewster Pierce Memorial School (Section 4.1.2). Only five locations in Huntington Center use shallow wells or springs as their water supply. No information about the type of water supply serving the property was available for the remaining seven developed property locations (Table 6).

The properties in Hanksville (Figure 7) are served by individual drilled wells (26 properties) or individual shallow wells/springs (11 properties, see Tables 1, 4, and 7). Water supply information was not available for the remaining 10 developed properties in the village.

4.1.1. Huntington Fire District No. 1 System

A portion of the Lower Village is served by the Huntington Fire District No.1 Water System. The water source is a 73 foot deep, 6" diameter gravel well with an estimated yield of 125 gallons per minute. A 20,000 gallon concrete storage tank with two pump stations provides the required volume of storage and pressure distribution for the system. The distribution system consists of 0.75-inch and 2-inch PVC piping. The system currently serves 123 people through 47 service connections. Based on master meter readings the average daily water demand is 5,860 gallons per day with the peak demand reaching 6,900 gallons per day. The water system is not required to continuously chlorinate at this time but is capable of providing continuous chlorination when required.

A temporary Permit to Operate was issued by the State of Vermont's Water Supply Division on July 30, 2010. In this permit, reference was made to the latest Sanitary Survey performed on the system which was dated August 21, 2009. The Sanitary Survey identifies significant and minor deficiencies in the Fire District's system which required corrective actions in order to comply with the Water Supply Rules. A Sanitary Survey is performed by the State of Vermont approximately every three years. The completed sanitary survey evaluates the following applicable components:

- Source;
- Treatment;
- Distribution system;
- Finished water storage;
- Pumps, pump facilities, and controls;
- Monitoring, reporting, and data;
- Verification; and
- System management and operation.

Significant deficiencies identified in the latest Huntington Fire District No.1 sanitary survey include the following:

- Corrosion Control Treatment: The water system has tested higher than the allowable maximum contaminant levels for lead and copper. The water system was required to submit a treatment recommendation to address the problem, which it did. The recommendation submitted involved setting up a treatment train utilizing a sequestering reagent (likely

orthophosphate). According to our research, this has not been constructed. The system is currently attempting to "sample" into compliance (per an approved sampling plan) by providing annual lead and copper testing results.

- Operation and Maintenance Manual: The system needs to complete an O&M manual per the Water Supply Rules specifications.
- Manganese Treatment Required: The system is required to provide a treatment train to remove the high levels (nearly three times the maximum allowed) of manganese in the water. This has not been performed.
- Source Protection Plan Update: The source protection plan shall be updated every three years; an updated source protection plan is currently required.

4.1.2. Brewster Pierce Memorial School System

The Brewster Pierce Memorial School is served by a 307 foot deep, 6" diameter drilled bedrock well with an estimated yield of 25 gallons per minute. A 3,000 gallon concrete storage tank with pump provides the required volume storage and pressure distribution for the system. The system currently serves about 143 students and 25 staff, but has capacity to serve up to 217 students and staff. According to the most recent Sanitary Survey conducted by the Vermont Water Supply Division, the system's average day demand is 3,000 gallons per day and maximum day demand is 4,000 gallons per day. Based on water meter readings, the average daily water use is 1,227 gallons per day. The water treatment system includes particulate filters, a water softener, and ultraviolet disinfection with chlorine disinfection back-up.

The latest Sanitary Survey performed on the system was dated August 7, 2009. The Sanitary Survey identified three minor deficiencies, which have since been corrected.

4.1.3. Prior Water Supply Studies

In Huntington Center, as part of a four-classroom expansion of the Brewster Pierce Memorial School in the early 1990s, a hydrogeologic study was completed to better understand whether disposal of wastewater into the surficial sand and gravel aquifer posed a threat to the water quality in the deep, confined gravel aquifer which serves as a source of drinking water (Wagner, Heindel, and Noyes 1991). Soil borings were completed in the school yard and on the adjacent property for the installation of shallow monitoring wells and piezometers. The stratigraphy in the school yard consists of a sandy loam underlain by a medium brown sand and gravel deposit, which is in turn underlain by a stiff uniform blue gray silt/clay. On the south side of the school property, gray brown sandy silt was encountered near the ground surface; this horizon was saturated only a few feet below ground surface. Water level measurements were collected by hand for 10 days during April-May 1991, and remote dataloggers were installed at the drinking water supply well serving a nearby residence and in an adjacent piezometer. The dominant groundwater flow direction is to the northwest, suggesting that flow is controlled by the regional

hydrogeologic regime, with flow towards Brush Brook and the Huntington River. An induced pumping test conducted in May 1991 and subsequent comparison of hydrographs from the remote dataloggers did not indicate a hydraulic connection between the surficial and confined gravel aquifers.

Soil information available from well drillers' logs for nearby water supplies was also reviewed. Most wells in the vicinity draw water from a deep gravel source, confined by a clay horizon ranging from 20-78 feet in thickness. Near the western edge of the school property, the clay horizon begins at approximately 16 feet below ground surface and extends to approximately 65 feet, for a total thickness of 48'. The dense blue gray silty clay observed in soil borings on the school property is both laterally extensive and fairly thick, and the induced drawdown test conducted at a downgradient well demonstrated that this clay horizon acts as an impervious protective layer. The report concluded that expansion of the school's wastewater disposal system would not pose a threat to the quality of nearby potable water sources. Subsequent work in coordination with the school's expansion was completed to ensure that downgradient shallow wells drawing from the surficial aquifer were either decommissioned or protected from renovated effluent originating at the school's leachfield (Wagner, Heindel, and Noyes, 1991a).

4.2. Property Owner Survey

The main goal of the property owner survey was to obtain information regarding existing water supply and wastewater treatment systems. The survey was mailed to all property owners within the project areas in late August 2011. The data collected from the individual surveys were very useful to the project consultants during the assessment process. The survey provided us with information about ages and types of water supplies, as well as key information about water quantity or quality issues experienced by residents in each village area.

Nearly 75% of the respondents to the property owner survey indicated that their water supply was a drilled well (Table 1). About 15% of the respondents indicated that they used a dug well or spring, while the remaining 11% of respondents are connected to the Huntington Fire District No. 1 system. About half of the respondents' water supplies have been installed within the last 30 years (1981 or later), usually at the time that the property was developed; the remainder were installed before 1980 or were of unknown age. Drilled wells that were 40-120 feet deep were reported to be gravel wells, while those that were reported to be deeper than about 130 feet were generally reported to be bedrock wells. However, about 40% of the respondents did not know how deep their well was, or whether it was drilled into gravel or bedrock (Table 1).

Roughly a quarter of respondents to the survey (40 respondents) indicated that they have aesthetic concerns (taste, color, or smell) with their water supply. Aesthetic concerns reported included iron and/or manganese staining, hard water, sulfur smells (either consistently or associated with heavy use of the

water supply), and silt or sediment (which was reported by respondents as both an aesthetic and a contamination issue).

Roughly 17% of respondents indicated that they had a past or ongoing contamination issue with their water supply (Table 1). Noted contamination issues included bacterial contamination (20 of 23 respondents) or silting-in of drilled wells. About 40% (10 of 23 responses) of the reports of bacterial contamination were associated with the Huntington Fire District No. 1 system. One respondent reported problems with radon in their water supply.

About half of the survey respondents (97 total responses) indicated that they have one or more treatment systems associated with their water supply—a filter, water softener, ultraviolet (UV) disinfection, or a different treatment system (Table 1). In about half of the cases where water treatment was reported, no associated water quality issue was reported—indicating that either the filter or water softener is a pro-active measure, or perhaps that water quality issues were experienced in the past but that the treatment system is working to alleviate those concerns. Among those respondents who did report aesthetic or contamination-related issues, about half had some form of water treatment installed, and about half did not. Most respondents who specified that they used a filter for water treatment did not specify the type of filter in their response. A minority (10 respondents) indicated that they used UV disinfection to protect against bacterially-related contamination of their water supplies.

A small number of respondents indicated that they have problems with water quantity—periodically running out of water. Eight respondents indicated that they run out of water every few years, and five respondents indicated that water quantity is a consistent annual problem (Table 1). A few respondents indicated that, when their bedrock wells ran out of water in the last 10 years, they either had the well drilled deeper or hydrofractured, and that their water quantity was sufficient after that action was taken.

5. HISTORIC AND CURRENT WASTEWATER TREATMENT

Each of Huntington's three village areas has residences and other facilities that are served by individual and shared onsite wastewater treatment systems. There are no wastewater treatment plants or sewers in the study area. Information on the existing wastewater treatment systems was gathered from permit files, site visits, and other sources, as well as the information collected from the property owner surveys, is described in this section. General information regarding onsite wastewater dispersal systems, how they function and need to be maintained, and some information on newer components—as well as information about the current rules and regulations governing soil-based wastewater treatment systems in Vermont—is included in Appendix D.

5.1. Permit Programs & File Reviews

Vermont DEC's Regional Office permit files contain significant information about development in Huntington's villages over the last 30 years. Although limited permit information was available for many properties developed before about 1980, permits were found for all public buildings in the study areas except for the two general stores. Stone conducted file reviews at the Essex Junction Regional Office and the Regional Office's on-line permit database. As with water supply-related information, if a permit could reliably be matched with a parcel in one of the villages, relevant wastewater system information was digitized and included in the GIS infrastructure inventory. Table 4 summarizes the available permit records by village area, while the inventory-related data sources available for each parcel are summarized on Figures 5 (Lower Village), 6 (Huntington Center), and 7 (Hanksville).

5.1.1. State Permits

Stone reviewed the DEC permit files in the Essex Junction Regional Office for permits for public buildings (almost any occupied building except a single family residence) and for subdivisions that are less than 10 acres in size (since 1969). In the Lower Village, a total of 63 permits were found for 49 property locations (Table 4 and Figure 5). Wastewater system permits exist for some of the commercial and institutional buildings in the village, including the Huntington Public Library (from when the building was owned by the Historical Society), Huntington Garage, and the Fuller House offices. While most permits were for subdivisions or new construction of single family residences, a few recent permits were issued for wastewater system replacements, at least one of which was completed as a "best fix" due to the limited land area available on the property. The vast majority of the wastewater treatment infrastructure constructed under these permits was for on-site, in-ground septic tank and leachfield systems. There is one recent subdivision (permitted in 2002), located at the south end of the Lower Village, where individual septic tanks on each lot drain to pump stations and a shared, relatively large in-ground leachfield.

In Huntington Center, a total of 29 permits issued by Vermont DEC were found for 12 property locations (Table 4 and Figure 6). Wastewater system permits exist for most of the municipal and institutional buildings in the village, including the Town Garage, Fire Department, and Town Office parcel, the Brewster Pierce Memorial School, and the Community Church of Huntington (as the Huntington Baptist Church). Most permits, as in the Lower Village, were issued for new construction or renovations to existing structures. There is another subdivision with individual septic tanks and a shared leachfield, permitted in the late 1980s-early 1990s, located near the Shaker Hill Road/Main Road intersection. There was one recent permit issued for a replacement drilled well where a variance was requested for the setback between a wastewater system and the well, due to the limited available area on the property (Table 4).

In Hanksville, a total of nine permits issued by Vermont DEC were found for six property locations (Table 4 and Figure 7). All permits were for small subdivisions and new construction of single family residences. At least one of the recent permits includes advanced treatment, indicating that capacity for future development beyond a single family residence for that property may be somewhat limited (or, at least, that obtaining additional capacity on the lot may be costly).

There are no wastewater systems in any of the village areas that have design flows greater than 6,500 gallons per day, which would be covered under the Indirect Discharge Rules (John Akielaszek, Indirect Discharge Section of the Vermont DEC, pers. comm. October 2011).

5.2. Property Owner Survey

A main goal of the property owner survey was to obtain information regarding existing wastewater systems, as well as to gather information about property owners' plans for the future. The survey also allowed us to gather information about ages and types of septic systems, when septic tanks were last pumped, and whether the owners had made repairs or had plans on file.

In keeping with the residential character of Huntington's villages, the vast majority of respondents occupy their properties full-time—86% of respondents live or work in the villages year-round (Table 1).

Most respondents (93%) indicated that their wastewater systems consisted of septic tanks and some form of soil-based dispersal, which was almost always an in-ground leachfield consisting of either trenches or a seepage bed. Only four respondents indicated that their dispersal system was a raised or sand mound system. Nearly 70% of respondents' systems have been constructed since 1980, which corresponds well with information gained during review of DEC Regional Office permits, but is unusual for a relatively small Vermont village center with a long history of development.

Respondents to the survey reported reasonable knowledge about their systems' components and routine maintenance practices (for instance, 77% could report when their septic tank was last pumped out, etc.). Little other routine maintenance of septic systems was reported.

Approximately 23 of the respondents' onsite systems (representing about 6% of the village areas' properties) have experienced a system malfunction in the last 10 years, such as surfacing sewage or sewage back-up into a structure (Table 1). A few septic tank replacements were completed when old, metal tanks were discovered, while others were functional tanks that were replaced due to building expansions or remodels. Leachfield upgrades, when described, were generally completed when the existing leachfield either had surfacing effluent or was found to be under-designed during building renovations. All respondents reported that the system malfunction had been remedied. Remedial strategies included building sewer cleanouts and pipe repairs, cleaning off effluent filters, septic tank replacements, and leachfield replacements. Most respondents indicated that their systems continued to function properly.

Two questions on the survey were directed towards residents' interest in upgrading their water or wastewater systems, or whether there were any common factors preventing them from upgrading. About 20% of respondents indicated that they were seriously considering an upgrade. The costs of potential upgrades, and the fact that current systems were still operating properly, were by far the most common factors cited.

Besides collecting important information on wastewater treatment systems and water supplies, a series of questions were formulated for residents to gauge whether water or wastewater capacity was a limiting factor in property owners' plans for the future. Nearly equivalent numbers of respondents (about 10% in each case) indicated that they currently had a plan to change the use of their property, and that if they had access to additional water supply or wastewater treatment capacity, they would implement plans for their property that could not be implemented under current conditions (Table 1). Interestingly, there was very little overlap between the responses to the two questions. Respondents who indicated current plans felt in most cases that their existing property had capacity to implement those plans. Plans described by respondents which would require additional capacity included adding accessory apartments, creating subdivisions with smaller lot sizes, adding a café or pottery business, senior housing, and allowing expansion or more use of municipal amenities, especially the Town Hall.

6. WATER AND WASTEWATER SYSTEM EVALUATIONS

Onsite water supplies and wastewater treatment systems serving several Town-owned properties in the Lower Village and Huntington Center, as well as on private properties throughout all three villages, were evaluated by Stone staff. The following sections describe these evaluations, as well as findings and recommendations for municipal properties where applicable.

6.1.1. Huntington Public Library

An evaluation of the water and wastewater treatment systems serving the Huntington Public Library was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. of Stone Environmental, Inc. Also present at the evaluation was Wendy DeForest, Assistant Director.

In preparation for the evaluation, the following document was reviewed:

- Wastewater Permit WW-4-0690 (Water Supply and Wastewater Disposal Permit for the Huntington Historical Society and meeting hall), and associated plans.

The property's drilled well was located and appears to be in good condition. The Library staff reported that no water quality or water quantity problems have been experienced since the well was drilled, with the exception of silty water experienced during construction activities.

The Library's septic tank and pump station were located; as constructed, both tanks are located closer to the northern corner of the property in the parking lot. Risers to grade are installed on both septic and pump tanks, and the associated alarm panels are easily accessible. Both tanks are 1,000-gallon concrete tanks which were found to be in good condition, and were full of effluent at the time of the evaluation. Library staff members did not remember when the tanks had last been pumped out, and it is likely that the septic tank has not been pumped since the components were installed (around 2007).

On October 28, Bruce Douglas returned to the site and, with instructions from Anne Dannenberg, Library Director, the leachfield was located and is several hundred feet to the northwest of the Library, behind Dean Grover's barn. The leachfield appeared to be in good condition.

We recommend that the septic tank be pumped out, and that the pump operation and sludge levels in the pump station be checked by the pumper every time septic tank is pumped.

6.1.2. Brewster Pierce Memorial School

An evaluation of the water and wastewater treatment systems serving the Brewster Pierce Memorial School was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. of Stone Environmental, Inc. Also present at the evaluation was Sandy Heyman, Custodian.

In preparation for the evaluation, the following documents were reviewed:

- Wastewater Permit WW-4-0392 (Water Supply and Wastewater Disposal Permit for a 4-classroom expansion) and associated and documentation.
- Wastewater Permit WW-4-0392-1 (Water Supply and Wastewater Disposal Permit for after-school program for 20 children and 2 staff) and associated documentation.
- Wastewater Permit WW-4-0392-2 (Water Supply and Wastewater Disposal Permit for adding a pre-school with 13 children and 2 staff) and associated documentation.
- Water System Operation and Maintenance Manual, The Brewster-Pierce Memorial School, WSID # 6065, 120 School Street, Huntington, Vermont. Prepared by Grover Engineering PC, May 2008.
- Response to the Huntington Water and Wastewater Working Group's Wastewater and Drinking Water Needs Assessment Survey, for e911 address 120 School Street.

The property's drilled well was located as shown on the design plans, and appears to be in good condition. The well did experience some silting in 2003, but was re-lined by Vermont Well and Pump. A water storage vault is located outside the school building.

The water supply has historically experienced aesthetic issues related to high iron and manganese levels. A new water treatment system was installed in 2008, and includes particulate filters, a water softener, and ultraviolet disinfection with chlorine disinfection back-up (see Section 4.1.2). The treatment system was designed by Dean Grover and is operated by John Beauchamp.

The school's septic tanks were located and are in the positions indicated on design plans. There are two septic systems serving the school. The larger of the two systems, with a design flow of 2,800 gallons per day, was installed when the school was constructed in 1965 and upgraded in 1987. The smaller of the two systems, with a design flow of 702 gallons per day, was installed to serve the classroom additions completed in the early 1990s. Risers to grade are installed on both septic tanks. The tanks were not opened during the evaluation—they are pumped out every summer. Overall, both the water and wastewater systems are exceptionally well maintained and no recommendations are necessary.

6.1.3. Huntington Fire Department

An evaluation of the water and wastewater treatment systems serving the Huntington Fire Department building was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. and Alex Huizenga of Stone Environmental, Inc.

In preparation for the evaluation, the following documents were reviewed:

- Wastewater Permit WW-4-0454 (Water Supply and Wastewater Disposal Permit for construction of a new fire station) and associated plans and documentation.
- Wastewater Permit WW-4-0454-1 (Water Supply and Wastewater Disposal Permit for final approval of drilled well location) and associated documentation.
- Well Completion Report for well tag no. 61 / 620A, Huntington Fire Department, Huntington, VT.
- Response to the Huntington Water and Wastewater Working Group's Wastewater and Drinking Water Needs Assessment Survey, for the Fire Department building.

The property's drilled bedrock well was located as shown on the design plans, and appears to be in good condition. The well water has periodically had a rotten-egg odor, though recently no problems have been experienced, and a filter is installed in the Fire Department building. The well has a reported yield of 50 gallons per minute, is shared with the Town Office building and the Town Garage. No problems with water quantity were reported.

The Fire Department building's septic tank and dosing siphon were both located and are in the positions indicated on design plans. Both tanks are 1,000-gallon concrete tanks, and due primarily to the low occupancy of the Fire Department building (one meeting of 15 people once a week, plus emergencies), the septic tank had never been pumped. The septic tank was opened and appeared to be in good condition, but had significant sludge accumulation in the bottom of the tank.

The siphon tank was also opened—though this tank is covered with a heavy concrete lid, requiring assistance from Huntington Highway Department staff and a backhoe to uncover and lift. The water in the siphon tank was relatively clear, and staining on the overflow pipe was at the level specified in the plans (~2" below top of over flow); therefore, the siphon appears to be operating properly.

The shallow-placed leachfield trenches were located in the southeast corner of the ball field, and appear to be in good condition. Several attempts were made to characterize the soils near the leachfield, but the extremely gravelly nature of the soils meant that hand tools such as the auger were refused well before any condition that might limit onsite wastewater treatment was discovered.

At the end of the evaluation, we recommended that the septic tank and siphon tanks be pumped out; the tanks were pumped by P&P Septic on October 19, 2011. We also recommend that the installation of a riser to grade be planned for the siphon tank, to enable future maintenance of this key part of the Fire Department's wastewater treatment system.

6.1.4. Huntington Town Office

An evaluation of the water and wastewater treatment systems serving the Huntington Town Office building was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. and Alex Huizenga of Stone Environmental, Inc. Heidi Racht, Town Clerk, was also present for a portion of the evaluation.

No permits or documentation were available for the Town Office building, with the exception of the septic tank location as illustrated on the plan for the Fire Department's construction (Section 6.1.3).

The Town Office shares the Fire Department building's drilled well, and no additional issues were noted by the Town Clerk.

The Town Office's septic tank was located using the Huntington Highway Department's assistance and backhoe. The main access for the 1,000-gallon concrete tank is located 8'0" from the Town Office wall, and 7'8" from the west (landscape garden) wall. The baffle lid is located 7'6" off the building, and 5'6" off the west wall. The outlet pipe and baffle were both intact, and the water level in the septic tank was at the outlet. The tank outlet flows to the west beneath the timber retaining-wall landscaping. The last time the septic tank was pumped was unknown by the Town Clerk or Highway Department staff.

At the end of the evaluation, we recommended that the septic tank be pumped out; the tank was pumped by P&P Septic on October 19, 2011.

6.1.5. Huntington Town Garage

An evaluation of the water and wastewater treatment systems serving the Huntington Town Garage building was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. and Alex Huizenga of Stone Environmental, Inc. Clinton (Yogi) Alger and Raymond Liberty of the Huntington Highway Department were also present for portions of the evaluation.

In preparation for the evaluation, the documents described in Section 6.1.3 (for the Fire Department) were reviewed.

The Town Garage shares the Fire Department building's drilled bedrock well; no additional water quality issues were noted for the Town Garage.

The Fire Department building's septic tank was located with the assistance of the Town's backhoe and is in the positions indicated on design plans. The septic tank is a 1,000-gallon concrete tank, and is located partially beneath the chain link fence near the southwest corner of the garage. The septic tank was last pumped in the spring of 2010, and when opened, appeared to be in good condition.

The design plans for the Fire Department building show the Town Garage building's septic tank connection to a 1,000-gallon pump station, which then pumps to the leachfield constructed for the Fire Department building. However, the septic tank outlet instead flows to the west toward the salt shed, and terminates in perforated pipe laid in crushed stone. Once it became clear that no pump station or leachfield connection was installed, the shallow excavation was covered with crushed stone and filter fabric to prevent contact or damage to the pipe. We recommended that the coming fiscal year's budget for the Highway Department include funding for the installation of a pumping station and connection to the existing leachfield.

6.1.6. Huntington Town Hall

An evaluation of the water and wastewater treatment systems serving the Huntington Town Hall building was conducted on October 18, 2011. The evaluation was performed by Bruce Douglas, P.E. and Alex Huizenga of Stone Environmental, Inc., Clinton (Yogi) Alger of the Huntington Highway Department was present for a portion of the evaluation.

No permits or documentation were available for the Town Hall building, and no information about its water supply system was available at the time of the evaluation.

The Town Hall's septic tank was located and has an access riser installed to grade. The main access for the 1,000-gallon concrete tank is located 7'5" from the west wall of the building, and 3'0" from the northwest corner of the building; the access riser is located underneath the handicap access ramp. A small (4-foot by 20-foot) in-ground leachfield is located south of the septic tank, though attempts to locate the leachfield using a metal probe were not successful due to the extremely gravelly nature of the native soil. The last time the Town Hall's septic tank was pumped was unknown by the Highway Department staff.

At the end of the evaluation, we recommended that the septic tank be pumped out; the tank was pumped by P&P Septic on October 19, 2011.

6.1.7. Private System Evaluations

Eighteen evaluations of private water supplies and onsite wastewater treatment systems serving individual properties in the Lower Village, Huntington Center, and Hanksville were conducted by Bruce Douglas and Brent Toth of Stone, with property owners present, in October-November 2011.

In the Lower Village, water quality issues including hardness, sulfur smells (either consistently or during high water use), and/or iron or manganese staining were reported during most evaluations, and for wells drilled into both gravel and bedrock. Occasional issues with sediment were reported for the Huntington Fire District 1 water system. Water quantity issues were reported in the area of Raven Ridge and at a location with a shallow well. Many property owners had installed water filters and water softeners to

combat aesthetic issues, and one had installed a UV treatment unit. One drilled well experienced silting and may have been overtopped by floodwaters during Tropical Storm Irene. River movement during the May and August storms destroyed at least one water supply and others are in danger of future river encroachment.

In all cases for evaluations in the Lower Village, Stone staff members were was able to locate septic tanks. Septic tanks were generally in good condition, and all but two of the tanks did not need to be pumped at the time of evaluation. In one case, the outlet cover for the septic tank was cracked and stuck, and when removed, the effluent level in the tank was above the outlet opening. The function and proper maintenance of filter screens were a common source of homeowner questions. One of the systems evaluated contained a pump station, and the pump and alarm were both operating properly. Conventional in-ground leach trenches or beds and drywells were encountered during the evaluations. In all cases but two, these systems appeared to be operating properly. At one location, the distribution box had cracked and the leach trenches were not being loaded equally; while at another location, the leachfield was located at a higher elevation than the septic tank, but no pump or siphon was present. Flooding that occurred in May and August inundated leachfield areas in the village, but no permanent wastewater system damage was seen during the evaluations.

Throughout the Lower Village, when time allowed, hand auger soil borings were advanced in the vicinity of probable replacement areas on several lots; however, the gravelly nature of the subsoils meant that hand tools were often refused before any condition that might limit wastewater treatment was encountered. One suitable replacement area was identified by this method for a residence that currently relies on a set of dry wells.

In Huntington Center, aesthetic water quality issues (high calcium, iron, and manganese) were reported in a bedrock drilled well, approximately 275 feet deep. The well also historically had issues with water quantity, which were solved by deepening the well. Septic tanks and leachfields were located and were in good condition.

In Hanksville, water quality concerns were identified in one instance, caused by the shallow water table and the structure of a shallow well. Deeper, drilled wells seem to have adequate yield, but have similar hardness issues to those seen elsewhere in town.

Septic tanks and leachfields were located and evaluated during the Hanksville site visits. Shallow depth to the water table was often an issue for these systems. One leachfield location was located near a stream, and is sometimes inundated during spring melt and heavy rain events. Another leachfield showed signs of surfacing wastewater. Causes were investigated during the visit, and the owner is in the process of repairing the system. As with the Lower Village, septic tank and effluent filter function and maintenance were common discussion topics during the evaluations.

7. CAPACITY ASSESSMENTS

The capacity assessment portion of this study includes data-driven Geographic Information System (GIS) analyses that combine spatial information, such as USGS topography and NRCS soils information, with local information such as building uses, well locations, and permitting data, to determine what, if any, constraints a property may contain related to potable water supply and onsite wastewater treatment and dispersal—and whether capacity might be available to support future development plans.

The results of these analyses were confirmed and refined by including all other sources of information collected and described in Sections 3-6 of this report. This review resulted in an overall summary of the known and potential limitations on each property, particularly with regard to wastewater treatment capacity—which is most often the factor that limits the development potential of an individual property. The property-specific recommendations do not necessarily reflect the current actual conditions of the individual wastewater treatment systems in the study areas. The results of these assessments are summarized on Tables 5-7.

Following is a description of each analysis and a summary of the results for each study area.

7.1. Water Supply Capacity Analysis Methods

Using information collected and described in the previous sections of this report, a GIS-based, planning level capacity assessment for potable water supply systems was completed. The assessment focuses on the water supplies themselves, and the spatial locations of supplies with a history of issues with water quality or quantity. The locations of potable water supply systems are also an important component of the wastewater capacity analysis-- the protective setbacks between onsite wastewater system components and water supply systems can significantly limit the area available on a property where a replacement septic system may be safely sited.

The water supply capacity analysis has two components: a water quality assessment and a water quantity assessment.

The water quality assessment simply summarizes approximate locations from the water supply inventory where either aesthetic or other water supply contamination issues were identified from property owner survey results (Section 4.2), or from evaluations of community water supply systems (Section 4.1).

The water quantity assessment builds on the two data sources above by evaluating the spatial distribution and reported well yields for drilled wells (both gravel wells and bedrock wells) within the village areas. We used approximate locations in the water supply inventory where a history of drilled well replacement, well deepening, hydrofracturing, of other activity indicative of water quantity problems was recorded in the Vermont DEC database of private wells or was reported to us in the property owner survey as a cross-

check on our assessments. We also made a qualitative assessment of the potential for well interference, in order to evaluate whether closely spaced wells, especially those drilled into bedrock, might contribute to water quantity problems in any portions of the villages.

The water supply inventory contains well yield data, in gallons per minute, for a total of 157 well locations (including 39 known gravel wells, 103 known bedrock wells, and 15 wells with yield data that were not classified as terminating in either gravel or bedrock). Where available, the well yield values were contoured separately for gravel and bedrock wells, and the resulting datasets were trimmed to correspond to the boundaries of each village area as appropriate. The resulting approximate bedrock well yields are shown over the entire extent of all three village areas, since the entire extents are underlain by the same bedrock formation. Well yield information for gravel wells, however, was trimmed to the likely extent of the gravel aquifer as follows:

1. Limited to areas where known gravel wells were located (no gravel well yield information was available for Hanksville).
2. Limited to the extent of fluvial or glacial outwash deposits according to USGS surficial geology map.
3. Limited to areas where drilled well completion reports for gravel and bedrock wells indicate 50 feet or more of overburden. Stratigraphy in drillers' logs indicates that in the Lower Village and Huntington Center areas, surficial sands and gravels are underlain by a thick silt/clay layer, which extends to approximately 50-60 feet below ground surface. This layer is then underlain by the coarse gravel aquifer that the "gravel wells" in the Villages draw their water from.

In order to evaluate the potential for well interference between closely spaced bedrock wells, we identified areas where drilled wells are located less than 200 feet apart. The 200-foot radius is used by Vermont DEC regional office and water supply permitting programs as a "rule of thumb", where wells that are proposed within 200 feet of each other or of pre-existing wells may be required to be installed and tested for interference before a permit is granted.

7.2. Water Supply Capacity Analysis Results

The results of the water supply capacity analyses are described below. Maps and tables illustrating and summarizing approximate locations where water quantity and water quality issues were identified are included for the Lower Village (Figure 8, Figure 8a, and Table 5), Huntington Center (Figure 9, Figure 9a, and Table 6), and Hanksville (Figure 10a and Table 7).

7.2.1. Water Quantity

In the Lower Village, well yields for the known gravel, drilled wells ranged from 10-100 gallons per minute or more (Figure 8). The locations of gravel wells closely corresponded with areas that the USGS surficial geologic map identified as fluvial and alluvial gravel deposits (Section 3.2.4), and all of the identified gravel wells are located in areas with more than 50 feet of overburden material. Six replacement wells identified from the property owner survey and other sources in the Lower Village were for gravel wells (Table 5), and the replacement wells drilled into gravel generally had well yields of 10 GPM or more. There were three reports of periodic or annual water quantity issues associated with gravel wells, mostly within the Huntington Fire District No. 1 service area.

Well yields for the known drilled, bedrock wells in the Lower Village area ranged from less than 1 gallon per minute to a maximum of 70 gallons per minute (Figure 8a). A clearly defined area, reaching from approximately Bridge Street south and to the west of Main Road, contains a grouping of bedrock wells with well yields of 1 gallon per minute or less. A well yield of 0.5 gallons per minute is equivalent to 720 gallons per day, or about the expected water use that that would be needed to supply a 5-6 bedroom house. During high water use periods, or during prolonged drought conditions, low-yielding wells may be more likely to experience water quantity problems—or to experience occasional water quality problems, as the well draws water from farther outside its normal drawdown zone. A few other isolated areas, particularly in the northern part of the Lower Village near the Main Road – Texas Hill Road intersection, also showed well yields of 1 GPM or less.

The areas of low-yielding bedrock wells in the Lower Village generally correspond with current or past reports of water quantity problems from other sources, including 11 properties where a drilled bedrock water supply well had been replaced, and another three properties where existing bedrock wells had been deepened or hydrofractured (Figure 8a and Table 5). Depths of the replacement bedrock wells ranged from 230 to 1100 feet. The deepest replacement wells were generally located in the area of Blackbird Swale, Raven Ridge, and the southern portion of Bridge Street. Replacement wells drilled into bedrock generally had low yields (four wells had yields of 1-5 GPM and six wells yielded less than 1 GPM). Reports of low-yielding drilled wells were generally located along and west of Main Road, corresponding closely with the area of low-yielding wells identified in Figure 8a. Three reports of water shortages were associated with bedrock wells, 300-500 feet deep. Fifty-nine properties reported no problems or issues with water quantity, while no information was available for the remaining 186 properties in the Lower Village (Table 5).

Only a few areas, particularly along the southern portion of Bridge Street, Cummings Drive, and Hinesburg Hollow Road, showed any drilled bedrock wells that were spaced less than 200 feet apart, where well interference may be a concern. However, there are also a significant number of drilled wells

where the aquifer the well is drawing from is unknown, thus limiting the utility of this assessment for the Lower Village.

In Huntington Center, all well yields reported for known, drilled gravel wells were above 10 gallons per minute (Figure 9). As in the Lower Village, the locations of gravel wells tracked closely with the presence of surficial fluvial gravels as reported in the USGS surficial geologic dataset, and all were located in areas with at least 50 feet of overburden. Only one well replacement associated with a gravel well was noted in Huntington Center.

Only a few drilled wells that terminated in bedrock in Huntington Center, located north of Shaker Hill Road and near the Main Road-Trapp Road intersection, had well yields of 2.5 gallons per minute or less (Figure 9a and Table 6). Most areas of the village that are served by bedrock wells had well completion reports with yields of 10 GPM or more. A total of seven properties had indications of current or past issues with adequate water quantity for supplying existing property uses (Figure 9a and Table 6). In contrast to the trends observed in the Lower Village, instances of well replacement were mostly located between Camel's Hump Road and Trapp Road, rather than in areas of low-yielding bedrock wells. Most replacements were for drilled wells, and the new wells were bedrock wells 180-525 feet deep. Most replacement wells had yields of 10 GPM or more, though the deepest replacement well had a yield of 1-5 GPM. Some of the supplies that were flagged in the DEC private well database as replacement wells near the Main Road-Camels Hump Road intersection may be replacement wells serving existing structures due to the decommissioning of the co-op system in the 1990s, rather than because of a specific water quantity issue. There were no reports of periodic or annual water quantity issues from the property owner survey. Fourteen properties reported no water quantity problems, and no information about potential water quantity issues was available for the remaining 51 properties.

As in the Lower Village, only a few areas in Huntington Center, particularly along Main Road between Camel's Hump Road and the Fire Department, and in the Lassiter subdivision on Shaker Hill Road, showed any drilled bedrock wells that were spaced less than 200 feet apart, where well interference may be a concern.

In Hanksville, no drilled wells terminating in gravel were identified. Two small areas of low-yielding drilled wells terminating in bedrock are located near the Main Road-Carse Road intersection (Figure 10). Many of the eight instances of water supply replacement encountered correspond with areas of low-yielding wells, mostly located along Main Road (Figure 10 and Table 7). All replacements were bedrock wells, with depths of 195-550 feet. Yields for the replacement wells were generally adequate, though one had an estimated yield of less than 1 GPM. There were no instances of deepening or hydrofracturing of existing wells, or reports of periodic or annual water quantity issues. Four properties reported no water quantity problems, and no information about potential water quantity issues was available for the remaining 40 properties.

In Hanksville, properties are generally spaced far enough apart that well interference for drilled, bedrock wells is unlikely to be a significant concern.

7.2.2. Water Quality

In Lower Huntington Village, a total of 44 properties reported water quality issues related to existing water supply systems (Figure 8 and Table 5). Twenty-eight of these reports were reports of aesthetic issues (color, taste, or smell). There were three geographic clusters of reports near Texas Hill Road, the Huntington Fire District No. 1 service area, and the Agnes Drive area. Near Texas Hill Road, aesthetic issues were predominantly associated with drilled wells; where well construction information was available it appeared that both gravel and bedrock wells, with depths of 65-225 feet, were affected. The well serving the Huntington Fire District No. 1 is a gravel well, 73 feet deep. Other nearby wells with reported aesthetic issues are also gravel wells. In the area of Agnes Drive, all reports of aesthetic issues were for bedrock wells, with depths ranging 150-500 feet.

The predominant water contamination issue reported in the Lower Village was coliform contamination (six reports within Huntington Fire District No. 1, and seven reports outside the fire district service area). The majority of these reports were for drilled wells that had coliform issues when installed, or that were discovered during property transfers and remedied. Two of the reports were for dug wells or springs; both also reported using UV disinfection or filters to treat the water supply. There was one report of both aesthetic and coliform issues outside the fire district service area, for a drilled well of unknown depth. A total of 64 properties reported no water quality issues; no information was available for the remaining 166 properties.

In Huntington Center, a total of 10 properties reported water quality issues related to existing water supply systems (Figure 9 and Table 6). Seven of these reports were for aesthetic issues, and the reporting properties were mostly clustered near the Main Road/Camels Hump Road intersection. Aesthetic issues were associated with drilled wells (both gravel and bedrock wells). Three properties reported issues with coliform contamination (one of these also reported aesthetic issues with the water supply). Two of these properties, located near the Main Road/Camels Hump Road intersection, reported that the shallow wells where the contamination was discovered were later replaced with drilled wells. A total of 11 properties reported no water quality issues; no information was available for the remaining 51 properties.

In Hanksville, there were two reports of aesthetic issues, and one report of both aesthetic and coliform issues (Figure 10 and Table 7). All reports were associated with dug wells or springs, and there was no spatial pattern to reports of water quality issues. A total of 14 properties reported no water quality issues, and no information was available for the remaining 35 parcels.

7.3. Wastewater Capacity Analysis Methods

Using information collected and described in the previous sections of this report, a GIS-based planning level capacity assessment for onsite wastewater systems was completed. The assessment identifies which parcels may be constrained in terms of future growth, based on soils, lot size, flood plains, surface waters, wellhead protection areas, setbacks, and other permitting and natural resource protection criteria—as well as areas where additional capacity may exist to support future development. The results of this assessment will be used to help construct and visualize potential build-out scenarios in the next phase of the project.

There are two main components to the wastewater capacity analysis: an “available area” analysis and a “required area” analysis, each of which is described below.

The objective of the available area analysis is to identify which developed parcels would be constrained by inadequate lot size if required to install an onsite system that complies with all horizontal setbacks as set forth in current regulations and local ordinances. There are many factors that result in areas of a parcel being unavailable for construction of an onsite system. For example, state and local regulations require that certain "setbacks" or distances from natural or artificial features be maintained in order to protect those resources. One such setback is a required separation of 100 feet from surface waters such as ponds or streams. It is because of setback regulations that the total area on a parcel is significantly reduced when determining which areas are suitable for onsite systems.

A second and equally important part of determining if a parcel has enough suitable land area to support an onsite system is an analysis of the soil conditions on the parcel to determine the area required to treat the wastewater flows generated on the parcel—and, in terms of capacity, once existing development is accounted for, whether a given parcel might be able to support additional flows for future development.

The details of the assumptions and criteria that were used to conduct the wastewater treatment capacity analysis are included in Appendix E.

7.4. Current Condition Wastewater Capacity Analysis Results

In the Lower Village, a total of 94 properties, or about a third of those in the village area, were characterized as having potential limitations if the existing onsite wastewater treatment were to need replacement in the future (Figure 11 and Table 5). Most of the properties with current condition limitations are clustered near Huntington Acres, around the Main Road-Bridge Street intersection, along Bridge Street to the east of the Huntington River, and along Roberts Park Road near the river. A smaller number of parcels (18) likely have sufficient land area to replace the existing wastewater treatment system onsite, if needed in the future, but beyond that may have limited capacity to change or expand the use of the property. These parcels are also primarily clustered near the Main Road-Bridge Street intersection. The remaining 162 properties either appear to have some capacity to expand or change the

current property use, or are undeveloped. A total of 20 property owners in the Lower Village indicated that they either had future plans and adequate capacity to implement them, or had ideas or plans that would need additional capacity for successful implementation. Most of the 10 instances where existing plans could be implemented without additional capacity are located near the edges of the Lower Village, while most of the 10 instances where additional capacity may be needed in the future are clustered closer to the core of the village near the Main Road-Bridge Street intersection.

In Huntington Center, a total of 22 properties, or about a 30% of those in the village area, were characterized as having potential limitations if the existing onsite wastewater treatment were to need replacement in the future (Figure 12 and Table 6). Most of the properties with current condition limitations are located along Main Road, with small clusters near the Camel's Hump Road and Trapp Road intersections. Nine parcels likely have sufficient land area to replace the existing wastewater treatment system onsite, if needed in the future, but beyond that may have limited capacity to change or expand the use of the property. These parcels are primarily located between Camel's Hump Road and Trapp Road. The remaining 41 properties either appear to have some capacity to expand or change the current property use, or are undeveloped. A total of seven property owners in Huntington Center indicated that they either had future plans and adequate capacity to implement them, or had ideas or plans that would need additional capacity for successful implementation. As in the Lower Village, most of the three instances where existing plans could be implemented without additional capacity were located near the edges of the village on larger lots, while all of the four instances where additional capacity may be needed in the future are clustered near the Main Road-Camel's Hump Road intersection.

Of the three village areas, Hanksville has the highest proportion of properties (23 properties, or 44%) that currently may face limitations with replacement of their existing wastewater treatment systems if needed in the future (Figure 13 and Table 7). Most of the properties with current condition limitations are located along Main Road, with small clusters near the Carse Road-Moody Road intersection. Two parcels located along Main Road likely have sufficient land area to replace the existing wastewater treatment system onsite, if needed in the future, but beyond that may have limited capacity to change or expand the use of the property. The remaining 27 properties either appear to have some capacity to expand or change the current property use, or are undeveloped. No property owners in Hanksville indicated that they had future plans, regardless of whether they had capacity on-site to implement those plans.

8. BUILD-OUT SCENARIO DEVELOPMENT

The build-out scenarios developed during this project illustrate how differing water and/or wastewater management scenarios impact potential land uses and development densities in each village—a soils-up, rather than zoning-down, approach. The assessment of current conditions (Section 7) represents the basis for developing each build-out scenario, and infrastructure alternatives to support those scenarios. A total of three scenarios were developed, each of which is assumed to occur over a time-frame of roughly the next fifty years:

- "Do Nothing" (current zoning and development patterns continue)
- "Fix Existing Village Problems Only" (also referred to as "Fix Problems")
- "Provide for Village Centered Vitality" (also referred to as "Village Vitality")

This section of the report describes the three build-out scenarios, and the results from each scenario, in more detail. The range of capacity development options beyond the "Do Nothing" scenario were developed in cooperation with the Water and Wastewater Working Group members, as well as the members of a Planning Commission committee evaluating an alternate system of zoning and land development regulation (see Section 8.1.3 below). Infrastructure alternatives—and thus, to some extent, the range of development densities that may ultimately be feasible for the villages—attempted to balance the stated desire to focus future development in the existing villages against the likely capacity of the land in and near the villages to supply potable water and soil-based wastewater treatment. The consultants also tried to keep in mind that "bigger" is not always "better"—the infrastructure alternatives created in service of these build-out scenarios should not be out of scale with, or provide more capacity than, what residents are likely to think is reasonable for the future of the villages.

The build-out scenarios and related infrastructure alternatives were further informed by the following guiding principles expressed by the Working Group members:

- Consider community water supply options preferentially (e.g., before wastewater treatment options);
- Consider smaller/neighborhood scale wastewater options preferentially (before village-scale collection/treatment/dispersal or entirely on-lot wastewater treatment); and
- Avoid mandating use of filtrate systems on the individual property scale as a way to increase density.

8.1. Build-Out Scenario Descriptions

8.1.1. "Do Nothing" Scenario

The "Do Nothing" scenario continues current practice – maintaining existing water and wastewater infrastructure as it is, with the potential for future development limited to the estimated water and wastewater capacity available on each individual property. Replacement infrastructure will be located on same property as original systems. Parcels not currently complying with modern regulations cannot grow or change to a land use that involves increased water use or wastewater flow. All construction and maintenance costs are borne by property owners. This scenario assumes that the zoning districts and regulations currently in force (including a one-acre minimum lot size in the Village zoning districts) are continued in the future.

This scenario was illustrated by making estimates about future development or subdivision of currently open lands. Since the Village zoning districts currently have a one-acre minimum lot size, lots that are two acres or smaller may change use but will not become more densely developed or subdivide. Given the overall pattern of existing development and permits issued for new development in Huntington over the last 15 years, what is likely to happen in the future is perhaps one or two planned unit developments on larger lots at the outskirts of the villages (the locations of which cannot be predicted), but mostly one to three lot subdivisions for new single family residences.

The median lot size from WSPWSR permits for new subdivisions in the villages between 1996 and 2011 was 1.43 acres – say 1.5 acres. With the exception of the planned unit development subdivision on Agnes Road, all were one to four-lot subdivisions. Thus, a three-acre lot underlain by soils that were suitable for onsite wastewater treatment could in theory become two 1.5-acre lots, a six-acre area with suitable soils could become four 1.5-acre lots, and so on. This rule was applied in each of the three village areas only where existing parcels were more than 2 acres in size, and where soils that are mapped as suitable for conventional or raised onsite wastewater systems exist. This spatial calculation provided a rough idea of the number of new lots that could conceivably be created over the next 50 years, if current onsite wastewater regulations, zoning regulations, and zoning district boundaries remain in force.

8.1.2. "Fix Existing Village Problems Only" Scenario

The philosophy of this build-out scenario is to provide water and/or wastewater capacity to support areas of demonstrated need in all three Village areas, based on the Phase 1 evaluation and capacity assessment work described earlier in this report. The infrastructure alternatives accommodate current development densities and land uses, but do not provide significant capacity to accommodate future growth or changes in use on properties with current condition limitations. This scenario also assumes that the zoning districts and regulations currently in force (including a one-acre minimum lot size in the Village zoning districts) are continued in the future. Costs for construction and maintenance of shared improvements may be borne

entirely by the property owners served, or shared between landowners and the Town—though we recommend that community water or wastewater systems be owned by the Town. This scenario acknowledges that the areas of the Lower Village and Huntington Center where existing landowners have plans that need capacity, and the areas with the most concentrated current condition wastewater capacity needs, are the exact areas where Town Plan and state-level policy directives encourage additional development density—but does not rise to the level of change envisioned in the "Provide for Village Centered Vitality" scenario (described below).

While alternatives in this scenario will have an end result of allowing more flexible use of existing buildings, and possibly even something like a café or small restaurant, they will not result in appreciably greater future development density in the "core" areas of the Lower Village or Huntington Center—because the one-acre minimum lot size is still in effect. At the ultimate "build-out" under this scenario, outlying areas with larger lots will still end up with relatively unconnected, small residential subdivision-type development.

8.1.3. "Provide for Village Centered Vitality" Scenario

During the development of this scenario, the Water and Wastewater Working Group members encouraged collaboration between this effort's consultants and the members of a Planning Commission committee embarking on an initiative funded by a Municipal Planning Grant, in which they are exploring the concept of form-based zoning as it might apply to Huntington's villages.

The overall philosophy of the form-based zoning initiative is to evaluate changes to zoning regulations and districts that encourage denser but scale-appropriate development that merges with historic land uses. This focus contrasts with the way zoning is often currently implemented in Vermont, which, when coupled with onsite wastewater/water supply regulations, tends to result in 'village scale sprawl' (as can be observed in the Lower Village's current development pattern in particular). The form-based districts that were under consideration during the time that the build-out scenarios were being developed included:

- Village core, multi-use. Liberally mixed building and land uses, no minimum lot size, most permissive build-to areas, intended to encourage a relatively dense multi-use, multi-purpose street environment; parking located away from street or hidden.
- Residential, mixed use. Street-oriented development pattern; small-lot but primarily residential development envisioned; small front yards encouraged; no minimum lot size; a maximum lot size may be implemented for new development.
- Rural. Low-density, primarily residential development; larger minimum lot size; standards possibly similar to those applied in the current Rural Residential District.

This scenario assumes that some variation on the zoning districts and regulations envisioned by the form-based zoning initiative are implemented in the future. The philosophy of this scenario is to show the infrastructure, and likely associated costs, that may be needed to support the relatively dense development pattern envisioned in the Village Core and Residential, Mixed Use areas in the Lower Village and Huntington Center—to the extent this is possible given the carrying capacity of nearby soils and streams. Costs for construction and maintenance of shared improvements are shared between landowners and the Town—and community water or wastewater systems would be owned by the Town.

After discussion with Working Group members, it was decided to limit alternatives developed in support of this build-out scenario to estimated water use and wastewater flows that could support roughly a doubling of the current development density, preferentially within the historically dense core areas of the Lower Village and Huntington Center. No "Village Vitality" scenario was developed for Hanksville, as there is no remaining historic core area of development, and property owners in this village did not express any interest in changing the uses of their properties in ways that might require community water or wastewater infrastructure in the future.

In the Lower Village, in addition to the core area that is provided with both water supply and wastewater treatment capacity, this scenario provides community water supply capacity to much of the area near Main Road surrounding the village core, sufficient to support one and a half times the current development density—but does not supply additional wastewater treatment capacity. Providing community water supply capacity in this area effectively removes the protective well shield buffers—the primary development-related area restriction—from properties in this area, thus providing additional flexibility to property owners with regard to future development. The carrying capacity of the underlying soils to treat wastewater on-site will still, however, place somewhat of a natural upper limit on the density of development in this district.

While significant additional development is not anticipated in the vicinity of Huntington Fire District No. 1, the "Village Vitality" scenario includes community water supply for the Fire District's service area at its current water use in order to address existing issues related to water quantity and quality in that area.

8.2. "Do Nothing" Build-out Scenario Results and Discussion

The potential future development pattern in Huntington's villages under the "Do Nothing" scenario, where current water supply/wastewater treatment regulations and zoning/land development regulations are maintained over the next roughly 50 years, is illustrated in Figures 14-16. In the Lower Village, the "Do Nothing" build-out scenario would result in up to 146 new single-family homes being developed on roughly 36 parcels (Figure 14). Under this scenario, future subdivisions and increases in development density occur almost entirely outside the historic "core" area with present zoning—yet, the overall number of residential units could increase substantially, based on the currently remaining land area

available for development in the Lower Village. In fact, no lots in the "core" area can be subdivided with a minimum lot size of one-acre in the Village zoning district.

In Huntington Center, the potential future development pattern under the "Do Nothing" scenario is similar to that observed for the Lower Village (Figure 15). In this case, the "Do Nothing" build-out scenario would result in up to 109 new single-family homes being developed from what are now about 18 parcels of undeveloped land. As in the Lower Village, much of the future development would occur on the fringes of the historic "core" area—but in this case, the number of residential units could nearly triple, based on the currently remaining land area available for development in Huntington Center. In contrast to the Lower Village, a few lots immediately adjacent to the "core" area would be able to subdivide under the current one-acre Village zoning.

Unlike the other two villages, the projected development pattern for Hanksville under the "Do Nothing" scenario—of residences scattered throughout the village—is remarkably similar to the development pattern that already exists (Figure 16). In Hanksville, the "Do Nothing" build-out scenario would result in up to 55 new single-family homes being developed on what are now about 11 parcels of undeveloped land. This would represent approximately a doubling of the village's current development density.

8.3. Water Use and Wastewater Flow Projections

8.3.1. Water Use Projections and Water Source Demands

Water demand projections were developed for the current condition, and for the three build-out scenarios described in Section 8.1, using the design demand tables in the current (2010) version of the Water Supply Rule. To put the following water demand numbers in context, a three-bedroom single family residence under the 2010 Water Supply Rule will have an average day design demand of 450 gpd (0.32 gallons per minute or gpm), and with an assumed peaking factor of two, the maximum day design demand is 900 gpd (0.64 gpm). Unlike the state's WSPWSR, which allow for maximum design flows to be reduced when multiple residences are connected to the same leachfield, the Water Supply Rule requires that systems be designed at the prescribed demand with no credit for multiple connections to the same water supply system. Thus, in the projections that follow, the water demand will always be calculated as a higher number than the wastewater design flow.

8.3.1.1. Lower Village

Current water use and build-out scenario projections for water use for the Lower Village are summarized in Table 8. The current condition average day design demand for all properties in the Lower Village is 146,480 gpd (102 gpm), while the maximum day design demand is 292,960 gpd (204 gpm). In the current condition, this demand is spread over the whole village, and is supplied by Huntington FD No. 1 and by

individual or small shared wells and springs. These numbers are provided to give some overall context for the scenarios that follow.

Under the "Do Nothing" build-out scenario in the Lower Village, average day design demand would increase to 230,217 gpd and maximum day design demand would increase to 460,434 gpd—a 56% increase over the current condition (Table 8). As with the current condition, this demand is spread out over the entire village zoning district, and is supplied by Huntington FD No. 1 and by individual or small shared wells and springs. The water design demands reflect a near-doubling of the number of residential units currently located in the village zoning district—with that future development located almost entirely outside the historic "core" village area with present zoning.

The "Fix Existing Village Problems Only" scenario in the Lower Village results in a smaller but still significant increase in average day (217,629 gpd) and maximum day (435,257 gpd) design demands—a 48% increase over the current condition (Table 8). In this scenario, the locations of shared water supply systems depends primarily on which wastewater options—and specific disposal sites—are chosen in the Lower Village. In some cases, a small off-site water supply and distribution system would be needed to serve downgradient properties—but most if not all properties in the "core" could probably keep their water supplies. If sites west of Bridge Street are chosen, a larger community water supply system would be needed to serve properties between the wastewater system and the Huntington River. Water and wastewater alternatives developed under this scenario illustrate both possibilities (see Section 10).

As part of the "Fix Problems" build-out scenario development, an evaluation was completed to understand whether the Working Group members' preference to provide community water systems preferentially (before community wastewater systems) could be successfully incorporated into scenario development and alternatives analysis. Providing community water supply systems while keeping wastewater treatment on-site, however, has only a minimal positive impact on the on-lot wastewater capacity available for small parcels in the "core" areas of the Lower Village and Huntington Center. In the Lower Village, for instance, if a community water system were provided and existing water supply wells were decommissioned, about 30 properties would change from not having any capacity for a replacement system to having at least the capacity to replace their existing wastewater systems in the future. However, almost all of these properties are less than 2 acres in size. What this means for the future is that, even if community water was supplied for these parcels, they would not be able to subdivide given current zoning with a minimum one-acre lot size, and in many cases, not even if the minimum lot size was smaller. They may gain some flexibility to change use, and even to some extent to increase the size of their existing wastewater systems, but the density of parcels and/or buildings would not be able to increase appreciably in the 'core' area of the Bridge St./Main Road/East St. intersections. A similar pattern occurs for Huntington Center and for Hanksville—if only community water systems are provided, and existing wells are decommissioned, several lots gain some capacity to replace existing systems, but

almost all of these are less than 2 acres in size, so their subdivision potential is severely limited under current zoning regulations.

The "Village Vitality" scenario in the Lower Village results in a substantial overall increase in average day (221,393 gpd) and maximum day (442,785) design demands—a 51% increase over the current condition (Table 8). This water design demand projection assumed that, for the core zone, overall density would double, keeping a similar mix of property uses—so capacity is provided for 100% over the current condition's design demand for that area. Areas adjacent to the village core have capacity provided for 150% of current design demands, and the Huntington F.D. No. 1 vicinity has capacity provided for 100% of current design demands. Under this scenario, the water demand and wastewater flow projections still indicate a infill development in outlying areas – this will likely occur unless minimum lot size is significantly increased for the edges of the village district.

8.3.1.2. Huntington Center

Current water use and build-out scenario projections for water use for Huntington Center are summarized in Table 9. The current condition average day design demand for all properties in Huntington Center is 37,655 gpd (26 gpm), while the maximum day design demand is 75,310 gpd (52 gpm). As in the Lower Village, this demand is spread over the whole village but is supplied only by individual or small shared wells and springs.

Under the "Do Nothing" build-out scenario, average day design demand would increase to 94,686 gpd and maximum day design demand would increase to 189,372 gpd—a 150% increase over the current condition (Table 9). As with the current condition, this demand is spread out over the entire village zoning district, and is supplied by individual or small shared wells and springs. The water design demands reflect a near-tripling of the number of residential units currently located in the village zoning district—and like in the Lower Village, that future development would be located almost entirely outside the historic "core" village area with present zoning.

The "Fix Existing Village Problems Only" scenario in Huntington Center results in a slightly smaller increase in average day (87,893 gpd) and maximum day (175,787 gpd) design demands—a 133% increase over the current condition (Table 9). In Huntington Center, wastewater options—and sites—were chosen that did not require off-site water supply and distribution systems to serve downgradient properties. In this case, the small reduction in overall water demand is due to the development of selected, currently undeveloped properties as wastewater treatment and dispersal sites, thus making those sites unavailable for future residential construction (see Section 10).

The "Provide for Village Centered Vitality" scenario in Huntington Center results in the smallest overall increase in average day (78,660 gpd) and maximum day (157,320 gpd) design demands—a 108%

increase over the current condition (Table 9). As in the Lower Village, this water design demand projection assumed that, for the core zone, overall density would double, keeping a similar mix of property uses—so capacity is provided for 100% over the current condition's design demand for that area. Under this scenario, the water demand and wastewater flow projections still indicate infill development in outlying areas – this will likely occur unless minimum lot size is significantly increased for the more rural edges of the village district.

8.3.1.3. Hanksville

Current condition average day design demand for Hanksville was on the order of 25,000 gpd (17 gpm). This demand is spread over the whole village and is supplied only by individual or small shared wells and springs. Under the "Do Nothing" build-out scenario, average day design demand would approximately double, to 49,200 gpd (34 gpm) —a 97% increase over the current condition. As with the current condition, this demand is spread out over the entire village zoning district, and is supplied by individual or small shared wells and springs. The water design demands reflect a near-doubling of the number of residential units currently located in the village zoning district—but unlike in the other villages, that future development pattern would likely approximate the current pattern of widely scattered residences.

No community water supply scenarios were envisioned for Hanksville; no residents in that area expressed needs for future capacity, and the current condition capacity assessment did not reveal concentrated areas of existing water supply-related issues.

8.3.2. Wastewater Flow Projections

Wastewater flow projections were developed for the current condition, and for the three build-out scenarios described in Section 8.1, using the design flow tables in the current (2007) version of the Wastewater System and Potable Water Supply Rules. To put the following wastewater flow numbers in context, a three-bedroom single family residence under the 2007 WSPWSRs will have a design flow of 420 gpd, with no "peaking factor". These rules do allow for wastewater design flows to be reduced when multiple residences are connected to the same leachfield, down to a minimum of 245 gpd when 20 or more residential units are connected to a shared leachfield.

8.3.2.1. Lower Village

Current wastewater design flows and build-out scenario projections for wastewater treatment for the Lower Village are summarized in Table 11. Total current condition wastewater flows for all developed parcels in the Lower Village are 130,430 gpd. In the current condition, this wastewater flow is distributed throughout the village and is treated entirely by individual or small shared leachfields.

Under the "Do Nothing" build-out scenario in the Lower Village, wastewater design flows would increase to 204,756 gpd —a 56% increase over the current condition (Table 11). As with the current condition, these flows are spread out over the entire village zoning district, and are treated entirely by individual or small shared leachfields. The projected wastewater flows reflect a near-doubling of the number of residential units currently located in the village zoning district—with that future development located almost entirely outside the historic "core" village area.

The "Fix Existing Village Problems Only" scenario in the Lower Village results in a smaller but still significant increase in wastewater design flows to a total of 167,050 gpd—a 27% increase over the current condition (Table 11). In this scenario, the locations of shared wastewater options are targeted to three geographic areas where a demonstrated need for wastewater treatment capacity was observed during the Phase 1 work: Huntington Acres, the village "core" area (including the area around the Main Road-Bridge Street-East Road intersection, and Hemlock Hill-Bridge Street east of the Huntington River), and portions of the Roberts Park Road area near the Huntington River. These shared systems together account for wastewater flows of about 26,700 gpd. As with the current condition and "Do Nothing" scenarios, the majority of the wastewater flows (140,366 gpd) are distributed over the entire village zoning district, and will be treated entirely by individual or small shared leachfields. A near-doubling of the number of new residential units currently located in the village district could still occur, and as with the "Do Nothing" scenario, if no changes to current zoning regulations were implemented, that development would occur almost entirely outside the historic village "core" area.

The "Provide for Village Centered Vitality" scenario in the Lower Village results in the smallest overall increase in projected wastewater flows, for a total of 182,995 gpd—a 40% increase over the current condition (Table 11). As for the water design demand projection above, this scenario assumed that, for the core zone, overall density would double, keeping a similar mix of property uses—so capacity is provided for 100% over the current condition's design flow for that area. Shared wastewater treatment capacity can also be provided for areas of demonstrated need outside the village "core" (Huntington Acres and the Roberts Park Road / riverbank) at current design flow. Again, under this scenario, the wastewater flow projections indicate significant infill development in outlying areas – this will likely occur unless minimum lot size is increased for the edges of the village district.

8.3.2.2. Huntington Center

Current wastewater design flows and build-out scenario projections for wastewater treatment for Huntington Center are summarized in Table 12. Total current condition wastewater flows for all developed parcels in Huntington Center are 36,415 gpd. As in the Lower Village, this wastewater flow is distributed throughout the village and is treated entirely by individual or small shared leachfields.

Under the "Do Nothing" build-out scenario in Huntington Center, wastewater design flows would increase to 91,356 gpd—a 150% increase over the current condition (Table 12). As with the current condition, these flows are spread out over the entire village zoning district, and are treated by individual or small shared leachfields. The projected wastewater flows reflect a near-tripling of the number of residential units currently located in the village zoning district—with that future development located almost entirely outside the historic "core" village area.

The "Fix Existing Village Problems Only" scenario in Huntington Center results in a smaller but still significant increase in wastewater design flows to a total of 80,300 gpd—a 120% increase over the current condition (Table 12). In this scenario, the locations of shared wastewater options are targeted to serve properties on Main Road from the Brush Brook Bridge to Trapp Road, where a demonstrated need for wastewater treatment capacity was observed during the Phase 1 work. The shared systems together account for wastewater flows of about 9,100 gpd. As with the current condition and "Do Nothing" scenarios, the majority of the wastewater flows (about 71,200 gpd) are distributed over the entire village zoning district, and will be treated entirely by individual or small shared leachfields. A near-tripling of the number of new residential units currently located in the village district could still occur, and as with the "Do Nothing" scenario, if no changes to current zoning regulations were implemented, that development would occur almost entirely outside the historic village "core" area.

The "Village Vitality" scenario in Huntington Center results in the smallest overall increase in projected wastewater flows, for a total of 61,280 gpd—a 69% increase over the current condition (Table 12). As for the water design demand projection, this scenario assumed that, for the core zone, overall density would double, keeping a similar mix of property uses—so capacity is provided for 100% over the current condition's design flow for that area. Again, under this scenario, the wastewater flow projections still indicate significant infill development in outlying areas – this will likely occur unless minimum lot size is increased for the edges of the village district.

8.3.2.3. Hanksville

Current wastewater design flows and build-out scenario projections for wastewater treatment for Hanksville are summarized in Table 13. Total current condition wastewater flows for all developed parcels in Hanksville are 23,030 gpd. As in the other villages, this wastewater flow is distributed throughout the village and is treated entirely by individual leachfields.

Under the "Do Nothing" build-out scenario in Hanksville, wastewater design flows would increase to 50,064 gpd—a 118% increase over the current condition (Table 13). As with the current condition, these flows are spread out over the entire village zoning district, and are treated entirely by individual or small shared leachfields. The projected wastewater flows reflect a doubling of the number of residential units

currently located in the village zoning district—though in Hanksville's case, the distributed nature of the likely future residences is similar to the pattern of existing development.

The "Fix Existing Village Problems Only" scenario in Hanksville results in a smaller but still significant increase in wastewater design flows to a total of 44,858 gpd—a 95% increase over the current condition (Table 13). In this scenario, the locations of shared wastewater options are targeted to properties on Main Road, where a demonstrated need for wastewater treatment capacity was observed during the Phase 1 work. The shared systems together account for wastewater flows of about 4,100 gpd. As with the current condition and Do Nothing scenarios, the majority of the wastewater flows (about 40,800 gpd) are distributed over the entire village zoning district, and will be treated entirely by individual or small shared leachfields.

Given the lack of a historic concentration of development, and little expressed interest in future plans that require additional wastewater capacity in Hanksville, no carrying capacity/modified zoning scenario was developed for this village.

9. POTENTIAL COMMUNITY WATER SUPPLY SOURCE AND WASTEWATER DISPERSAL SITE OPTIONS

Once the build-out scenarios were developed and the water demands and wastewater flows that would be necessary to support those scenarios were understood, we turned our attention to determining whether any areas of land within or near Huntington's villages had the potential capacity to supply either community water supply or wastewater treatment capacity to meet those future demands. This section describes the screening criteria that were used to identify possible community drinking water source areas and wastewater treatment sites, and summarizes which of those sites were ultimately used in developing the community water and wastewater alternatives and attendant cost estimates.

9.1. Community Water Supply Source Criteria and Options

Several areas of land within and near the Lower Village and Huntington Center were considered as potential shared potable water supply source sites. Figure 17 illustrates potentially suitable source areas near each of the villages, and Table 10 provides a summary of the potential water supply capacity ranges, pros and cons, and other details of each site. These areas have generally not been field tested for water supply yield or overall source suitability, and in nearly all cases it is unknown if they are available for use as individual or shared water supply sources. The areas are identified to show that such systems are feasible, and to provide a basis for cost estimating.

Some of the criteria used in evaluating sites for community water supply sources included:

- Sites within or near the lower, confined gravel aquifer areas identified in Phase 1, with the potential to tap that aquifer
- Potential to control the Zone 1 wellhead protection area through ownership or easement on a single parcel of land (for a Public Community Water System with 15 or more connections, the control area is a 500-foot radius from the water source)
- Proximity to higher-elevation land, such that reservoirs can be successfully sited for gravity distribution and pressurization of the water system
- Proximity to properties recommended for offsite solutions
- Environmental issues such as surface water crossings, floodways and floodplains, well interference, nearby onsite wastewater systems or potential shared wastewater system sites, and nearby hazardous material users or potentially contaminated sites
- Physical issues such as access, bedrock depths for water line installation, bridge or river crossings, and water line crossings
- Local knowledge of properties

- Other permit issues

No on-site evaluation of any of the potential community water supply source areas discussed below was conducted during this study. Site-specific source testing would be required to confirm the suitability of each potential site to supply potable water to a community water system. The permission of the individual landowners would be needed before any site-specific evaluations could occur.

A total of 13 potential community water source sites were initially identified and evaluated within and near the Lower Village and Huntington Center. (Figure 17 and Table 10). Each potential water source area is described in greater detail in Appendix F.

Within and near the Lower Village, two of the eight identified sites (Maplewood Cemetery at W-LV-2 and the Huntington F.D. No. 1 source at W-LV-5) were removed from consideration due to political or permitting issues that would make successful implementation of a project using those sites infeasible. Several other sites were removed from consideration either because they were located within or immediately adjacent to the floodplain (such as W-LV-1 and W-LV-4), or because their locations were either downgradient of existing wastewater systems, near potential shared wastewater sites with significant capacity, or close to existing hazardous sites. Nearly all of the potential source sites located within the Lower Village zoning district boundary had one or more of these limitations. Two potential source sites, both located south of the Lower Village (W-LV-7 and W-LV-8) met most or all of the siting conditions the consultants used as screening criteria. These two sites were used preferentially in developing infrastructure alternatives in support of the "Fix Existing Village Problems Only" (Section **Error! Reference source not found.**) and the "Provide for Village Centered Vitality" (Section 8.1.3) build-out scenarios for the Lower Village. Site W-LV-8 was utilized in developing water-supply-related infrastructure alternatives for both of these villages, since it is located about halfway between the Lower Village and Huntington Center.

Within and near Huntington Center, many of six identified potential source water sites were also located within or immediately adjacent to the floodplain (such as the Town Offices, Garage, and Fire Dept. parcel at W-HC-4). Some of these locations were also located down-gradient of existing wastewater systems (W-HC-3 in the middle of the village area) or co-located with potential shared wastewater sites with significant capacity (W-HC-1 and W-HC-2 at the northern end of the village, for example). One potential source site, located well to the south of Huntington Center (W-HC-6) met most or all of the siting conditions the consultants used as screening criteria, and this site, along with W-LV-8, was used preferentially in developing infrastructure alternatives in support of the "Fix Existing Village Problems Only" (Section **Error! Reference source not found.**) and the "Provide for Village Centered Vitality" (Section 8.1.3) build-out scenarios for Huntington Center.

9.2. Community Wastewater Treatment/Dispersal Site Criteria and Options

Several areas of land within and near the three villages were considered as potential shared dispersal system sites. Figure 17 illustrates potential areas of suitable soils near each of the villages, and a summary of the potential wastewater treatment capacities, advantages/disadvantages, and other details for each site is included as Table 14. These areas have generally not been field tested for soil suitability, and in nearly all cases it is unknown if they are available for use as individual or shared dispersal systems. The areas are identified to show that such systems are feasible, and to provide a basis for cost estimating.

Some of the criteria used in evaluating sites for shared systems included:

- Well suited soils over an area large enough to support a shared leachfield
- Relatively flat or moderate slopes (20% or less)
- Proximity to properties recommended for off-site solutions
- Environmental issues such as downgradient water supplies, surface water crossings, floodways and floodplains
- Physical issues such as access, bedrock depths for collection system, bridge or river crossings, and water line crossings
- Local knowledge of properties
- Other permit issues

Aside from site evaluations of Town-owned systems that were conducted as part of the preliminary investigation, no on-site evaluation of any of the potential dispersal areas discussed below was conducted during this study. Site-specific soil testing and topographic surveying of each potential site would be required to confirm suitability for wastewater dispersal system. The permission of the individual landowners would be needed before any site-specific evaluations could occur.

A total of 21 potential shared wastewater dispersal sites were initially identified and evaluated within and near Huntington's three village areas (Figure 17 and Table 14). Each potential wastewater treatment and dispersal site is described in greater detail in Appendix G.

Within and near the Lower Village, one of the 12 identified sites (Maplewood Cemetery at WW-LV-6) was removed from consideration due to political or permitting issues that would make successful implementation of a project using that site infeasible. Several other sites were removed from consideration either because they were located adjacent to the floodplain (WW-LV-10) or very small receiving streams (WW-LV-1, for example). In several cases, sites had potential land area and soil-based treatment capacity for smaller shared systems (up to 6,499 gpd) but not for larger shared systems that would be permitted under the Indirect Discharge Rules (WW-LV-5 and WW-LV-9, for example). In and near the Lower Village, the prevalence of relatively sandy and gravelly soils means that, in contrast with

many Vermont villages, there is likely more soil-based wastewater treatment capacity available near the village than may be needed to support future village growth and development plans. However, that capacity is located entirely on private property, and is outside of the village 'core' area where the Town Plan states future development would ideally be focused. Though nine of the identified sites were identified as having potentially significant capacity, sites WW-LV-3, WW-LV-4, WW-LV-5, WW-LV-8, and WW-LV-9 met most or all of the siting conditions the consultants used as screening criteria, and these sites were used preferentially in developing infrastructure alternatives in support of the "Fix Problems" (Section **8.1.2**) and the "Village Vitality" (8.1.3) build-out scenarios for the Lower Village.

Within and near Huntington Center, one of the nine identified sites (land adjacent to the Brewster Pierce School at WW-HC-6) was removed from consideration due to political or permitting issues that would make successful implementation of a project using that site infeasible. Two other sites were removed from consideration either because the identified soil-based treatment capacity was likely not sufficient to serve either of the build-out scenarios (the Town Office/Fire Dept./Town Garage property at WW-HC-7 and the adjacent privately owned land at WW-HC-8). There are several large, open parcels located to the north and south of the 'core' area of Huntington Center with the potential to serve one or more of the build-out scenarios. The presence of finer-textured soils and shallower seasonal high water tables in Huntington Center as compared to the Lower Village means that, although the overall wastewater treatment needs for Huntington Center are smaller, those smaller flows are nearly a match for the potentially available soil capacity located near the village. As in the Lower Village, this capacity is located entirely on private property, and is outside of the village 'core' area where the Town Plan states future development would ideally be focused. Sites WW-HC-1, WW-HC-2, WW-HC-3, WW-HC-4, and WW-HC-9 met most or all of the siting conditions the consultants used as screening criteria, and these sites were used preferentially in developing infrastructure alternatives in support of the "Fix Problems" (Section **8.1.2**) and the "Village Vitality" (Section 8.1.3) build-out scenarios for Huntington Center.

In Hanksville, only one area of open land was located that had the potential to serve this village's build-out scenario. Area WW-HV-1 is privately owned, but does meet the siting conditions the consultants used as screening criteria, and was used preferentially in developing infrastructure alternatives in support of the "Fix Problems" (Section **8.1.2**) build-out scenario for Hanksville.

10. WATER SUPPLY AND WASTEWATER TREATMENT ALTERNATIVES AND COST ESTIMATES

The water supply and wastewater treatment alternatives developed for Huntington's three villages were generally developed to emphasize the value of existing infrastructure investments and considering passive (e.g., gravity based), proven, low-maintenance systems first wherever possible.

Since the results of the capacity assessments (Section 7) indicated that wastewater treatment capacity was a greater limiting factor than water supply capacity, the community water supply alternatives developed under the "Fix Problems" build-out scenario were intended to provide strategic water capacity in support of the successful utilization of specific shared wastewater treatment sites. The shared wastewater treatment sites that are utilized drive whether and where water supply alternatives are placed in the "Fix Problems" scenario, especially in the Lower Village. In the "Village Vitality" scenario, community water supply alternatives were developed that enable densely spaced development and increased flexibility to change property use in village 'core' areas, and that support somewhat increased development density in areas adjacent to those core areas.

In all cases for community water supply alternatives, the use of pumps to transport water was limited to pumping from water sources to storage reservoirs. The water distribution systems illustrated in these alternatives are all pressurized by gravity. In addition, as directed by the Water and Wastewater Working Group members, the alternatives and cost estimates for community water supply do not include fire-fighting flows or storage requirements.

On the wastewater system side, a range of different collection system technologies could potentially be utilized to convey wastewater from individual properties to further treatment and, ultimately, to dispersal sites in or near the villages. In each village, the majority of the identified wastewater dispersal sites are at a higher elevation or a significant distance from where the wastewater is being generated, and so the alternatives developed use a combination of effluent gravity and effluent pumping collection systems.

In all of the villages, the shared wastewater treatment and dispersal sites appear to be suitable for conventional, in-ground pressurized absorption trench leachfields. Since these treatment and dispersal systems are generally the most passive and low-cost options to construct, operate, and maintain, shared pre-treatment systems and other advanced technologies were not included in the wastewater alternatives that were developed for either the "Fix Problems" or the "Village Vitality" build-out scenarios.

Finally, the wastewater treatment "service areas" do not change within each scenario for the wastewater infrastructure alternatives. The changes between alternatives are primarily in the use of shared system dispersal sites where there are multiple feasible options. The specific wastewater sites that are utilized, in turn, drive whether and where the community water supply alternatives are placed, especially for the "Fix

Problems" scenario. The wastewater sites utilized play a major role in determining what properties would need to be served by community water systems under this scenario.

The details of each alternative, from the current condition through the "Village Vitality" scenario, are included in Tables 15-16 (for water supply) and Tables 17-19 (for wastewater treatment).

One "Do Nothing" alternative was developed for each of the three villages (Figures 14, 15, and 16), and a total of 25 infrastructure alternatives were developed for the three villages as follows:

Village and Build-Out Scenario Description	Count of Water Alternatives	Count of Wastewater Alternatives
Lower Village		
Fix Existing Village Problems Only	6	5
Provide for Village Centered Vitality	3	3
Huntington Center		
Fix Existing Village Problems Only	0	2
Provide for Village Centered Vitality	3	2
Hanksville		
Fix Existing Village Problems Only	0	1

The following sections generally describe the infrastructure alternatives, as well as some of the assumptions used in their development.

10.1. "Do Nothing" Scenario

The potential future development pattern in Huntington's villages under the "Do Nothing" scenario, where current water supply/wastewater treatment regulations and zoning/land development regulations are maintained over the next roughly 50 years, was described in Section 8.2 and is illustrated in Figures 14-16. In each village, the "Do Nothing" build-out scenario would result in nearly a doubling of the overall number of residential units, based on the currently remaining land area available for development. In the Lower Village and Huntington Center, most of this future development activity would occur on the fringes of the historic "core" areas of the villages, while in Hanksville the current pattern of residences scattered throughout the village would be maintained.

10.2. "Fix Existing Village Problems Only" Scenario

The results of the capacity assessments (Section 7) indicated that wastewater treatment capacity was a greater limiting factor than water supply capacity—particularly in the 'core' areas of the Lower Village and Huntington Center. As stated in Section **8.1.2**, the infrastructure alternatives are intended to accommodate current development densities and land uses, but do not provide

significant capacity to accommodate future growth or changes in use on properties with current condition limitations. This scenario also assumes that the zoning districts and regulations currently in force (including a one-acre minimum lot size in the Village zoning districts) are continued in the future. While alternatives in this scenario will have an end result of allowing more flexible use of existing buildings, and possibly even something like a café or small restaurant, they will not result in appreciably greater future development density in the "core" areas of the Lower Village or Huntington Center—because the one-acre minimum lot size is still in effect.

Thus, the community water supply alternatives developed under the "Fix Problems" build-out scenario for the Lower Village (Figures 18-20 and Table 15) were intended to provide strategic water capacity in support of the successful utilization of specific shared wastewater treatment sites (Figures 26-30 and Table 17). Shared wastewater treatment capacity is provided for three main areas of demonstrated need at their current wastewater design flows, as identified in Phase 1:

- The Huntington Acres vicinity (Figure 26)
- The village 'core' area (Main Street near Bridge and East Streets, including Bridge Street on both sides of the Huntington River) (Figures 18-20 and 27-29)
- The Huntington River bank along Roberts Park Road and East Street (Figure 30)

Under this scenario, the Lower Village's five water supply and wastewater treatment alternatives are paired—for example, Alternative LV-W-B.2a in Table 15, the water supply alternative for the Huntington Acres need area, is paired with wastewater alternative LV-WW-B.2a in Table 17. The wastewater "service areas" do not change between the alternatives considered under this scenario—instead, the shared system dispersal sites change where there are multiple feasible options, and the specific wastewater sites that are utilized drive whether and where the water alternatives are placed. For the village 'core' area, two wastewater collection and dispersal system options are provided: one option with a stream crossing of the Huntington River (alternative LV-WW-B.2c, Figure 28) and one option with two dispersal sites and no Huntington River crossing (alternatives LV-WW-B.2b in Figure 27 and LV-WW-B.2d in Figure 29). The village 'core' areas each have a paired water supply alternative – but since no mapped water supplies or other restrictions are located down-gradient from the Huntington Acres or Roberts Park Road shared wastewater dispersal sites, these two wastewater alternatives have no paired water supply alternative.

Two wastewater treatment alternatives were developed for the "Fix Problems" scenario in Huntington Center—each for the same group of small parcels with limited capacity for replacement of existing systems, located mostly along Main Road (Tables 16 and 18, and Figures 34 and 35). The wastewater dispersal sites utilized to construct these alternatives did not have any mapped water supplies or other restrictions located down-gradient, so these two wastewater alternatives have no paired water supply alternative.

One wastewater treatment alternative was developed for a series of capacity-limited properties along Main Road in Hanksville (Table 19 and Figure 38). The wastewater dispersal site did not have any mapped water supplies or other restrictions located down-gradient, so this wastewater alternative has no paired water supply alternative.

10.3. "Provide for Village Centered Vitality" Scenario

Infrastructure alternatives developed for the "Village Vitality" scenario are intended to illustrate how much and what kinds of wastewater and water supply infrastructure may be required to realize a future development pattern for the Lower Village and Huntington Center that closely merges with historic land uses—while also working with modern environmental regulations and the natural carrying capacity of nearby soils and streams. As discussed in Section 8.1.3, the alternatives developed in support of this build-out scenario were limited to estimated water use and wastewater flows that could support roughly a doubling of the current development density within the historically dense core areas of the Lower Village and Huntington Center.

Our goals for these alternatives were first, to develop wastewater alternatives that support a doubling of wastewater treatment capacity in the historic "core" areas of the Lower Village and Huntington Center—and to strategically support capacity-limited areas outside those "core" areas if feasible (especially the Huntington Acres and Roberts Park/Riverbank areas in the Lower Village). Our second priority was to develop water supply alternatives that enable densely spaced development and maximum flexibility to change property uses in the historic "core" areas, and to support current land uses and somewhat increased development density in areas adjacent to the "core" area of the Lower Village by providing community water supply – but not community wastewater collection and dispersal.

Given these goals, the three community water supply alternatives developed under the "Village Vitality" build-out scenario for the Lower Village (Figures 21-23 and Table 15) were intended to provide capacity in support of current and future development, while still enabling the successful utilization of specific shared wastewater treatment sites. In contrast to the alternatives developed for the "Fix Problems" scenario (Section 10.2), neither the community water supply nor wastewater treatment/dispersal "service areas" change between the alternatives considered under this scenario Instead, both water supply and wastewater dispersal alternatives independently illustrate a few of the multiple feasible options.

As in the "Fix Problems" scenario for the Lower Village, wastewater treatment alternatives developed under the "Village Vitality" build-out scenario (Figures 26 and 30-33, and Table 17) include service for the same three main areas of demonstrated need:

- The Huntington Acres vicinity at 100% of its current design flow (Figure 26)

- The village 'core' area at 200% of its current design flow (Main Street near Bridge and East Streets, including Bridge Street on both sides of the Huntington River) (Figures 31-33)
- The Huntington River bank along Roberts Park Road and East Street at 100% of its current design flow (Figure 30)

Again, as with alternatives developed for the village 'core' area under the "Fix Problems" scenario, two wastewater collection and dispersal system options are provided: one option with a stream crossing of the Huntington River (alternative LV-WW-C.2c, Figure 32) and one option with two dispersal sites and no Huntington River crossing (alternatives LV-WW-C.2b in Figure 31 and LV-WW-C.2d in Figure 33).

In Huntington Center, three water supply alternatives and two wastewater treatment alternatives were developed for the "Village Vitality" scenario. In this case, both the water supply (Figures 23-25 and Table 16) and wastewater alternatives (Figures 36-37 and Table 18) were intended to support doubling of existing capacity in the historic "core" area, and the community water supply and wastewater treatment service areas are identical. Since the "core" area includes all of the parcels identified earlier as having limited capacity for replacement of existing systems, the service area is simply an extension of the area identified in the "Fix Problems" alternatives. As with the "Fix Problems" alternatives for this village, the wastewater dispersal sites utilized to construct these alternatives did not have any mapped water supplies or other restrictions located down-gradient, so these two wastewater alternatives have no paired water supply alternative. Instead, as with the "Village Vitality" alternatives for the Lower Village, the community water supply and wastewater treatment alternatives may be considered independently.

10.4. Preliminary Costs

The cost estimates developed for the "Do Nothing" scenario (as described in Sections 8.1.1 and 8.2) attempt to simply illustrate the cost of taking no action. Essentially, what would the collective cost to the property owners in the villages be if, in the future, each owner needed to replace their existing water supply and/or their wastewater system under modern regulations? To create this estimate, we used information about soils and geology, lot sizes, and environmental conditions, as well as information about existing water and wastewater system types (Tables 5, 6, and 7), to estimate the type of replacement systems that would likely be needed at each property given current regulations (see Appendix E for detailed worksheets). Then we multiplied the total number of each type of likely replacement water or wastewater system by the estimated cost to construct that type of system, as well as to get the system designed/engineered and permitted. For wastewater treatment systems, we assumed that over a 50-year time frame, all systems would either be constructed, or that existing systems would likely need major repair or replacement. Since water supply systems tend to have a longer life cycle, we assumed that, while all new water supplies would be constructed, only 75% of the existing drilled gravel wells and 50% of the existing drilled bedrock wells would likely require replacement over a 50-year time frame.

The water and wastewater system types and assumptions that were used to calculate the "Do Nothing" scenario infrastructure construction/ replacement costs included:

- Drilled gravel well: Replace existing water supply with a drilled well to gravel (assume 100 foot depth); properties in the Huntington Fire District No. 1 service area were assumed to have water supply replacement costs similar to that of a drilled gravel well.
- Drilled bedrock well, best case: Replace existing water supply with a drilled well to bedrock (assume 250 foot depth)
- Drilled bedrock well, worst case: Replace existing water supply with a drilled well to bedrock (assume 1,000 foot depth)
- In-ground septic systems: Replace existing wastewater treatment system with a 1,000-gallon concrete septic tank and a conventional pipe-and-stone leachfield, assume a three-bedroom single family residence at 420 gallons per day.
- Raised or mound septic system: Replace existing wastewater treatment system with a 1,000-gallon concrete septic/pump tank and a pressurized at-grade leachfield
- Advanced treatment, performance based system, or best fix: Replace existing wastewater treatment system with a 1,000-gallon concrete septic/pump tank and a sand mound leachfield
- Connections to shared leachfields (or leachfield site): Assume similar per-property costs as a conventional, in-ground septic system.

Summaries of the estimated project costs for each of the alternatives, including the technical services and other related costs, are broken down for each alternative for comparison in Tables 20-21 for the water supply alternatives, and Tables 22-24 for the wastewater treatment alternatives. While some of these alternatives (especially the "Village Vitality" scenario alternatives) can be considered separate projects on their own, in other cases the water and wastewater alternatives are paired such that one may not be feasible without the other. The total project costs for paired municipal water and wastewater alternatives, as well as the replacement cost for systems within each village that would remain privately owned, are summarized in Table 25 for the Lower Village and Table 26 for Huntington Center. The details of how the consultant arrived at opinions of probable cost for the construction of each alternative are included in Appendix I (water supply) and Appendix J (wastewater treatment).

There are many trade-offs in avoided costs and potential benefits implicit in the construction cost estimates. For instance, in the "Do Nothing" alternative, construction costs are financed and paid entirely by individual property owners using short-term financing, and replacement systems are limited to the capacity available on each owner's individual property. In contrast, the "Village Vitality" alternatives provide shared water supply and/or wastewater treatment capacity for many properties in the Lower Village and/or Huntington Center, including flexibility for owners to change property uses and increase flows—and the ability to access long-term municipal finance vehicles.

The ranges of estimated total project costs for combined water supply and wastewater alternatives for the Lower Village, including related site testing, design, permitting, and installation, were as follows:

Alternative Description	Alternative IDs	Total, Combined Project Cost
Do Nothing scenario, all Village properties	LV-A	$8,641,000
Fix Problems scenario, Lower Village core, with river crossing	LV-B-1+LV-B.2c	$10,984,000
Fix Problems scenario, Lower Village core, no river crossing	LV-B-1+LV-B.2b and LV-B.2d	$12,290,000
Fix Problems Scenario, including Huntington Acres and Roberts Park/Riverbank area	LV-B-1+ LV-B.2a+LV-B.2c+LV-B.2e; LV-B-1+ LV-B.2a+LV-B.2b+LV-B-2d+LV-B.2e	$13,203,000 - $14,509,000
Village Vitality scenario, Lower Village core, with river crossing	LV-C-1+ LV-WW C.2c +LV-W-C.2a; LV-C-1+ LV-WW C.2c +LV-W-C.2b	$14,417,000 - $14,335,000
Village Vitality scenario, Lower Village core, no river crossing	LV-C-1+ LV-WW C.2b + LV-WW-C.2d +LV-W-C.2a; LV-C-1+ LV-WW C.2b + LV-WW-C.2d +LV-W-C.2b	$14,782,000 - $14,864,000
Village Vitality Scenario, including Huntington Acres and Roberts Park/Riverbank area	LV-C-1+ LV-WW-C.2a + C.2c + C.2e + LV-W-C.2a; LV-C-1+ LV-WW-C.2a + C.2b + C.2d +C.2e + LV-W-C.2b	$16,554,000 - $17,083,000

The ranges of estimated total project costs for combined water supply and wastewater alternatives for Huntington Center, including related site testing, design, permitting, and installation, were as follows:

Alternative Description	Alternative IDs	Total, Combined Project Cost
Do Nothing scenario, all Village properties	HC-A	$3,657,000
Fix Problems scenario, Huntington Center core	HC-B-1+HC-WW-B.2a; HC-B-1 + HC-WW-B.2b	$4,668,000 - $4,777,000
Village Vitality Scenario, Huntington Center core	HC-C-1+HC-W-C.2a + HC-WW-C.2a; HC-C-1+HC-W-C.2b + HC-WW-C.2b;	$6,559,000 - $7,734,000

In the "Village Vitality" scenario for the Lower Village and Huntington Center, a community water supply alternative was designed that provided capacity to both villages (identified as LV-W-C.2c and HC-W-C.2c). Total project costs to provide both community water supply and wastewater treatment capacity to both villages using this combined water supply alternative—including both the cost of the municipal systems and replacement costs for systems that would remain on private property--ranged from $20,373,000 - $21,220,000 for both village 'core' areas only, and $22,492,000 - $23,341,000 for all areas including Huntington Acres and the Roberts Park/Riverbank areas in the Lower Village.

The estimated total project costs for combined water supply and wastewater alternatives for Hanksville, including related site testing, design, permitting, and installation, were as follows:

Alternative Description	Alternative IDs	Total, Combined Project Cost
Do Nothing scenario, all Village properties	HV-A	$2,180,000
Fix Problems scenario, limited capacity properties	HV-W-B + HV-WW-B.1+HV-WW-B.2	$5,300,000

A more detailed preliminary engineering study, including site-specific testing of the potential community water supply and wastewater dispersal sites discussed in Section 9, would be needed in order to further refine these cost estimates. The final project costs would be lower if, for example, a topographic survey reveals that a greater portion of the village areas may be served by effluent gravity wastewater collection systems, or that fewer pump stations are needed than are currently envisioned. However, costs could also shift higher if, for example, a preferred community water supply site is not available, and additional pumping or a longer distribution line were needed in order to utilize a particular community source water site.

10.5. Permitting and Other Environmental Concerns

The following permits and environmental reviews are needed for all of the alternatives:

- Wastewater System and Potable Water Supply Permits will be needed for the permitting and construction of any alternative described above, including new or replacement water supply or wastewater treatment systems constructed under the "Do Nothing" scenario.
- Any local permits that would be required.

The following permits and environmental reviews may or may not be needed, depending on which alternative or alternatives the Town chooses to move forward:

- The "Fix Problems" and "Village Vitality" wastewater alternatives for the village core areas in both the Lower Village and Huntington Center would require an Indirect Discharge Permit from the Vermont ANR Indirect Discharge Section. Since little recent development has occurred within these core areas, the "Fix Problems" alternatives (where only existing flows are provided capacity) may qualify as an "existing indirect discharges of sewage", provided that the connecting properties were developed on or before May 17, 1986. Although the permitting criteria and process are somewhat less stringent for "existing" indirect discharges, systems permitted in this way are limited to existing wastewater flows—meaning that connected properties would not be able to add bedrooms or otherwise change their property's use if that meant increased wastewater flows. A community wastewater treatment system constructed to support both existing and new development, as envisioned under the "Village Vitality" scenario's wastewater alternatives, would be considered a "System with New Indirect Discharge to Class B Waters" under the IDRs. More-pre-discharge environmental monitoring is required, but once construction is complete,

connected properties have greater flexibility to change uses or add bedrooms, accessory housing, etc.

- Any community water supply alternative that has 15 or more connections, or serves 25 or more people on a year-round basis, will be classified as a Public Community Water System and will require source, construction and operating permits from the Vermont ANR Water Supply Division. All of the "Village Vitality" water supply alternatives would be considered Public Community Water Systems. The permit process for a new proposed source to serve a Public Community Water System consists of three phases (application and site evaluation, source testing, and source evaluation). A Construction Permit is also required; the water distribution system must be reviewed and approved by the Water Supply Division prior to construction to insure that there is adequate water supply for the proposed services and that the proposed improvements will be constructed properly to provide clean and safe drinking water. Finally, once the source is approved and the system is constructed, the Town would obtain an Operating Permit, which is renewable annually.
- If alternatives in either the "Fix Problems" or "Village Vitality" scenarios disturb more than one acre of land during construction activities, the resulting project will need to obtain coverage under General Permit 3-9020 for stormwater runoff from construction sites. Given the proximity of the Huntington River to many of the alternatives, a resulting project may be classified as either Low Risk or Moderate Risk. For Low Risk projects, a Notice of Intent must be filed, and applicable practices detailed in the *Low Risk Site Handbook for Erosion Prevention and Sediment Control* must be followed. For Moderate Risk projects, a site specific Erosion Prevention and Sediment Control (EPSC) Plan must be developed and implemented that meets the requirements of the general permit and conforms to the *Vermont Standards and Specifications for Erosion Prevention and Sediment Control* (2006). Moderate Risk projects require preparation by an individual familiar with the principles of erosion prevention and sediment control.
- Many of the alternatives in both the "Fix Problems" and "Village Vitality" scenarios include at least one stream crossing. In these cases, Stream Alteration Permits would be needed from the ANR Water Quality Division.
- The "Village Vitality" alternatives may disturb more than 10 acres of land, which is the threshold for municipal infrastructure projects to require an Act 250 permit. The "Village Vitality" alternative that includes a combined water supply system for both the Lower Village and Huntington Center will almost certainly require an Act 250 permit.
- With receipt of federal loans or grants, a National Environmental Policy Act (NEPA) environmental review process will be required. Due to the relatively small areas of disturbance for the "Fix Problems" alternatives, an Environmental Assessment (EA), which is a level of review required when environmental impacts are expected from a project and

the State is charged with determining the level of impact, may not be needed. Such an assessment is likely to be needed for the "Village Vitality" alternatives, especially in the Lower Village or if the combined water system alternative is preferred. Ultimately, the desired outcome is a "Finding of No Significant Impact (FONSI)" from the federal agency providing the funding. However, the preliminary evaluation is not sufficient to confirm that this is achievable. Further investigation of specific alternatives, which include STEP tanks, collection system routes, and dispersal sites, will be necessary.

- With receipt of federal loans and/or grants, a project Archeological Resource Assessment (ARA) may be required in the early stage of a project to assess the likelihood of finding significant historic and archeological resources within the proposed disturbed areas.

The following permits and environmental reviews are not likely to be needed:

- Main Road runs through all three villages from north to south, and collection systems for all of the alternatives either cross or run parallel to it. Main Road is a Class 2 Town Highway, however, so construction within this road's right-of-ways will not require a Permit to Work within the State Right-of-Way from the Agency of Transportation.
- Alternatives that disturb areas near wetlands may require state and/or federal wetland permits—however, the alternatives described during this project generally do not fall near wetland areas. In the event that this changes, the U.S. Army Corps of Engineers administers the federal wetland program and the Vermont ANR Water Quality Division administers the state program, which requires a Conditional Use Determination (CUD) for all impacts within and up to a 50-foot buffer zone inside of Class II wetland areas. This could also trigger the need for a 401/404 water quality certification.

If any of the community water supply alternatives are preferred, discussions should be initiated with ANR Water Supply Division personnel regarding coordination of preliminary testing of potential source water sites. If the testing confirms source suitability, these investigations could in turn lead to Public Community Water System source permits, especially for "Village Vitality" scenario alternatives.

Continued discussions with ANR Wastewater Management Division personnel will be needed regarding coordination of preliminary testing of potential wastewater dispersal sites. If further investigation on any of the potential dispersal sites confirms soil and site suitability, then these investigations could in turn lead to small-scale Wastewater System and Potable Water Supply permits (for the Huntington Acres, Roberts Park/Riverbank, or Hanksville areas), since each of these proposed alternatives has design flows of less than 6,500 gpd. If any of the "Fix Problems" or "Village Vitality" alternatives for village core areas are preferred, preliminary characterization of the potential sites and of the capacity of the receiving streams to accept an indirect discharge of renovated effluent should be developed in coordination with the staff of the Indirect Discharge Permit program.

Finally, any design that involves work in rights-of-way within the Huntington Fire District No. 1 service area will need to avoid the existing potable water supply mains to the greatest extent possible, or to plan for properly designed water/sewer crossings. The “Fix Problems” alternative for the Roberts Park/Riverbank area would likely require multiple crossings of service to individual properties or of water distribution mains.

11. PRIORITIZING THE ALTERNATIVES

While project costs and ongoing expenses are significant considerations in making decisions about any municipal infrastructure project, they are not the only criteria which should be considered. Often, qualitative considerations (such as quality-of-life for residents, ease of project implementation, ease of maintenance, whether the project implements or impedes local planning goals, etc.) can have a significant impact on the decision making process. Table 27 presents a matrix which ranks the relative advantages and disadvantages of each grouping of alternatives proposed for the Lower Village using a variety of different criteria. Table 28 presents a similar matrix, applying the same criteria, to each alternative proposed for Huntington Center – as well as for the "Village Vitality" scenario alternative that provides wastewater treatment at the Village-specific level with a single community water system serving both the Lower Village and Huntington Center.

The presence of significant potential water supply and wastewater treatment capacity located in reasonable proximity to both the Lower Village and Huntington Center has resulted in the design of a series of alternatives that—within each build-out scenario—have more similarities than differences. In the Lower Village, the most significant differences between the alternatives, and those that could most influence community decision making, include:

- In the "Fix Problems" scenario, utilizing a single wastewater treatment site and crossing the Huntington River results in a lower construction project cost – but if the stream crossing is not carefully designed and constructed, the trade-off for lower construction cost could be a broken wastewater main during a flood. Not utilizing the Huntington River crossing in this scenario results in a more costly construction project, because it will likely require construction of an expensive community water system in order to use the closest wastewater treatment site.
- In the "Fix Problems" scenario, there is likely to be somewhat of a trade-off in operation and maintenance costs—but these costs could be significant whether a stream crossing is chosen (and thus a single wastewater treatment site that requires site-specific monitoring) or the stream crossing is avoided (the two separate wastewater sites would likely have lower operating costs, but source monitoring and a part-time operator would be required to operate the community water supply system).
- Options to provide capacity for outlying areas of demonstrated need, such as Huntington Acres and the Roberts Park/Riverbank areas, provide an environmental benefit but very little in the way of preserving economic viability for the core of the Lower Village.
- While all of the "Fix Problems" scenario alternatives address existing capacity issues, they do not provide significant capacity for future growth or development. Thus, the vast majority

of new residential development will occur on larger lots near the fringes of the village zoning district.

- Since both water supply and wastewater treatment capacity are being supplied to the core area of the Lower Village under the "Village Vitality" scenario, there is less of a trade-off in construction costs between the alternatives, depending upon whether or not a Huntington River crossing is utilized for wastewater treatment. In this case, the higher construction cost that would be incurred by avoiding a wastewater main stream crossing may be worth the increased flood resilience that the avoided crossing would provide. A river crossing would still be necessary, however, for the water distribution system.
- The "Village Vitality" scenario alternatives illustrate the level of water supply and wastewater treatment infrastructure that may be needed to truly foster capacity for future growth and development that is consistent with historic development patterns and that conforms with modern environmental regulations. Under this scenario, new development can be focused in the village core, and existing properties in core areas will have maximum flexibility to subdivide or change uses.

The more favorable alternatives for the Lower Village include:

- "Fix Problems" Scenario: Village Core, Huntington River Crossing (Alternatives LV-W-B.2c + LV-WW-B.2c)
- "Village Vitality" Scenario: Village Core, Huntington River Crossing (Alternatives LV-W-C.2a + LV-WW-C.2c)

In Huntington Center, the most significant differences between the alternatives, and those that could most influence community decision making, include:

- In the "Fix Problems" scenario, neither wastewater treatment alternative requires a paired water supply alternative, and both wastewater alternatives utilize a single wastewater treatment site. One of the alternatives requires a stream crossing (of Brush Brook north of the village core) to reach a dispersal site at a greater distance from the village core. In this case, the lowest cost alternative is also likely to be the most flood-resilient, assuming the nearer wastewater dispersal site has adequate capacity.
- In contrast to the "Fix Problems" scenario alternatives in the Lower Village, operation and maintenance costs will likely be similar between these wastewater alternatives. Both would be eligible for a General Permit under the Indirect Discharge Rules, which usually does not contain downgradient water quality monitoring provisions.
- As in the Lower Village, while the "Fix Problems" scenario alternatives address existing capacity issues, they do not provide significant capacity for future growth or development.

Thus, the vast majority of new residential development will still occur on larger lots near the fringes of the village zoning district.

- Under the "Village Vitality" scenario for Huntington Center, the trade-off in construction costs between the alternatives depends primarily upon the distance between the village core area and the proposed water source or wastewater dispersal site. All of the water supply alternatives require a stream crossing, while the wastewater alternatives may or may not require a Huntington River crossing.
- As in the Lower Village, the "Village Vitality" scenario alternatives illustrate the level of water supply and wastewater treatment infrastructure that may be needed to truly foster capacity for future growth and development in Huntington Center that is consistent with historic development patterns and that conforms with modern environmental regulations. Under any of these alternatives, new development can be focused in the village core, and existing properties will have maximum flexibility to subdivide or change uses.
- If community water systems are preferred for both the Lower Village and Huntington Center, it is likely more cost effective from the perspective of both construction and operational costs, to serve both villages from a single source, control building, and reservoir—especially if the location approximately halfway between the two villages proves to have sufficient water supply capacity.

The more favorable alternatives for Huntington Center include:

- "Fix Problems" Scenario: No Brush Brook crossing (Alternative HC-WW-B.2a)
- "Village Vitality" Scenario: Alternatives HC-W-C.2a + HC-WW-C.2a

In Hanksville, we do not recommend an infrastructure alternative past the "Do Nothing" scenario. The major factors in this recommendation include the distributed nature of existing development in the village, the limited number and capacity of potentially suitable shared wastewater dispersal sites, the high construction cost of any improvements relative to the small number of properties that would share the costs and benefits, and the lack of stated interest from Hanksville property owners in making changes to their properties that would require additional wastewater treatment capacity.

While we have assigned a "more favorable" or "less favorable" ranking for grouping of alternatives based on our own professional judgment, the final decision about which scenario or alternatives to pursue—if any—rests with the residents and stakeholders of Huntington.

12. FUNDING SOURCES

There are several common sources of grant and loan funding for municipal water supply and wastewater projects. The Water and Wastewater Working Group has already begun involving the Vermont Department of Environmental Conservation (DEC), Facilities Engineering Division in this project--Mr. Don Robisky of the Wastewater Management Division is currently working with the Town's consultant and is providing coordination with DEC's Facilities Engineering staff. The DEC and USDA Rural Development (RD) have programs that can provide grants or loans for eligible municipal water or wastewater projects, providing the various funding program requirements are satisfied.

All grant and loan recipients must be municipal entities and nearly all past projects receiving grant and loan funding have served designated municipal growth centers.

12.1. State and Federal Programs

There are several state and federal funding programs that can help finance community water and/or wastewater projects. Many of these programs are administered through the Vermont DEC Facilities Engineering Division, with the noted exception of Rural Development funds. The most common funding sources are summarized in the following sections. It is worth noting that, for projects with relatively small construction costs, the additional regulatory and administrative requirements of some of the state and federal funding sources may significantly increase the overall project cost.

12.1.1. VT Department of Environmental Conservation: Drinking Water SRF (State Revolving Fund) Loans

Funding for municipally owned water system projects in Vermont is generally available from the Vermont Agency of Natural Resources, Water Supply Division, through the Drinking Water State Revolving Fund (DWSRF) loan program. A similar funding program for municipally owned wastewater projects is generally available from the Wastewater Management Division, through the Clean Water State Revolving Fund (CWSRF) loan program. Both the DWSRF and CWSRF are managed through the Facilities Engineering Division.

12.1.1.1. Funding Priority List

If a project is eligible for funding through the DWSRF loan program, the water system must apply for the annual DWSRF Project Priority List. Projects to correct the most serious risks to public health receive first consideration in awarding available funds. Completed applications for placement on the construction project priority list must be filed by January of each year to be eligible for the next October 1st to September 30th funding cycle. Projects are funded based on their priority points and their readiness to proceed. If a project is not ready to proceed, it will be bypassed on the current list, and must re-apply for

the next year's priority list. Through this bypass procedure, additional projects that were not initially identified for funding and are ready to proceed may be funded.

12.1.1.2. Planning Assistance

Funding for this feasibility study has been provided in part through the Vermont Water Supply Division (WSD) at no cost to the Town of Huntington. In general, additional planning may require the investment of engineering design and/or hydrogeological services before actual construction of any improvements. To help reduce the burden on small water systems, the State of Vermont can provide a 0%, 5-year DWSRF planning loan if the system is a municipality (a town, fire district or a school) or a private, non-profit community water system. Planning loans are generally rolled into a construction loan. Additionally, up to $50,000 of a planning loan may be forgiven for a municipality under certain circumstances. Planning loans are typically available for preliminary engineering studies, hydrogeological services including the drilling of new sources, surveys, and the development of final design plans.

12.1.1.3. SRF Funding for Construction

Projects requesting construction funding must apply for the annual DWSRF project priority list. Construction funding is available for municipal and private community water systems, and for non-profit non-community water systems. Interest rates and terms are determined using the community median household income (MHI), current annual operation and maintenance costs, and existing water system debt (if any). Construction loans may be repaid over a term of up to 20 years; interest rates are generally between 2-4%.

12.1.2. VT Department of Environmental Conservation: Clean Water SRF (State Revolving Fund) Loans

Awards can be made to municipalities on pollution control (wastewater treatment-related) work for planning, design or construction. The overall process and criteria for eligibility and use of the CWSRF are similar to that described above for the Drinking Water SRF. The Town of Huntington has received a "planning advance" loan to fund the current project. The planning advance does not have to be repaid to the State if the project is not constructed. However, should the project continue into the next phase, a potential source of planning funds is the CWSRF program. Planning loans are interest-free, while construction loans carry a 2% administration fee. The construction loans are repaid in equal annual payments over a term of up to 20 years. Loan repayments are returned to the revolving fund for subsequent use as new loans. A local bond vote typically secures this sort of loan funding.

12.1.3. U.S. Department of Agriculture, Rural Development Loans and Grants

Funding is also available for municipal water and wastewater projects through the United States Department of Agriculture Rural Development office (USDA RD) in Montpelier, VT. Loan and grant amounts are based upon the municipality's median household income from the 2010 census and the estimated equivalent user cost for the chosen water or wastewater project. The RD loan % value is re-evaluated every quarter and is subject to change on a quarterly basis. The 2010 US Census income data is not yet available at the Town level, but the Town of Huntington's median 2010 American Community Survey census median household income is $65,750, which is above RD's intermediate rate. This means that the project will likely not qualify for RD grant funding. However, an income survey of households in the area can provide additional and more specific information regarding incomes in the service area. The current lending rate from USDA RD for loan-only projects is 4.5% for 40 years; however they should be contacted directly for current funding packages.

12.1.4. Vermont Municipal Bond Bank

Municipally owned water or wastewater systems can go directly to the Vermont Municipal Bond Bank for funding. Current rates rate at the bond bank for a 30-year loan are 4.5%.

12.1.5. VT Department of Housing and Community Affairs, Community Development Block Grant Program (Vermont Community Development Program - VCDP)

Awards are based on a very competitive and income-sensitive process. Water or wastewater projects that meet VCDP benefit requirements (for instance, 51% of persons benefiting must be low to moderate income eligible) can apply for the implementation grant. Implementation grants range from $50,000 to a maximum of $300,000. A special multi-year grant option can go as high as $1,000,000.

12.1.6. Vermont Department of Environmental Conservation: 35% Grant – Dry Weather Pollution Abatement

Awards may be made to municipalities for the planning and construction of facilities for abatement of dry-weather pollution. This may include interceptor and collection sewers, pump stations, sewage treatment facilities, outfall sewers, and subsurface dispersal treatment and dispersal systems. This grant is normally not implemented unless there is tandem State or Federal grant/loan funding for the project. This grant requires the identification of points of pollution to document these sources of pollution to the surface waters of the State. A State Facilities Engineering Division engineer will inspect the potential points of pollution to determine eligibility for State funding.

12.2. Community Water and Wastewater System Revenue Concepts

Financing a municipal water or wastewater system can be accomplished using several potential revenue streams, depending on local politics and on residents' perception of the direct and indirect benefits of the project to the community and to individual landowners. Several of the potential revenue streams that may be viable for community infrastructure projects in Huntington's villages are discussed below.

12.2.1. Service Connection Fees, Connection or "Hookup" Fees, and User Fees

Publicly owned water and wastewater systems customarily establish a Rate Schedule for the users or customers of the system. The normal approach is to charge for both the privilege of connecting (one time) as a connection fee, then an ongoing fee, normally computed on an annual basis and billed quarterly, for the actual use of the service. Often, but not always, the ongoing user fee is at least partly determined based on the volume of water utilized in the connected residence or business.

12.2.2. Special Management District Fees

The Town could consider establishing a "Management District"—especially if alternatives within the "Village Vitality" scenario end up being preferred. Within the district, those properties which are not connected to a community water or wastewater system could voluntarily choose (or be required, if the Town made that decision) to have their systems managed by a public entity (such as the Town or a Fire District). For water systems, the management might entail regular well pump checks and water quality testing, while for wastewater systems, the management services might include annual system evaluations and septic tank pumping as needed (generally every 3 to 5 years).

This approach does several things:

- Regular inspection and maintenance extends the life of existing water and wastewater systems and results in fewer failures
- The Town can monitor areas of water supply or wastewater capacity problems and plan for future extensions
- Property owners will be more aware of the importance of proper system use
- Provides a source of revenue to the municipally-owned system

A typical range of fees for this service could be $100 to $400 per year, depending on whether septic tank pump-out costs are included.

12.2.3. Village-Wide Cost Sharing

The members of Huntington Fire District No. 1, for example, already share the costs and benefits of a community water system, paying a rate set annually which covers the ongoing expenses and maintenance costs for their water supply and distribution system. If, following a similar logic, residents in the Lower Village or Huntington Center (or those property owners within each village that would be served by one or more of the alternatives) agree that constructing water supply or wastewater treatment improvements represents a significant benefit that they wish to support financially, they could choose to provide financial support to finance a portion of the improvements. However, it is also true that alternatives within the "Fix Problems" and "Village Vitality" scenarios represent improvements to Town-owned and community infrastructure that may be best supported by all Huntington residents, rather than only those within the Village boundaries or within a particular service area.

12.2.4. Town-Wide Tax

Often, communities include a town-wide tax to augment the required revenues to support a community wastewater system that serves only a small portion of the municipality. This is a balancing act, because usually all town voters will be asked to support a bond vote, and a tax on properties not served will be viewed negatively. If this revenue option is considered, a clear point needs to be made that a vital "village center" is important to all town residents, so that local businesses may continue or expand, and that town-owned properties are preserved and improved. When implemented for more conventional water or wastewater projects in Vermont, the tax provides about 10% of the overall revenue needed, and may be about 1 to 2 cents on the tax rate.

13. RECOMMENDATIONS

This study has shown that a range of community water supply and wastewater treatment options can be constructed, under current zoning bylaws and water and wastewater system regulations, which sustain the current development trends of Huntington's villages but allow little expansion or change within the historic "core" areas of the Lower Village and Huntington Center. Sufficient community water supply and wastewater treatment capacity exists near the Lower Village and Huntington Center that an alternate future path, in which zoning bylaws are modified to encourage smaller lot sizes and foster a development pattern of compact villages surrounded by open land while also providing infrastructure that conforms with modern regulations, is not only possible but feasible and achievable.

This report contains information that can now be considered by the Selectboard and town staff, residents, and business owners in Huntington for implementation. While the consultant can recommend one scenario or set of alternatives over another, the real decisions lie with the community.

Following are some items to consider for the next steps in a potential community water supply or wastewater treatment project:

13.1. Working Group / Town Work

- Review and decide on a favored scenario or set of alternatives to move forward, potentially including management and local funding options;
- Initiate discussions with Vermont ANR Facilities Engineering Division, Water Supply Division, and/or Wastewater Management Division staff regarding planning loans or other financing to continue developing one or more community water or wastewater systems;
- Initiate discussions and obtain permission for preliminary testing on potential privately-owned sites suitable for shared water and wastewater system sites;
- Develop public outreach plan for building support for construction and funding, especially if any action past the "Do Nothing" scenario is preferred;
- Continue to work with consultants on technical work (described below).

13.2. Technical Work

- Preliminary soil and site investigations on potential community wastewater system sites, including conducting preliminary hand auger tests or backhoe soil test pits, refining hydrogeological capacity estimates, and understanding other technical permit issues relating to specific sites.
- Preliminary groundwater investigations on potential community water source sites, including installation and yield testing of one or more test wells.

In addition, we offer the following recommendations regarding maintenance of Town-owned wastewater systems:

- The Huntington Public Library's septic tank should be pumped out as soon as possible, and the pump operation and sludge levels in the pump station be checked by the pumper every time septic tank is pumped.
- Since the septic tanks at the Town Office, the Town Garage, the Fire Department, and the septic/holding tank at the Town Hall were all pumped in October 2011, a regular schedule should be established and adhered to, where each tank is checked every 2-3 years, and pumped if necessary.
- The Brewster Pierce Memorial School's water supply and wastewater treatment systems are operated and maintained in exemplary fashion, and this great work should be continued in the future.
- To facilitate future maintenance of the siphon tank on the wastewater system serving the Fire Department building, a riser to grade should be installed on the siphon tank. This is a minor adjustment to the system that does not require a State wastewater permit.
- The Town Garage's septic tank should be connected to a pump or siphon station and connected to the existing shared leachfield, as illustrated on the design plans and specified in the permit for the system.

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APPENDICES

APPENDIX A: WATER AND WASTEWATER WORKING GROUP MEMBERS

Barbara Felitti

Aaron Worthley

Dean Grover

Gordon Miller

Mariah Riggs

Roman Livak

Thomas Bailey

Jim Christiansen

APPENDIX B: HANDOUTS, PRESS RELEASES, NEWS ARTICLES, AND OTHER PROJECT OUTREACH

Water and Wastewater Capacity Study to Start in Huntington
Submitted by Barbara Felitti

Stone Environmental of Montpelier, and their partner Green Mountain Engineering of Bristol will begin conducting a water and wastewater capacity assessment in Huntington this August. The assessment will identify current water and wastewater issues, needs and capacity in the three village districts, as well as options for expanding water and wastewater capacity for each village. The assessment is fully funded through a planning advance from the Vermont Agency of Natural Resources (ANR), and so is being conducted at no cost to the Town.

One of the first activities will be to conduct a survey of residents and property owners about their water and wastewater systems. The survey will ask about information such as the type of systems residents have (e.g., do you have a drilled well or a dug well?), or if residents experience any problems with their systems (e.g., does high seasonal groundwater affect your septic system?). A self return stamped envelope will be provided to mail the surveys back to Stone Environmental. Stone Environmental will compile the results and report it back to the Town in a general manner to maintain confidentiality of individual property owner information. Individual property concerns or issues will not be reported to the Town. For example, Stone Environmental may find that a certain area of a village has water supply issues during a drought. The results of the survey and other research will be presented to the Town at a public meeting in early to mid November. We hope that the residents in the village districts will participate in the survey so that we can have good results.

As part of the assessment, residents in the village districts will also have an option of receiving a free evaluation of their property's soils and systems from Stone Environmental or Green Mountain Engineering. Residents who would like to take advantage of in this opportunity will indicate their interest on the survey they mail back to Stone Environmental.

The assessment is being overseen by the Huntington Water and Wastewater Assessment Working Group with representatives from several town boards and committees (Selectboard, Planning Commission, Conservation Commission, Town Hall Committee). We will try to publish a monthly article in the Times Ink and will also use Front Porch Forum and postings in Town to keep people informed about progress. If you have any questions or want more information, please come to one of our meetings (the committee meets the 1st Wednesday of each month, 7:00 – 8:30 pm at the Town Office) or email Barbara Felitti at HuntingtonWWWGroup@gmail.com . More information about the committee is also available at the Huntington municipal planning website: http://www.huntington-mpg.info/.

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Capacity Assessment for Huntington's Villages

Huntington's Water and Wastewater Working Group, with the support of the Selectboard, is taking proactive steps to learn more about the current capacity and needs of septic systems and drinking water supplies in the villages of Huntington - Huntington Lower Village, Huntington Center, and Hanksville. This information will then be used to better understand the options for future uses and development in these villages. This water and wastewater capacity assessment is being led by the Town's Water and Wastewater Working Group, which has chosen the project team of Stone Environmental, Inc. of Montpelier and Green Mountain Engineering, Inc. of Williston to conduct the study.

PURPOSE OF THE ASSESSMENT

The assessment will help Huntington officials and residents better understand the potential in the villages for future growth. No one option is being promoted, rather, the assessment will consider a range of options and their costs. The assessment has three main objectives:

- Identify current water and wastewater issues and needs of residential, public, and commercial structures in the three village districts.
- Identify current water and wastewater capacity in the three village districts.
- Assess options for expanding water and wastewater capacity for each village district, along with the associated cost and scale/quantity of additional capacity (build out scenarios).

SURVEY FOR VILLAGE PROPERTY OWNERS

For the initial assessment and identification of needs to work, the project team needs to know some basic information about septic systems and water supplies in the villages. Stone Environmental has sent a short survey to all the property owners in the Town's Village Zoning Districts. The more surveys that are returned to Stone, the more accurate their assessment of current conditions and potential needs will be. **Any information provided for the survey will be treated as strictly confidential**. The project consultants, Stone Environmental, will never report any site-specific information about individuals' water or wastewater systems to any regulatory agency, nor will they associate specific answers with private properties or property owners in presentations or reports to the Town.

In addition, over the fall months, the project team is offering a limited number of ***free, voluntary on-site water and wastewater assessment follow ups*** to property owners within the villages. A sign-up opportunity for this follow up is included in the survey form.

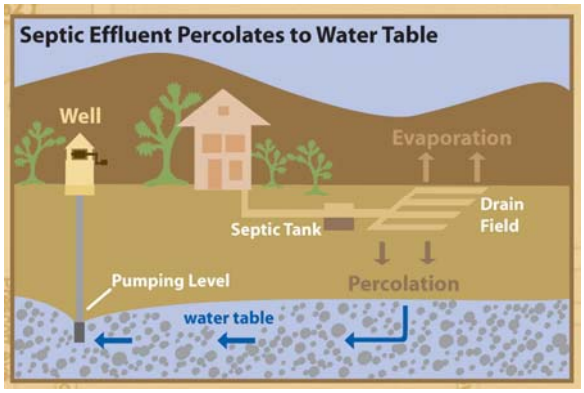
HOW DO SEPTIC SYSTEMS WORK?

A "basic" septic system consists of a septic tank, a distribution box, and a drainfield or leachfield (illustrated below). The septic tank provides settling of solids and primary treatment of the wastewater. The effluent from the septic tank then flows into gravel-lined trenches, where it percolates into soil.

WHY BE CONCERNED ABOUT WATER OR WASTEWATER?

Huntington has experienced several issues with respect to water and wastewater in the past, including:

- Seasonal issues with septic systems not functioning properly when water tables rise.
- Droughts, which particularly affect supply from shallow or dug wells.
- Elevated levels of harmful bacteria (E. coli) in the Huntington River, which have been attributed to livestock, pets, wildlife, and people.



The Huntington Town Plan and zoning regulations encourage denser development in the village districts, but we do not know if the villages can support this. Rather, it may be that denser development is limited by regulations

for wells and septic systems, because for health reasons leachfields cannot be located too close to existing drinking water supply wells.

Community development is also limited by the lack of information about water and wastewater capacity options. Many Town residents have expressed interest in the development of other businesses such as a local restaurant in one of the village centers, which may not be possible without new septic capacity. Existing buildings such as the Town Hall in Huntington Center may not be able to be put back into full use without a new septic system, as there is no obvious capacity at the Town Hall's site.

While most properties in Huntington's villages contain some form of wastewater treatment system, the systems' condition and suitability in relation to the buildings' uses and soil properties are often not known, or may be undocumented. Older systems may be undersized and may not be properly treating the wastewater before it reaches groundwater, and ultimately the Huntington River and drinking water wells.

These inter-related issues can significantly impact local plans for current and future uses of the land in Huntington's villages—especially since no work has yet systematically assessed the carrying capacities of local soils and groundwater, or whether those resources can sustainably support existing or future planned land uses.

WHAT IS THE TIMELINE FOR THIS PROJECT?

Most of the work for this study will be completed in the fall and winter of this year. There will be two public meetings to discuss the project and to gather community input—one in early November 2011, and one in March or April 2012. The final report will be published in the spring of 2012.

WHAT IS THE END RESULT OF THE PROJECT?

Once the all the results have been presented at public meetings, Stone Environmental will prepare a report which details:

- Areas in the village districts which have limitations for current water and wastewater capacity and future development.
- Areas in the village districts which provide potential to further develop water and wastewater capacity.
- How much water and wastewater capacity is available in each village district based on current conditions, with no improvements made.
- Different scenarios for developing water and wastewater capacity and the approximate cost of each scenario.

Ultimately, Town officials and residents of Huntington will make decisions about how and whether to proceed with implementing any of the recommendations made by Stone Environmental.

Your completion of the surveys is a key part of ensuring that the end result is based on solid information. Thanks for your help.

WHO CAN I CONTACT FOR MORE INFORMATION?

If you have comments, questions, or concerns about the project, please contact us directly:

Amy Macrellis
Consultant Team Manager
Stone Environmental, Inc.
(802) 229-1884
amacrellis@stone-env.com
http://www.stone-env.com/water

Barbara Felitti
Huntington Water and Wastewater Working Group
(802) 434-5996
HuntingtonWWWGroup@gmail.com
http://www.huntington-mpg.info/

WATER & WASTEWATER ASSESSMENT PUBLIC MEETING ON NOV 16TH

On November 16th there will be a public meeting to discuss the preliminary results of the water and wastewater assessment, including results of the survey of the three village districts and initial research.

The survey provided a good “snapshot” of water and wastewater systems in Huntington’s villages.

Many people may not realize that Huntington already has one public water supply system which serves Huntington Woods and Roberts Park in the Lower Village, and that several residents share water and/or septic systems. Other interesting facts:

- The majority of people (75%) have a drilled well. Others have a dug well or spring (14%) or are connected to a public water system (12%).
- 22% of people share their water supply with another building or property.
- 27% have concerns about the taste, color or smell of their water – some noted their water is rusty and has odors, others have bacteria or mineral problems.
- 42% use a filter or ultraviolet (UV) disinfection.

Some people would like to subdivide or further develop their property if they had access to a water supply and/or wastewater treatment. Others have concerns about further developing town water or sewer systems. What do you think?

Come to the public meeting and learn the facts, and participate in a discussion!

Water and Wastewater Capacity: Issues and Opportunities in Huntington's Village Districts

Lower Huntington Village, Huntington Center, and Hanksville

Amy Macrellis, Alan Huizenga, & the Water & Wastewater Working Group
Huntington Public Library
November 15, 2011

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Introductions and Acknowledgements

The Huntington River, summer 2011.

- Water & Wastewater Working Group Members
- Consultant Team Members
- Project funding partner from Vermont DEC

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Meeting Agenda

1 Background and Project Purpose / Goals
2 Overall Project Plan and Project Areas
3 Overview of Information Sources
4 Results and Findings to Date by Village
5 Capacity Analysis Summary
6 Next Steps
7 Questions and Answers / Discussion

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Background

Huntington Town Hall, Fall 2011.

- Limited area available on-site for wastewater treatment at Town Hall
- Drinking water shortages during droughts
- Draft bacteria TMDL for Huntington River near Lower Village
- Planning advance funding available from DEC to assess capacity, issues at village scale

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Project Goals

Brewster Pierce Memorial School grounds and garden, Huntington Center, Fall 2011.

- Identify current water and wastewater issues and needs in villages
- At village level, identify potential available capacity
- Assess options (and costs) for "no action" and for expanding water and wastewater capacity under different future "build-out" scenarios

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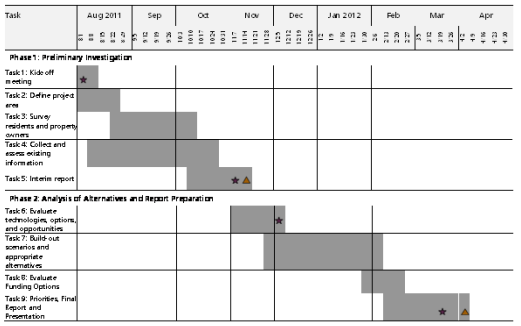
Project Plan and Schedule



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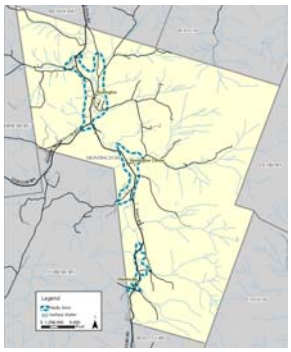
Project Areas - Villages



- Lower Huntington Village
- Huntington Center
- Hanksville
- Project areas limited to Village Zoning Districts plus 50-foot buffer

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Overview of Information Sources

Natural resources and water infrastructure in Huntington, Summer-Fall 2011.

- Natural resource inventory (topography, wetlands, floodplains, streams, soils, geology)
- Infrastructure inventory (property owner surveys and site visits, permit reviews, State private well database)

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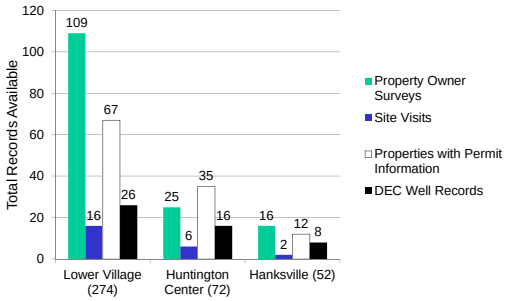
Overview of Information Sources



Infrastructure inventory data sources summary by village.

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Property Owner Survey Results

Beaudry's and nearby properties, Lower Village, summer 2011.

- Participation rate – 38%
- General state of knowledge about infrastructure
- Reports on water treatment, water problems
- Opinions on the future of water and wastewater in the villages
- Ideas for changing / expanding land uses if capacity available

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Site-Specific System Evaluations

Caption or reference

- Completed for all Town-owned properties
  - School system in great shape
  - A few repairs needed at Town Garage, Fire Dept.
- Also completed for 18 private properties

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Capacity Assesments for Water Supply and Wastewater Treatment

Huntington as viewed from Camel's Hump.
Image credit: Laura Hill Bermingham, University of Vermont.

- Village scale—where are there opportunities and limitations? What are they?
- Water quantity and water quality
  - Assessed well yields, evaluated reports of water quantity/quality issues
- Current condition soil-based wastewater capacity
  - Compared land area on each parcel to current property use and regulations

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What have we learned so far?

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Lower Village

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Village Areas Overview

- Lower Village
- 796 acres
- 274 properties total
- 247 residential
- 5 commercial or municipal properties
- 22 undeveloped

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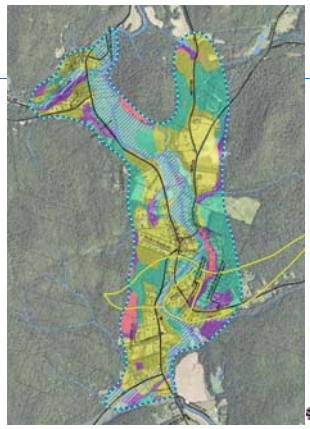
Natural Resource Inventory



- Lower Village
  - Limited wetlands, but large area in 100-year floodplain
  - ~40% of soils suitable for in-ground leachfields
  - Surficial, gravel and bedrock aquifers

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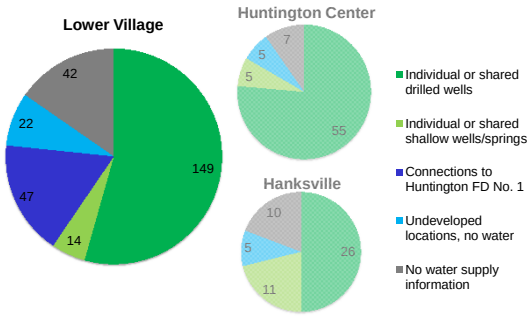
Current Water Supply Infrastructure



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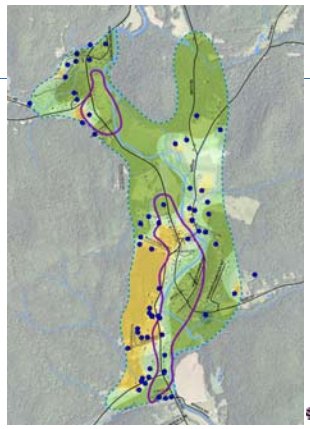
Water Supply Capacity—Well Yields and Quality



- Lower Village
  - Small proportion of dug wells or springs
  - Drilled gravel wells are high-yielding
  - Low-yielding bedrock wells in southwest portion of village
  - Water quality issues include aesthetics, coliform (~17%)

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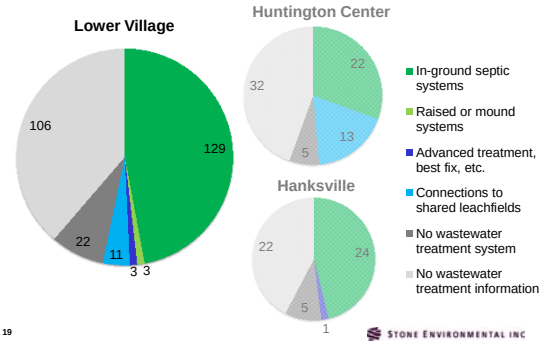
Current Wastewater Treatment Infrastructure



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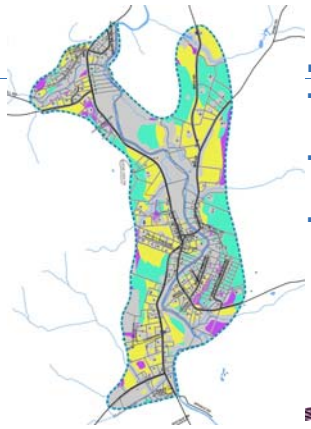
Wastewater Treatment Capacity, Current Condition



- Lower Village
  - Primary environmental limitations are streams, floodplains
  - Well shields are primary development-related limitation, esp. on small lots
  - Several instances where future plans need wastewater capacity

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Huntington Center

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Village Areas Overview

- Huntington Center
- 389 acres
- 72 properties total
- 59 residential
- 5 commercial or municipal properties
- 5 undeveloped

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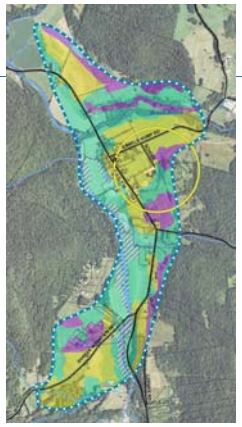
Natural Resource Inventory



- Huntington Center
  - ~35% of soils suitable for in-ground leachfields
  - Limited wetlands; less area in 100-year floodplain
  - Surficial, gravel, and bedrock aquifers

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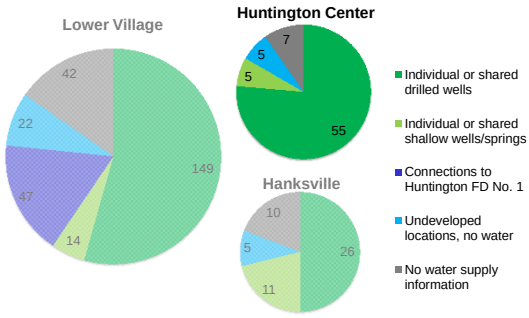
Current Water Supply Infrastructure



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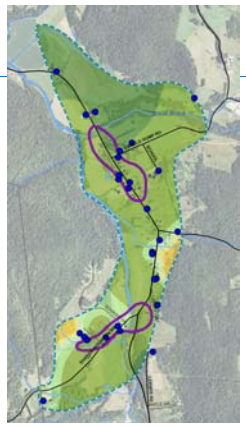
Water Supply Capacity—Well Yields and Quality



- Huntington Center
  - Very few dug wells or springs
  - Drilled gravel wells are high-yielding
  - Fewer, isolated areas of low-yielding bedrock wells
  - Reports of water quality issues mostly aesthetic (11%), a few coliform issues reported

Study Area
Building
Bedrock Well
Approx. Extent of Gravel Aquifer
Drilled Bedrock Well Yields (GPM)
Less than 1
1 - 2.5
2.5 - 5
5 - 10
10 - 50
50 - 100

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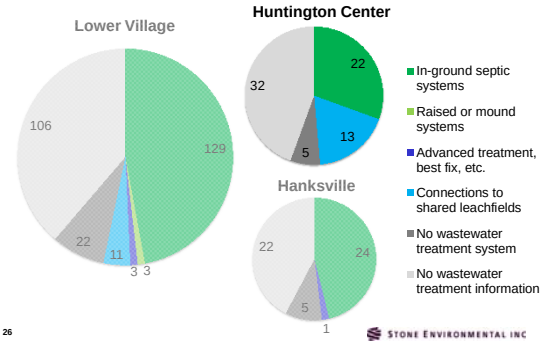
Current Wastewater Treatment Infrastructure



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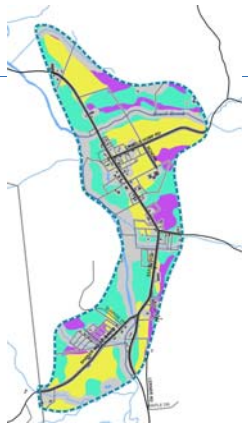
Wastewater Treatment Capacity, Current Condition



- Huntington Center
  - Primary environmental limitations are streams, floodplains
  - Well shields are primary development-related limitation, esp. on small lots
  - Several instances where future plans need wastewater capacity

Study Area
Building
Parcel Boundary
Environmental or Development Setback
Onsite System Suitability
Conventional Subsurface Leachfield
At-Grade, Mound, or Filtrate Leachfield
Performance Based/Best Fix or Not Suited

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Hanksville

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Village Areas Overview

- Hanksville
- 209 acres
- 52 properties total
- 47 residential
- 5 undeveloped

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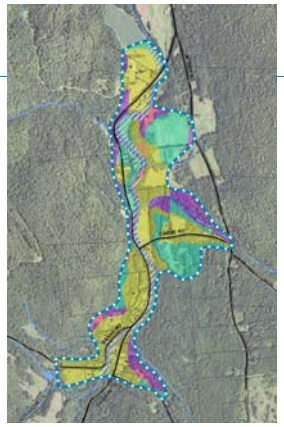
Natural Resource Inventory



- Hanksville
  - 50% of soils suitable for in-ground leachfields
  - Steep slopes, bedrock limiting
  - Some small lots in 100-year flood elevation
  - Surficial and bedrock aquifers

Study Area
Parcel Boundary
Onsite System Suitability
Suitable for Conventional Subsurface Leachfield
Suitable for At-Grade, Mound, or Filtrate Leachfield
Performance Based/Best Fix System or Not Suited
Underground Storage Sites
Hazardous Sites
Hazardous Facilities
50 ft Elevation Contour
Stream
Pond / Lake
Building
Steep Slope (> 30%)
Groundwater Source Protection Area
Wetland
FEMA 100-Year Flood Zone

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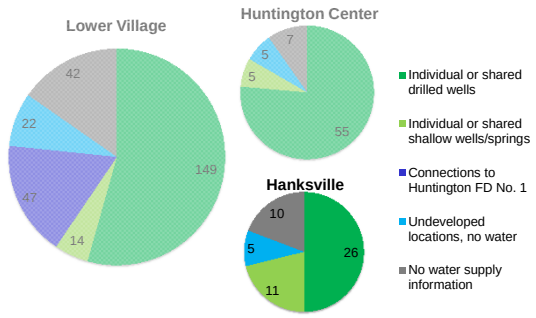
Current Water Supply Infrastructure



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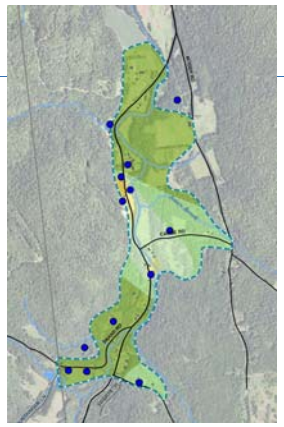
Water Supply Capacity—Well Yields and Quality



- Hanksville
  - Higher proportion of dug wells and springs
  - No drilled gravel wells found
  - Few, isolated areas of low-yielding bedrock wells
  - Few water quality issues reported

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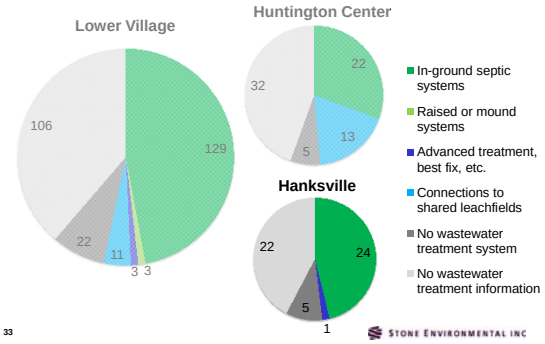
Current Wastewater Treatment Infrastructure



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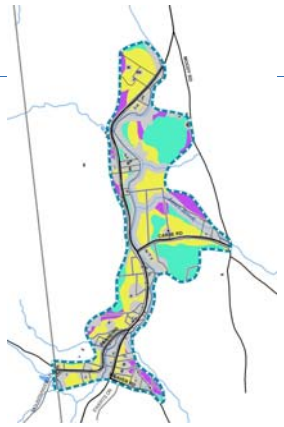
Wastewater Treatment Capacity, Current Condition



- Hanksville
  - Streams/floodplain, steep slopes primary environmental limitations
  - Well shields primary developmental limitation for small lots – but fewer of those
  - No future plans described that need capacity

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Capacity Assessments Summary

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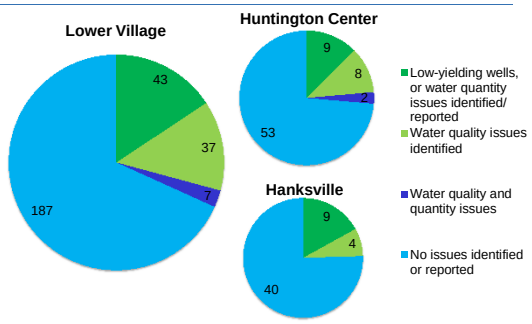
Water Supply Capacity Assessment Summary



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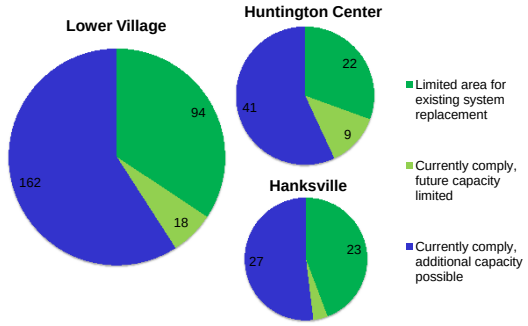
Wastewater Treatment Capacity Assessment Summary (Properties)



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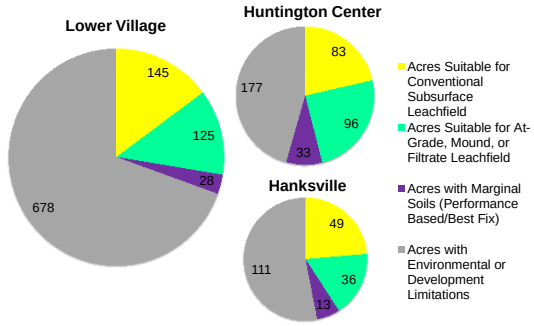
Wastewater Treatment Capacity Assessment Summary (Acreages)



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Next Steps

1. Identify range of technologies/options of interest
2. Develop and execute "no action" and "build-out scenarios"
3. Develop accompanying costs
4. Evaluate potential financial options
5. Public Meeting and summary report

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Water & Wastewater Capacity Assessment
Public Meeting
Nov. 15, 2011

Name	Contact info (optional)
Jim Christiansen	
Linda Fickbohm	
Dana Cummings	
AARON WORTHLEY	
DEAN GROVER	
Heidi Weston	
Peter Williams	
GORDON MILLER	
Meg Keir	
KNOX CUMMIN	
FRED BISBEE	
WALLY TEAKIES	
Susan Giovannetti	
BRAD WASHBURN	
Barbara Felitti	

JUNE 6, 2012

PROPERTY OWNER MEETING

WATER & WASTEWATER CAPACITY STUDY

Name

Knox Cummin

Margaret Taft

Bill Heyman

Water and Wastewater Capacity in Huntington's Villages

Lower Huntington Village, Huntington Center, and Hanksville

Amy Macrellis, Alan Huizenga, Brad Washburn, & the Water & Wastewater Working Group

Huntington Public Library

June 14, 2012

STONE ENVIRONMENTAL INC

Introductions and Acknowledgements

The Huntington River, summer 2011.

- Water & Wastewater Working Group Members
- Consultant Team Members
- Project funding partner from Vermont DEC

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Meeting Agenda

1 Project Purpose / Goals
2 Overview of Water and Wastewater Issues
3 Overview of Shared Water/WW Sites
4 Build-out Scenarios
5 Options and Costs for Increasing Capacity
6 Next Steps
7 Questions and Answers / Discussion

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Project Goals

Brewster Pierce Memorial School grounds and garden, Huntington Center, Fall 2011.

- Identify current water and wastewater issues and needs in villages
- At village level, identify potential available capacity
- Assess options (and costs) for "do nothing" and for expanding water and wastewater capacity under different future "build-out" scenarios

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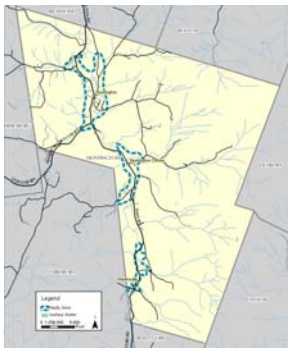
Project Areas - Villages



- Lower Huntington Village
- Huntington Center
- Hanksville
- Project areas limited to Village Zoning Districts plus 50-foot buffer

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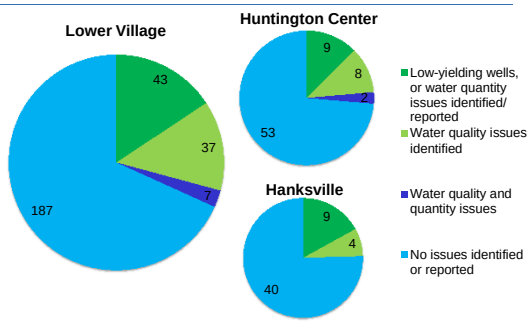
Water Supply Capacity Assessment Summary



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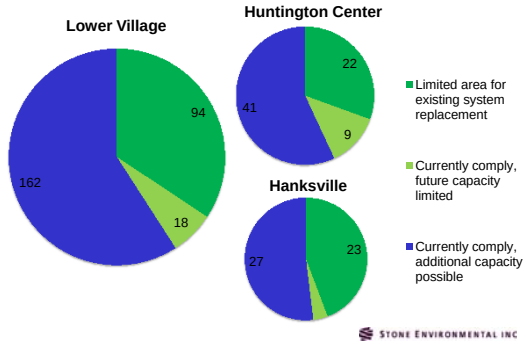
Wastewater Treatment Capacity Assessment Summary (Properties)



7

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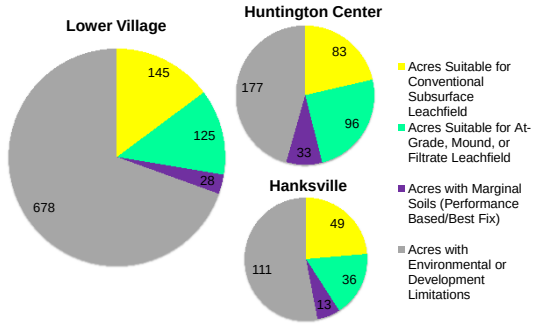
Potential Community Water and Wastewater Sites

- Huntington Center
  - Six potential water source sites originally considered, and two sites were used in developing build-out options
  - Nine potential wastewater treatment/dispersal sites originally considered, and five sites were used in developing build-out options

Study Area
Parcels with flows
Potential Community Wastewater Area
Potential Community Water Area
Potential Water Source

STONE ENVIRONMENTAL INC

Wastewater Treatment Capacity Assessment Summary (Acreages)



8

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Potential Community Water and Wastewater Sites

- Hanksville
  - No water supply sources considered
  - One potential wastewater treatment/dispersal sites originally considered, and this site was used in developing build-out options

Study Area
Parcels with flows
Potential Community Wastewater Area
Potential Community Water Area
Potential Water Source

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Potential Community Water and Wastewater Sites

- Lower Village
  - Nine potential water source sites originally considered, and three sites were used in developing build-out options
  - 12 potential wastewater treatment/dispersal sites originally considered, and five sites were used in developing build-out options

Study Area
Parcels with flows
Potential Community Wastewater Area
Potential Community Water Area
Potential Water Source

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Build-out Scenarios

1 Do Nothing

- Maintain existing water/wastewater infrastructure and 1-acre Village zoning
- New or replacement infrastructure located on same property as original systems
- Property owners solely responsible for construction / replacement costs
- Future subdivisions predicted based on existing lot sizes and the suitability of soils for onsite wastewater

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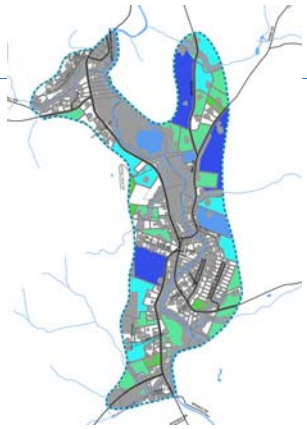
Future Development, Do Nothing Scenario



- Lower Village
  - Up to 146 new single-family homes on ~35 parcels
  - Nearly all future development happens on fringes
  - No lots in "core" area can subdivide under 1-acre zoning

Study Area
Environmental or Development Setback
Parcel Boundary
Potential Development: Additional Parcels
1
2 to 3
3 to 5
5 to 10
10 to 20
None

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Build-out Scenarios

2 Fix Existing Village Problems Only

- Provide shared water and/or wastewater capacity only to support areas of demonstrated need
- Accommodate current development densities and land uses
- Community systems owned by Town, financed by Town/users
- Keep current zoning districts / regulations

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Future Development, Do Nothing Scenario

- Huntington Center
  - Up to 108 new single-family homes on ~18 parcels
  - Most future development happens on fringes
  - A few lots adjacent to "core" area can subdivide under 1-acre zoning

Study Area
Environmental or Development Setback
Parcel Boundary
Potential Development: Additional Parcels
1
2 to 3
3 to 5
5 to 10
10 to 20
None

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Build-out Scenarios

3 Provide for Village Centered Vitality

- Zoning districts and regulations are changed to encourage continuing historic development pattern
- Smaller or no minimum lot size in "core" areas; 1-acre minimum lot size on fringes
- Options under this scenario support up to 2x existing flows for water and wastewater in core areas of Lower Village and Huntington Center

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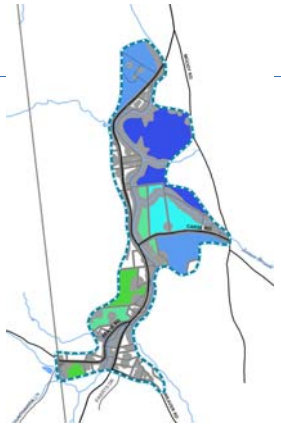
Future Development, Do Nothing Scenario



- Hanksville
  - Up to 59 new single-family homes on ~11 parcels
  - Most future development follows current pattern

Study Area
Environmental or Development Setback
Parcel Boundary
Potential Development: Additional Parcels
1
2 to 3
3 to 5
5 to 10
10 to 20
None

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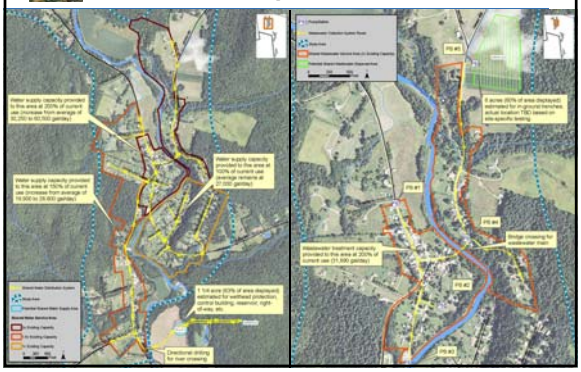
What do the options look like?



Water & Wastewater Options Summary

Natural resources and water infrastructure in Huntington, Summer-Fall 2011.

- 12 water options and 16 wastewater options
- Passive, primarily gravity-based water distribution and wastewater treatment technologies
- Little need for alternative or advanced community wastewater treatment technologies

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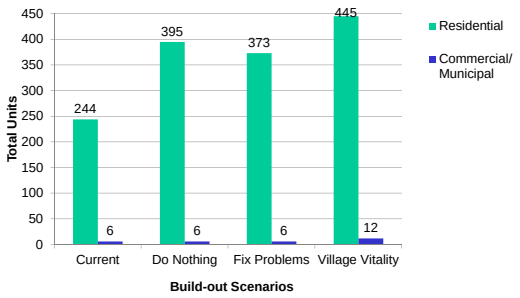
Lower Village: Additional Capacity by Scenario



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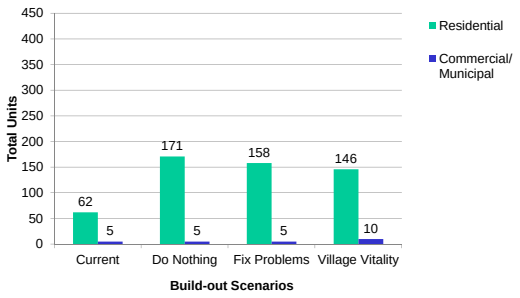
Huntington Center: Additional Capacity by Scenario



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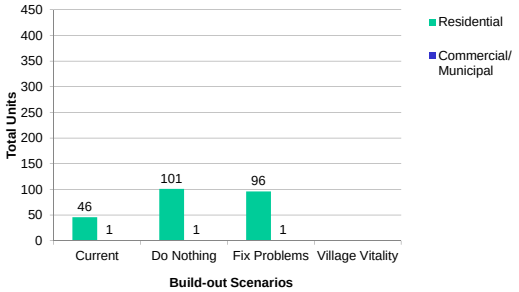
Hanksville: Additional Capacity by Scenario



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Future Water Supply Costs by Scenario (Million $)

	Do Nothing		Fix Problems		Village Vitality	
	Private	Municipal	Private	Municipal	Private	Municipal
Lower Village	$ 3.3		$ 2.7 - $ 3.2*	$ 0.49- $ 2.4*	$ 1.2	$ 5.3 - $ 7.2**
Huntington Center	$ 1.2		$ 1.1		$ 0.5	$ 1.9 - $ 7.2**
Hanksville	$ 0.78		$ 0.73			

* In the "Fix Problems" scenario, water supply capacity is provided primarily to facilitate use of specific shared wastewater treatment sites, so costs (and cost distribution between private or municipal systems) vary widely depending on which shared wastewater site is chosen.
** In the "Village Vitality" scenario, the high-range cost is for an alternative that supplies municipal water to the Lower Village AND Huntington Center, using a single source, reservoir, and distribution system.

Cost estimates for community water and wastewater options include site and source testing, permitting/engineering/legal, construction, and land acquisition.

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Future Wastewater Treatment Costs by Scenario (Million $)

	Do Nothing		Fix Problems		Village Vitality	
	Private	Municipal	Private	Municipal	Private	Municipal
Lower Village*	$ 5.4		$ 3.8 - $ 4.7	$ 3.0 - $ 5.7	$ 2.9 - $ 3.3	$ 3.9 - $ 7.1
Huntington Center	$ 2.4		$ 1.9	$ 1.6 - $ 1.7	$ 1.1	$ 3.0 - $ 3.4
Hanksville	$ 1.4		$ 1.2	$ 1.6		

* In the Lower Village, the low range of costs for "Fix Problems" and "Village Vitality" includes only the Main Road-Bridge Street-East Street vicinity, generally; while the high range also includes Huntington Acres and the Roberts Park Road vicinity, especially properties on the Huntington River.

Cost estimates for community water and wastewater options include site and source testing, permitting/engineering/legal, construction, and land acquisition.

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Future Wastewater Costs, Financing Compared to Recent VT Projects

	Shoreham	Pownal	Cabot	Warren	Lower Village	Hunt. Center
Total Project Cost (Other communities' costs not adjusted for inflation and are as of ~2006)	$2,400,000	$29,000,000	$4,678,000	$4,350,000	$3,900,000 - $7,200,000	$3,000,000 - $3,400,000
Equivalent Users (EU)	86	700	139	115	~150-200	~80
Gross Cost per EU	$27,900	$41,400	$33,655	$31,950	$26,000 - $36,000	$37,500 - $42,500
Connected Users to pay all?	No	No	Yes	No		
Cost on Town Wide Tax	Yes	Yes	No	Yes		
	4.5¢ on Town Tax	$76 Flat Tax per Parcel		1.7¢ on Town Tax		
Local Share %	19%	7%	13%	21%		
State and Federal Grant %	81%	93%	87%	79%		

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Conclusions

- Issues are real—but solutions are feasible
- No action = no new development focused near historically dense areas of Lower Village and Huntington Center
- Fixing problems at current property uses still does not enable small-lot development near the Bridge St. or Camel's Hump Rd. intersections
- If zoning is changed to reduce minimum lot size, little will happen in historically compact areas without wastewater capacity—for maximum flexibility, water capacity is also needed
- Capacity is available close to areas of need, but is privately owned and vulnerable to fragmentation/development

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Next Steps

- Finalize report (expected by end of June)
- Joint meeting with Selectboard, Planning Commission in July—discuss whether / how to move forward
- Continue to talk about options and implications with the owners of potential community water supply source and wastewater treatment sites
- If a decision is made to move forward with one or more options, negotiate with property owners to complete preliminary field testing on preferred sites

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JUNE 14th
PUBLIC MEETING
WATER & WASTEWATER CAPACITY STUDY

NAME

Ginger Lobkowitz
Megs Keir
Duncan Keir
Dana Cummings
Barbara Elliott
Dori Barton
Jim Christiansen
Jeff Congo
Gary Miller
Amy Macrellis
Barbara Felitti
Aaron Worthley
Tom Bailey
Dean Grover
Don Robisley
Alan Huzinga
Boyd Washburn
Paul Dreher

Water and Wastewater Capacity Assessment for Huntington's Villages

With support from the Huntington Selectboard, the Water and Wastewater Working Group was formed in January 2011. The Town secured a planning advance from VT Department of Environmental Conservation (VT DEC) to conduct a water and wastewater capacity assessment for Huntington's three villages—including all of the land within the Lower Village, Huntington Center, and Hanksville village zoning districts, as well as a 50-foot buffer zone outside each district.

The objectives of the study were to:

- Identify current water and wastewater issues and needs of residential, public, and commercial structures in the three village districts;
- On a village district level, identify current water and wastewater capacity; and
- Assess options for expanding water and wastewater capacity for each village district, along with the scale/quantity of additional capacity (build out scenarios) and associated costs.

Huntington has two significant natural resources: a high-yielding gravel groundwater aquifer beneath portions of the Lower Village and Huntington Center that is generally protected from sources of contamination by a thick layer of silt, and a series of sandy, gravelly deposits near the modern ground surface that are often suitable for in-ground wastewater treatment systems.

Properties in the villages currently are served primarily by individual, on-site water supplies and wastewater treatment systems. There are a few shared water and wastewater systems, like the drilled gravel well that serves the Huntington Fire District No. 1 (Roberts Park Road and Huntington Woods area), and the in-ground leachfields that serve houses on Agnes Drive in the Lower Village and Sunrise Drive in Huntington Center.

The primary water supply issues identified in this study were low-yielding bedrock wells (especially in the Lower Village), along with scattered reports of water quality issues that included aesthetic (color, taste, smell) or bacteria (coliform) contamination concerns, affecting about 20% of the wells in all three villages. The primary wastewater capacity issue identified in this study was space-related limitations for the replacement of existing wastewater treatment (septic) systems—especially on the small parcels near the Main Road-Bridge Street intersection in the Lower Village and the Main Road-Camels Hump Road intersection in Huntington Center. Property owners in these space-limited areas would need access to additional wastewater capacity, and sometimes to additional water capacity, to change the uses or their properties or expand current uses. Owners who need to replace their current systems, but lack sufficient space to do so, will likely be limited to the current use of their property. Lack of wastewater capacity due primarily to small lot sizes and wastewater system/water supply buffer conflicts is the over-riding infrastructure issue from a future planning perspective, especially for small parcels in the Lower Village and Huntington Center. It affects a larger proportion of properties than any of the other issues identified (40-45% of properties in these two villages), and is a more challenging and costly issue to address.

The study confirmed that a range of community water supply and wastewater treatment options can be constructed in the village districts to address existing issues and needs, and to support future development. Both water and wastewater options can rely on conventional technologies, such as gravity-based community water distribution and in-ground (though large-scale) community leachfields, for wastewater treatment. These systems generally have minimal visual impacts (no large structures or water towers) and maintain open space. In all cases, the most passive, lowest-impact technologies feasible were used in developing the water and wastewater options. Three build-out scenarios were developed to illustrate how differing water and wastewater management options may impact land use and development

densities in the villages—a soils-up, rather than zoning-down, approach. Each of the build-out scenarios were assumed to occur over roughly the next fifty years:

- ***Do Nothing***: Continue one-acre minimum lot size in the village zoning districts; rely primarily on individual property owners to pay for and take care of water and wastewater systems; maintain existing water and wastewater infrastructure as it is, with the potential for future development limited to the estimated water and wastewater capacity available on each individual property.
- ***Solve Existing Village Problems Only***: Continue one-acre village zoning; provide Town-owned water and/or wastewater capacity to support current property uses in areas where water or wastewater issues are currently identified but with no allowance for additional capacity to accommodate future growth in these areas.
- ***Provide for Village Centered Vitality***: Implement smaller minimum lot size requirements, or perhaps even remove minimum lot size restrictions, in portions of what are now the village districts; provide Town-owned community water and/or wastewater infrastructure to support a denser development pattern in village core areas, to the extent this is possible given the carrying capacity of nearby soils and streams.

Each scenario results in different impacts on the number of new residences which may be built and where development in the village districts occurs. If the Town continues with current zoning and relies on individuals to take care of their water and wastewater systems ("Do Nothing" scenario), the total number of residences in all three villages could increase from 356 to 666, and commercial/municipal units could increase slightly (from 12 to 15). Nearly all future development would occur on the larger lots located near the edges of the villages, rather than in or near the core areas of the Lower Village and Huntington Center. The estimated cost for individuals to construct or replace water supplies over a 50-year period is $5,288,000, and for wastewater systems it is $9,179,000.

If the Town continues with current zoning but addresses some existing areas of need ("Solve Problems" scenario), the total number of new residences in all three villages could increase from 356 to 625 and commercial/municipal units could increase slightly (from 12 to 16). This scenario provides environmental benefits by addressing the needs of certain areas, such as Huntington Acres and Roberts Park, but nearly all future development would still occur on larger lots near the edges of the villages. The estimated cost range to construct the community water supply systems which would last for a 50-year period is $2,855,000 to $4,907,000, and for wastewater systems it is $6,232,000 to $9,058,000.

If the Town changes or removes lot size requirements in portions of what are now the village districts and provides community water and/or wastewater infrastructure ("Village Vitality" scenario) it can support a denser development pattern in village districts. Under this scenario the total number of new residences in all three villages could increase from 356 to 687 and commercial/municipal units could increase from 12 to 22. The additional commercial capacity, in particular, could be used to serve future uses like restaurants, which would otherwise be very challenging to build or attract. The estimated range of costs to construct water supply systems which would last for a 50-year period is $7,190,000 to $8,164,000, and for wastewater systems it is $6,913,000 - $10,461,000, depending on the systems selected.

The options the Town chooses will impact how the villages develop. Continuing with current zoning ("Do Nothing") or implementing options only to address water quality or wastewater issues ("Solve Problems") result in the vast majority of new residential development on larger lots near the fringes of the village zoning district. They do not provide capacity for future growth or development in the historic core centers of the Lower Village or Huntington Center. If more compact development in these centers is desired, adjustments to zoning and consideration of community water/wastewater infrastructure will be needed.

The final report contains information that can now be considered by the Selectboard and town staff, residents, and business owners in Huntington for implementation. While the consultant can recommend one scenario or set of alternatives over another, the real decisions lie with the community.

Huntington, VT Front Porch Forum Postings

Issue No. 1369, Aug 28, 2011: http://frontporchforum.com/areas/76/issues/1369

Water and Wastewater Capacity Study in Huntington

Barbara Felitti • Moody Rd

As reported in a recent article in the Times Ink, a water and wastewater capacity assessment is being conducted in the three village districts (Huntington Center, Lower Village, and Hanksville). The assessment will identify current water and wastewater concerns and needs, determine existing water and wastewater capacity and propose options if the Town would like to increase capacity. Stone Environmental of Montpelier and their partner Green Mountain Engineering of Bristol will conduct the assessment.

One of the first activities will be to survey residents and property owners in the village districts about their water and wastewater systems. Postcards announcing the survey have been sent out, and the survey itself will be mailed out in early September. Survey results will be compiled by Stone Environmental to analyze larger trends/needs in the village districts and so individual resident information will be confidential. Initial results will be reported at a public meeting in November, and the assessment completed by April.

As part of the assessment, residents in the village districts will also have an option of receiving a free evaluation of their property's soils and systems from Stone Environmental or Green Mountain Engineering (this can be indicated on the survey response).

Please note, the assessment and offer of free evaluation covers only properties in the village districts, NOT the entire Town.

The assessment is funded by the Vermont Agency of Natural Resources (ANR), and so is being conducted at no cost to the Town. The work of the consultants is overseen by the Huntington Water and Wastewater Assessment Working Group with representatives from several town boards and committees (Selectboard, Planning Commission, Conservation Commission, Town Hall Committee).

The working group encourages residents to complete the surveys so that we will have good data for the assessment.

If you have any questions, please feel free to contact me to discuss them either via the forum or off-line (at this email or at HuntingtonWWWGroup@gmail.com) The working group meets the first Wednesday of each month from 7:00 – 8:30 pm at the Town Office and residents are welcome to attend meetings. More information about the working group is also available at the Huntington municipal planning website: http://www.huntington-mpg.info/.

Issue No. 1382, Sep 08, 2011: http://frontporchforum.com/areas/76/issues/1382

Seeking Completed Wastewater and Drinking Water Property Surveys

Barbara Felitti • Moody Rd

Wastewater and Drinking Water Property Surveys have been mailed out to all residents in the village districts. We will greatly appreciate it if you will complete them by Sept. 16th and mail them back to Stone Environmental.

If you did not get a survey, please be in touch with Barbara Felitti (434-5996 or this email address) or Amy Macrellis of Stone Environmental (800 959-9987 ext. 236 or 802 229-1884).

Thank you!

Huntington Water & Wastewater Working Group

Issue No. 1388, Sep 14, 2011: http://frontporchforum.com/areas/76/issues/1388

Please Complete Wastewater & Drinking Water Surveys Sept. 16

Barbara Felitti • Moody Rd

A friendly reminder to village district residents (Lower Village, Huntington Center and Hanksville) to please complete your wastewater and drinking water surveys by Friday, Sept. 16. Thanks very much to those who have already completed them!

Huntington Water & Wastewater Working Group

Issue No. 1406, Oct. 5, 2011: http://frontporchforum.com/areas/76/issues/1406

Water & Wastewater Working Group Meeting Oct. 5

Barbara Felitti • Moody Rd

Water & Wastewater Working Group Meeting
Wednesday Oct 5th
7:00 - 8:30 at the Town Office (lower level)

Tentative agenda:
- Review preliminary results from the water and wastewater survey
- Select a date for the November public meeting
- Prepare an article for the Times Ink
- Complete consultant feedback evaluation

Meetings are open to the public and Town residents are welcome!

Issue No. 1410, Oct. 10, 2011: http://frontporchforum.com/areas/76/issues/1410

Still Time to Complete Wastewater & Drinking Water Surveys

Barbara Felitti • Moody Rd

Residents of Huntington Center, Lower Village and Hanksville – if you have not yet completed the Wastewater & Drinking Water Survey, there is still time to do so!

We received a 33% response rate -129 returned surveys of 398 mailed. While this is a good percentage, we would like to increase the number of responses. If you have not completed the survey yet, please do!

Need another copy of the survey? You can contact me by email or phone (434-5996). Also copies of the survey will be at the Town office and Library starting Tuesday.

THANK YOU to everyone who has completed the survey so far!

Results will be presented at a Town Meeting on Nov. 16th. More details to follow.

Issue No. 1418, Oct. 18, 2011: http://frontporchforum.com/areas/76/issues/1418

Water & Wastewater Site Visits & Surveys

Barbara Felitti • Moody Rd

SITE VISITS - Stone Environmental is conducting follow-up on-site visits for village district residents who returned surveys and indicated they were interested in this additional assessment.

Site visits are being scheduled for this week, next week and early November. Amy Macrellis from Stone Environmental is calling and emailing residents who expressed interest in the follow-up visits. You can also reach her at (802) 229-1884 or amacrellis@stone-env.com

SURVEYS – if you are a village district resident and have not yet completed your drinking water and wastewater survey, there is still time to do so. Copies are available at the library and town office. We're trying to compile as complete a picture as possible for the town and every survey helps.

Please be in touch with me if you have any questions.

Issue No. 1436, Nov. 8, 2011: http://frontporchforum.com/areas/76/issues/1436

Water & Wastewater Capacity Meeting Nov. 15

Barbara Felitti • Moody Rd

There will be a public meeting on Tuesday, Nov. 15th at 7:00 pm at the Huntington Library in the Lower Village on "Water and Wastewater Capacity: Issues and Opportunities in Huntington's Village Districts".

There will be a presentation and discussion of results of research and the recent water and wastewater survey by Stone Environmental.

For questions or further information, you may contact Barbara at this email or 434-5996.

We hope you can attend!

Huntington Water & Wastewater Working Group

Issue No. 1442, Nov. 14, 2011: http://frontporchforum.com/areas/76/issues/1442

Water & Wastewater Capacity Public Meeting Nov. 15

Barbara Felitti • Moody Rd

There will be a public meeting on Tuesday, Nov. 15th at 7:00 pm at the Huntington Library in the Lower Village on "Water and Wastewater Capacity: Issues and Opportunities in Huntington's Village Districts".

There will be a presentation and discussion of results of research and the recent water and wastewater survey by Stone Environmental.

For questions or further information, you may contact Barbara at this email or 434-5996.

We hope you can attend!

Huntington Water & Wastewater Working Group

Issue No. 1458, Dec. 1, 2011: http://frontporchforum.com/areas/76/issues/1458

Water & Wastewater Working Group Updates

Barbara Felitti • Moody Rd

We are still working on getting a copy of the presentation of results of the capacity assessment posted on the Town website. A notice will be sent out once it's uploaded.

The Dec. 7 meeting of the Water & Wastewater Working group is cancelled. The next meeting will be Jan. 4th.

Issue No. 1463, Dec. 6, 2011: http://frontporchforum.com/areas/76/issues/1463

Water & Wastewater Capacity Assessment Info

Barbara Felitti • Moody Rd

A copy of the presentation "Water and Wastewater Capacity: Issues and Opportunities in Huntington's Village Districts: presented at a November public meeting by the consultants Stone Environmental is available on the Town website.

The direct link is: http://huntingtonvt.org/index.php/documents-forms-a-permits/reports-and-research/water-and-waste-water-working-group/765-2011-11-15-water-and-wastewater-capacity-meeting.html

Or, go to the Town website home page, www.huntingtonvt.org look under "Recently Updated Documents" and click on the "2011 11 15 Water and Wastewater Capacity Meeting".

Thank you to Nancy Stoddard for being able to get this posted!

Please let me know if you have any questions. -Barbara Felitti

Issue No. 1621, June 4, 2012: http://frontporchforum.com/areas/76/issues/1621

Huntington Water & Wastewater Capacity Public Meeting June 14

Barbara Felitti • Moody Rd

The assessment of water and wastewater capacity in the three village districts of Huntington Center, Lower Village, and Hanksville is completed. There are several options for expanding water and wastewater capacity, particularly in the Lower Village and Huntington Center. A public meeting to discuss the study and options will be held on Thursday, June 14th from 7:00 – 9:00 pm at the Huntington Library in the Lower Village. Please join us to learn more!

Issue No. 1640, June 11, 2012: http://frontporchforum.com/areas/76/issues/1640

Huntington Water & Wastewater Capacity Public Meeting June 14

Barbara Felitti • Moody Rd

A public meeting will be held this Thursday, June 14th from 7:00 – 9:00 pm at the Huntington Library to discuss the results of a water and wastewater capacity assessment for the three village districts of Huntington Center, Lower Village, and Hanksville. For the first time, Huntington has comprehensive information about the water supply and wastewater issues and capacity within the three village districts. There are several options for expanding water and wastewater capacity, particularly in the Lower Village and Huntington Center. Please join us to learn more.

APPENDIX C: WATER SUPPLY SYSTEM TYPES AND VERMONT'S WATER SUPPLY REGULATIONS

C.1. Water Supply System Components

Drilled wells draw water from deep below the ground and are a common source of drinking water for both households and communities. During the construction of a drilled well, steel casing is inserted into the hole, which is secured at least 10 feet into bedrock. The well itself is continued deeper into the bedrock until an adequate supply of water is encountered (a different method is used for gravel wells). After drilling is finished, a submersible water pump is installed and the well is disinfected and tested prior to use. Wells drilled since 1987 may have a metal tag with identifying numbers, which correspond to the well driller's report filed for the well.

Dug wells draw water from the surficial, shallow water table, and thus they are generally more vulnerable than drilled wells to surface water contamination. However, a properly constructed dug well in a good location can produce high-quality water. During the construction of a dug well, an excavation is completed into the water table, which is lined with interlocking concrete tiles or other appropriate material set on a gravel base. The excavation around the tiles is backfilled with native soil, making sure that the finished grade slopes away from the wellhead. After well construction is finished, a submersible water pump is installed. After construction, adequate cleaning of the inside of the well and careful disinfection is particularly important, because the handling of construction material and pump equipment can contaminate the well water.

Springs are located where ground water emerges naturally from the earth's surface, usually along hillsides, at the base of slopes, or in low areas. For springs that are utilized as potable water supplies, concrete spring tile should be installed, with a screened overflow pipe and a tight-fitting, latching cover. Springs should be protected from entry by rodents or insects. If the property around the spring is sloped so that rain water can pool around or enter the spring, a diversion ditch or berm should be constructed, so that surface water runoff is kept away from the spring.

Regardless of the type of water supply serving a property, maintaining an adequate separation distance between potable water supplies and onsite wastewater systems is important, to ensure that the wastewater is adequately filtered by natural soils before reaching a water supply well (or, if properly sited, so that water supply wells are not situated immediately down-gradient from onsite wastewater systems). Conversely, the presence of onsite wells can limit onsite wastewater treatment options because of the required protective setbacks between water supply wells and wastewater disposal systems.

C.2. Vermont Regulations for Potable Water Systems

Chapter 21 of the Environmental Protection Rules, last revised December 1, 2010, is referred to as the Water Supply Rule. The purpose of this rule is to protect the public health by assuring safe, affordable drinking water from Public and Non-public water systems and to implement and enforce the provisions of the Federal Safe Drinking Water Act and Vermont Statutes. It provides the design and permitting criteria for five basic types of water systems:

- Public Community water systems,
- Public Non-transient, non-community (NTNC) water systems,
- Public Transient Non-community (TNC) water systems,
- Bottled water systems, and
- Non-Public water systems requiring permits.

The rule varies in its applicability to the five different types of water systems. Non-public water systems not requiring permits, such as single family homes on lots not subject to State subdivision rules, have no direct responsibilities under the rule, but are regulated indirectly by portions of it and other rules.

Public Community Water Systems and Bottled Water Systems must meet more complex standards within the rules. Public non-community and non-public water systems requiring permits are subject to considerably simplified technical standards within the rules. Currently, the only Public community water system in Huntington is Huntington Fire District No. 1. This system is classified as a Public Community System (it has 15 or more connections, or it serves 25 or more people on a year-round basis). The Brewster Pierce Memorial School's water supply system is classified as a Non-Transient, Non-Community (NTNC) water system (it is not a community water system, but regularly serves at least 25 of the same people for more than 6 months per year).

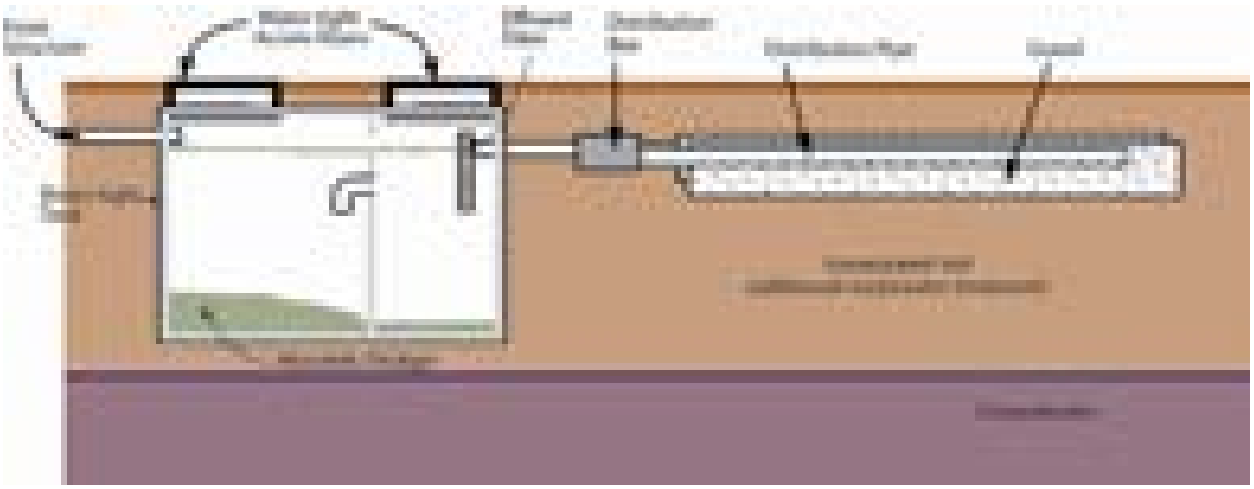
The rules require source, construction, and operating permits for certain types of water systems. Minimum drinking water quality, facility and operation requirements, system reporting and record keeping, public notification, source water protection and standards for water system design, construction and protection requirements are all contained within this complex set of rules.

APPENDIX D: WASTEWATER SYSTEM COMPONENTS AND VERMONT'S REGULATIONS FOR SOIL-BASED WASTEWATER SYSTEMS

D.1. Wastewater System System Components and Maintenance

Decentralized wastewater treatment and dispersal systems, when properly sited, installed, and maintained, can be a long-term effective means of wastewater treatment and dispersal. They can, however, cause negative impacts when they malfunction or when they are installed too close to the water table, surface waters, or other sensitive environmental features.

A traditional, gravity flow, onsite "septic system" includes at least a 1,000 gallon concrete septic tank, a concrete distribution box, and a leach bed or leach trenches. The septic tank settles out the solids and provides some treatment; the distribution box splits the flows evenly between pipes or trenches, and the leach bed or trenches (made out of crushed stone or alternative materials with perforated pipe covered with filter fabric) along with the unsaturated soils below the system provide the final distribution and treatment. The illustration below, which is based on images that were created for the Vermont Department of Housing and Community Affairs' 2008 handbook *Wastewater Solutions for Vermont Communities*, shows the components of a traditional onsite wastewater treatment system, and their relation to the surrounding soils and groundwater.



In addition to the perforated pipe and aggregate trenches shown in the illustration above, traditional wastewater dispersal options in Vermont also include drywells and mound systems. Some newer wastewater dispersal options in Vermont include at-grade systems and subsurface drip irrigation.

The survey responses and information from permit reviews indicated that at least a few properties (8 out of the ~200 properties where leachfield type is known) scattered in the three village areas for which information is available currently use drywells for accepting septic tank effluent. Drywells typically follow septic tanks and consist of concrete cylinders with open bottoms and holes in the sides, surrounded by stone, which hold wastewater until it disperses into the ground. New or replacement drywells have not been permitted in Vermont since 2002.

Cesspools, which are similar in construction to drywells but are not preceded by a septic tank, are also not permitted in Vermont under the current small-scale wastewater system regulations (see section D.2 below). These systems often direct wastewater flows from buildings to the water table with little or no treatment, and thus can be significant sources of nutrient, pathogen, and other contaminants to the groundwater. While no cesspools were reported in the property owner survey results, we did receive anecdotal reports of cesspools within the study area's boundaries during the project.

Maintenance of gravity-based, passive traditional technologies is relatively simple, consisting of having someone check the levels in the septic tank and pumping it out when necessary, checking and cleaning effluent filters regularly, checking to make sure that the distribution box and outlet pipes are level, and inspecting the dispersal field for any seepage or surfacing of effluent.

Advanced pre-treatment components can be added after the septic tank to improve wastewater treatment prior to dispersal. Pre-treatment components may also allow for increased capacity of onsite systems, which maximizes available soil resources, may allow for the use of sites not previously approved under the state's rules for wastewater systems, or may allow the use of a leachfield that has a smaller footprint and/or has a shallower vertical separation to seasonal high groundwater or bedrock.

As decentralized wastewater systems become more complex, as with those that use advanced pre-treatment or rely on pumps or blowers, it becomes even more important to make sure that they are operating properly. Since the more complicated systems are often installed to overcome difficult site conditions like shallow groundwater, there is less of a 'margin of safety' if the system malfunctions before sensitive resources such as shallow groundwater are negatively impacted. Systems that use pumps to distribute wastewater effluent, like at-grade or mound systems, should be checked at least once a year to make sure that the pumps are cycling and operating properly. The maintenance requirements for pre-treatment systems vary with the individual technology, but should include at least one inspection per year.

D.2. Vermont Regulations for Soil-Based Wastewater Treatment Systems

D.2.1. Wastewater System and Potable Water Supply Rules

The latest revisions to these rules, generally referred to as the "EPRs" or "EPR Chapter 1", became effective on September 29, 2007. These rules apply to decentralized wastewater dispersal systems with design flows of up to 6,499 gallons per day (gpd) and to sewer connections for any design flow. Important changes were made in many areas of the EPRs, including the implementation of universal jurisdiction and the 'clean slate', an overall re-organization of the EPRs to improve readability, and the addition of several alternative technologies.

With the latest revision to the EPRs, wastewater systems and potable water supplies that were previously exempt from state regulation may be required to obtain a permit for activities such as:

- new construction (including single family residences that need sewage dispersal and/or water);
- construction or modification of a wastewater system and/or potable water supply;
- new connections to an existing wastewater system and/or potable water supply;
- subdivision of land; and
- repair or replacement of a failed wastewater system and/or potable water supply.

Vermont is the last state in the nation to implement this kind of permit requirement for all properties statewide. This is often referred to as the state having "universal jurisdiction" over sewage and water.

The legislation includes a "clean slate" exemption that basically grandfathers all buildings, campgrounds, lots, wastewater systems, and potable water supplies that were in existence before January 1, 2007. On or after the January 1, 2007 date, a permit is required when any action covered under these rules is taken (for example, if a property is subdivided or a repair or replacement is needed). If the wastewater system or potable water supply fails, a variance from the rules is available if no fully complying replacement can be found. (This is often referred to as a "best fix" situation, see Section D.1.) This provides relief for a number of properties that currently are unmarketable due to non-compliance with the rules.

New, clearer definitions are provided for "failed" water supplies and wastewater systems. This is important because anyone with a failed system now needs a repair permit and also has a defect in their property title.

The EPRs now include general approvals for the use of constructed wetlands and subsurface drip distribution systems for the dispersal of wastewater in addition to the different types of alternative

systems allowed through product-specific approval. The general use approvals enable these innovative/alternative components to be used when designing wastewater systems.

Other changes to design requirements that may be useful to landowners in the study area include:

- Reduction in minimum design flow for a single family residence to 2 bedrooms (from 3 bedrooms). This will allow smaller wastewater systems to be built.
- If a primary dispersal system is designed and constructed with pressure distribution that can handle 150% of the design flow, no replacement area is required. This change will enable some lots that were not developable (because they lacked the space and soils needed to site the required identical replacement system) to be developed.
- If a mound system is designed and constructed for 100% of the design flow, no replacement area is required. Designers and engineers have advised that, in nearly every case, failed mounds can be replaced or restored to full function on the original footprint. This also means that properties with mound systems and replacement areas that were permitted before the 2007 rule revision may be able to subdivide or redevelop property that was previously at its maximum wastewater treatment capacity.
- Composting toilets are now specifically allowed in the EPRs, and there is no longer a requirement that a project have enough area to build a septic system even though a composting toilet is proposed. The new rules also allow a smaller leachfield to be used for graywater only when a composting toilet is proposed.
- Language has been added to make clear that water and wastewater systems may not be constructed within a floodway and that construction requirements apply when constructing within the flood plain.

During the 2010 legislative session, House Bill H.779 was passed which creates an obligation on all applicants for a Wastewater System and Potable Water Supply Permit under the EPRs to notify other landowners whenever the isolation distances related to wastewater system and potable water supplies extend onto property not owned by the applicant. The notification requirement was added because of concern that current permit review procedures did not take into account the potential for proposed wastewater systems and potable water supplies to restrict future development on land not owned by the applicant, due to the requirements for isolation distances between water supplies and soil-based wastewater systems. Further information about the notification requirement is available from DEC's website.

D.2.1.1. Dispersal System Options

Many options are available for the dispersal of treated wastewater from decentralized systems under the WSPWSRs. Septic tanks and absorption trenches or beds are commonly utilized under favorable site conditions (those having percolation rates of between 1 and 60 minutes per inch and at least 3.5-7 feet to seasonal high groundwater levels and bedrock). At-grade and mound dispersal systems are generally used where minimum site conditions are met, but the site conditions are not favorable enough for the design of subsurface systems. Finally, filtrate effluent dispersal systems may be used when innovative/alternative treatment is a component of the wastewater system. Any of the previously discussed soil-based dispersal systems are permissible as filtrate systems; further, loading rates may be increased and vertical separation distances from bedrock and seasonal high water tables may be reduced if the treated effluent meets certain standards (see Section D.1 for more detail on wastewater dispersal options).

Spray dispersal (disposing of treated wastewater into native soil by surface application, using sprinklers) may also be used under the WSPWSRs for systems with design flows of up to 6,499 gpd. A continuous impeding layer beneath more permeable soils must underlie a spray dispersal site, and increased isolation distances to surface waters and drinking water sources are required. While these site conditions may be found near the study area, the treated wastewater must be chlorinated before dispersal, and there are significant requirements for restricting access and for seasonal storage of wastewater that may be difficult to meet.

D.2.2. Indirect Discharge Rules

The 1986 Vermont Legislature established new criteria for larger soil-based wastewater systems, which took into account these larger systems' potential impacts on water quality and aquatic biota (living organisms) in Vermont surface waters. Since January 1990, wastewater treatment systems with design flows of 6,500 gpd or greater have been regulated under Chapter 14 of the EPRs, commonly known as the Indirect Discharge Rules or IDRs. The IDRs are used to permit septic tanks and leach fields, and also treatment plants and spray dispersal systems, which use soil as part of the wastewater treatment process. Following primary and/or secondary treatment, the soil provides final effluent polishing and renovation before it reaches groundwater and, eventually, surface water. This is in contrast to direct discharge systems, which may discharge through a pipe directly to surface waters.

Any flows directed to a cluster wastewater treatment system with design flows of greater than 6,500 gpd that is constructed to support development that was already complete as of May 17, 1986 will likely be considered an "Existing Indirect Discharge" under the IDRs. The DEC is required by statute to issue a permit for existing indirect discharges unless they find that the discharge is causing a violation of the Vermont Water Quality Standards. This application category, however, is limited to indirect discharges

already occurring in 1986 and thus may not be suitable if significant new development is desired within the study area.

Under the IDRs, a community wastewater treatment system constructed in the study area to support both existing and new development would be considered a "System with New Indirect Discharge". If wastewater dispersal sites with design flows of greater than 6,500 gpd are located near one of the unnamed streams on the outskirts of the village, they may be considered "Systems with New Indirect Discharges to Class B Waters" under the IDRs. These systems are required to obtain an indirect discharge permit before construction begins. In order for a permit to be issued, the permittee would be required to demonstrate that the new discharge:

- will not significantly alter the aquatic biota of the receiving waters;
- will not pose more than a negligible risk to public health;
- will be consistent with existing and potential beneficial uses of the waters; and
- will not violate Water Quality Standards.

The permittee must also document compliance with the Aquatic Permitting Criteria, the Reliability Permitting Criteria, and the Public Health Protection Criteria as stated in the IDRs before a permit will be issued. The larger a proposed cluster system is, the more likely it is to trigger additional hydrogeological and biological testing and monitoring requirements. Permits issued under the IDRs typically include effluent monitoring and downgradient groundwater monitoring requirements.

The latest IDRs became effective in April 2003. A General Permit is allowed for systems with design flows of 15,000 gpd or less and that do not require a certified operator to manage the system. Annual inspections and reporting of system failures are required under the General Permit.

The Aquatic Permitting Criteria include sampling for nutrient parameters (including total dissolved phosphorus and nitrate-nitrite nitrogen). The current IDRs allow a range of options that permittees can use to demonstrate compliance with the Aquatic Permitting Criteria for projects with smaller design flows that do not appear to have the potential for significant environmental impact.

APPENDIX E: CURRENT CONDITION WASTEWATER CAPACITY ANALYSIS METHODS

There are two main components to the wastewater capacity analysis: an "available area" analysis and a "required area" analysis, each of which is described in this appendix.

E.1. Available Area Analysis

The first step in the assessment of suitable areas was to determine the available area on each developed parcel. This process involved both analyses of GIS data to identify areas unsuitable for onsite system development, as well as database operations to identify parcel features that might further limit onsite system development. The table below lists each of the setbacks of features that will be examined in the available area analysis. Each of these features is then briefly discussed.

Available Area Assessment Criteria

Limiting Features	Horizontal Setback (ft)
Surface waters (ponds and streams)	100
Wetlands	100
Top of embankment, or slope greater than 30%	25
Bedrock Escarpments	25
Property line	25
Zone 1 Wellhead Protection Area	Extent of defined Wellhead Protection Area
Private Drilled Wells	100
Private Shallow Wells or Springs	150
Foundation, Footing, or Curtain Drains	35

Source: Vermont Environmental Protection Rules, Wastewater System and Potable Water Supply Rules, eff. September 2007.

1. Surface Waters: Lakes and ponds were identified from the Vermont Hydrography Regions dataset, and streams were identified from the Vermont Hydrography Routes dataset. These lines and areas were spatially buffered with the indicated setback distance using GIS.
1. Wetlands: Wetlands were identified from the Proposed Significant Wetlands dataset. The features in this dataset were spatially buffered with the indicated setback distance using GIS.
2. Top of Embankment, or Slope greater than 30%: Areas with slopes of greater than 30% were identified from the LiDAR Bare Earth DEM and calculated slope % dataset. These areas were spatially buffered with the indicated setback distance using GIS.

3. Bedrock Escarpments: Bedrock Escarpments were obtained from the Chittenden County soils dataset. Escarpments were spatially buffered with the indicated setback distance using GIS.
4. Property Lines: Property lines were obtained from the 2008 Huntington Parcels dataset. Property lines were spatially buffered with the indicated setback distance using GIS.
5. Zone I Wellhead Protection Areas: Wellhead protection areas (for permitted community water supplies) were obtained from the State Water Supply GIS dataset. These areas were used as-is with no additional spatial buffering in GIS.
6. Private Water Supplies: All known drilled and shallow wells were included in the available area analysis. Water supply information was collected from spatial data sources, from permit files, and from property owner surveys. Each water supply point was spatially buffered with the indicated setback distance using GIS. Where the water supply inventory indicated that a parcel is served by a private water supply, but the location of the water supply is not available, an area equivalent to half of the setback distance was subtracted from the parcel's available area. This reduction in the well setback is equivalent to assuming that a portion of the area resulting from a standard setback would overlap adjacent parcels and other buffer areas on a small lot. It is likely that overall, this method underestimates the well shield areas required by the state's Water Supply Rules for the protection of drinking water supplies. Under these rules, a shield-shaped area that extends uphill from the circular buffer shown on the maps (200 feet uphill for drilled wells, 500 feet uphill for shallow wells or springs) is required to be set aside for groundwater protection. The GIS analysis tools are not capable of drawing such shields for each water supply, so the circular "radius" buffer is used instead. This assumption will result in some properties with private water supplies appearing to have more area available for an onsite system than is actually the case. For undeveloped properties without water supply information, no water supply or buffer is assumed to exist.
7. Building Footprints: Building footprints were digitized from the available orthophotographs and E911 structure locations (eSites). The building footprints were buffered using GIS, making a conservative assumption that structures generally have footing drains. The building footprint areas were included in the analysis as areas unavailable for onsite systems.
8. Available Area Calculation: The total available area for a parcel was determined by subtracting an assumed building footprint area from the area of the parcel outside the required setback buffers as calculated by the GIS analysis. This calculation is shown in the following equation:

   Area Available = Parcel Area – Required Setback Buffers – Building Footprint – Wellhead Protection Area Buffer

E.2. Required Area Analysis

The required area for construction of an onsite system was determined from two primary pieces of information: 1) soil properties (percolation rates and long-term acceptance rates) for each parcel, 2) design parameters for each onsite system. Assumptions we made regarding the determination of each of the inputs to the required area calculation are described below.

E.2.1. Soil Properties

Percolation rates and long-term acceptance rates (LTAR) were calculated for each soil type within the study area. We assigned average percolation rates using the soil textures from the NRCS soils data and the average rates listed in the Vermont Indirect Discharge Rules. Each parcel was assigned the properties of the predominant soil type for purposes of determining required area.

E.2.2. Onsite System Design Assumptions

Design flows for residential parcels were estimated based on the number of bedrooms recorded for each property by property owners in survey responses, or as recorded in permit documentation. If no information was available for a residential property, we assumed that the wastewater system would be designed to serve a three-bedroom single family home. The only exceptions to this were where the 2011 Huntington Grand List indicated that the property was a duplex (in which case we assumed four bedrooms), or a camp (in which case we assumed two bedrooms).

Design flows and required dispersal system areas for commercial and institutional (religious, municipal, etc.) properties were extracted from electronic permit records or property owner survey responses. Where no electronic permit information or survey response was available for a developed commercial or institutional parcel, we estimated the design flow based on current regulations and property use.

Where suitable soils existed, the onsite system was assumed to be a standard trench leach field design. The standard Vermont Wastewater System and Potable Water Supply Rules long-term application rate (LTAR) effluent loading rates were used in the sizing of the leach field. A standard three-foot wide trench with four feet separation was used as the typical layout. This results in a range of areas needed for the leach field depending on the soil's assumed percolation rate. For soils where only mound systems would be feasible, an estimate of the required area for a mound dispersal system was calculated using the LTAR values for mounds specified in the Rules. It was assumed that if a leach field (or mound) could be successfully sited on the property, there was adequate area for other system components, such as septic tanks and distribution boxes.

E.3. Area Analysis Assessment

The available area for an onsite system was compared to the required area for each parcel. Parcels were identified as area limited if the available area was less than the required area. Parcels were identified as being unconstrained when the available area was greater than or equal to the required area. If any land area was available on a property in addition to what would be required to replace the existing leachfield, we characterized the approximate design flow (in gallons per day) that the additional area might represent. Properties with 280 gallons per day or less of potential additional capacity (essentially, the size that would be needed for a two-bedroom, four-person expansion of an existing leachfield) were characterized as having potentially limited capacity for future expansion of the existing property use. Properties with more than 280 gallons per day of potential additional capacity were characterized as having potential for additional capacity to serve future development.

E.4. Screening Level Review and Capacity Determinations

Once the results of the GIS analyses were produced, a screening level review was conducted on a subset of the parcel-level results. This review includes using all of the additional information known about the properties (permits, test pit and percolation test results if included in the document inventory, etc.), and confirming the results of the GIS analyses. The final outcome of this assessment was a summary map that shows whether or not there are areas in the villages that have limitations that may preclude onsite system replacement in the future, or whether each area may be able to accommodate potential future development.

In addition, the summary maps show approximate locations where survey respondents indicated that their plans for the future of their properties had adequate onsite wastewater treatment capacity, as well as properties where owners indicated that future plans may need wastewater treatment capacity off-site in order to be successful.

APPENDIX F: DETAILED DESCRIPTIONS OF POTENTIAL WATER SUPPLY SOURCE OPTIONS

F.1. Lower Village Water Supply Source Options

F.1.1. W-LV-1, Lower Village, 1235 Main Road

Area W-LV-1, a small portion of a privately owned property located near the Main Road – Texas Hill Road intersection, is located within the proven gravel aquifer area identified during Phase 1 (Figure 8). The area of interest is very small, about 0.1 acres in size, so there is little possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. However, the site is on the same side of the Huntington River as the majority of developed parcels in the Lower Village, so the need for stream crossings would be minimized. The area is within the 100-year floodplain of the Huntington River. There are no nearby potentially contaminated sites or hazardous waste facilities, but there are up to five onsite wastewater systems within 500 feet of the potential water source area. There is a large hill to the southwest of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system—though the shortest access routes from source to reservoir travel through privately owned residential properties. A limited amount of ledge removal (along Main Road between Windy Pines Drive and Ledge View Drive) may be necessary in order to accommodate any water distribution systems that utilize this site.

F.1.2. W-LV-2, Lower Village, ~39 Mayo Road

Area W-LV-2, a portion of a privately owned property in the open cornfield located behind 39 Mayo Road, is located between two proven gravel aquifer areas identified during Phase 1 (Figure 8) and in the same overall geologic context. The area of interest is about 1.1 acres in size, and there is a good possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the opposite side of the Huntington River as the majority of developed parcels in the Lower Village, so stream crossings would be necessary. The area of interest is above the 100-year floodplain of the Huntington River, though nearly all of the surrounding land is within the floodplain. There are no nearby potentially contaminated sites or hazardous waste facilities, and there are no onsite wastewater systems within 500 feet of the potential water source area. There is a large hill to the north of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site. This site may not be suitable if shared wastewater treatment sites located along Pond and Bridge Roads are ultimately utilized for wastewater dispersal.

F.1.3. W-LV-3, Lower Village, Maplewood Cemetery

Area W-LV-3, a small portion of the Town-owned Maplewood Cemetery just north of the "core" of the Lower Village, is located just north of a proven gravel aquifer area identified during Phase 1 (Figure 8). The area of interest is about 0.2 acres in size, but the surrounding land is Town-owned, so there is a reasonable possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled by the Town. The site is on the same side of the Huntington River as the majority of developed parcels in the Lower Village, so the need for stream crossings would be minimized. The identified area is above the 100-year floodplain of the Huntington River. There are no nearby potentially contaminated sites or hazardous waste facilities, and there are only two onsite wastewater systems within 500 feet of the potential water source area. There is a large hill to the west of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site. Unfortunately, the current use of the property as a cemetery would make it politically challenging to also use it as a potable water source, even though Town controls the land.

F.1.4. W-LV-4, Lower Village, 1235 Main Road

Area W-LV-4, a small portion of a privately owned property located east of the Maplewood Cemetery, is located within the proven gravel aquifer area identified during Phase 1 (Figure 8). The area of interest is very small, about 0.1 acres in size, and there is little possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the same side of the Huntington River as the majority of developed parcels in the Lower Village, so the need for stream crossings would be minimized. The identified area is above the 100-year floodplain of the Huntington River, though much of the land to the east is within the floodplain. While there are no onsite wastewater systems within 500 feet of the potential water source area, the site is relatively close to two Leaking Underground Storage Tank sites (at the Beaudry's and the former Jacques' properties). In addition, careful evaluation would be necessary if shared wastewater treatment sites to the south were developed, to ensure that this source would not be within the two-year time of travel of the wastewater system or systems. There is a large hill to the west of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system—though the shortest access route travels through the Maplewood Cemetery. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.1.5. W-LV-5, Lower Village, Huntington Fire District No. 1 Source

Area W-LV-5, located west of Roberts Park Road, is located within the proven gravel aquifer area identified during Phase 1 (Figure 8) and is a known and currently utilized Public Community Water System source with a proven capacity of 125 gpm. The area of interest is very small, less than 0.1 acres in

size, and there is little possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the opposite side of the Huntington River as the majority of developed parcels in the Lower Village, so stream crossings would be necessary. The identified area is above the 100-year floodplain of the Huntington River. There is a large hill to the east of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system—though the shortest access route travels through several privately owned properties. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

There are several issues, however, that make use of this known and proven water source as a re-permitted Public Community Water System source problematic. The current source site is grandfathered, but would not be allowable under the current Water Supply Rule (for instance, several residences and leachfields are located within 500 feet of the source). In addition, there are known issues with the capacity of the existing distribution system, and the source water has consistent bacterial and sediment/silt issues which may in part be due to the well's construction. The chances of re-permitting this well to supply additional connections, or of installing a new source at this site to supply an expanded community water system, are exceedingly small.

F.1.6. W-LV-6, Lower Village, 2879 Main Road

Area W-LV-6, a portion of a privately owned property located south of the "core" of the Lower Village, is within the proven gravel aquifer area identified during Phase 1 (Figure 8). The area of interest is about 0.1 acres in size, but there is some limited possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the same side of the Huntington River as the majority of developed parcels in the Lower Village, so the need for stream crossings would be minimized. The identified area is above the 100-year floodplain of the Huntington River, though much of the land to the east is within the floodplain. Depending on source siting, there are 3-5 onsite wastewater systems within 500 feet of the potential water source area, and much of the Cummings Road vicinity, including one of the potential shared wastewater system sites, is likely within the two year time-of-travel area where groundwater would flow to or past the source. There is a large hill to the east of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system—though the shortest access route travels up Cummings Road and through several privately owned properties. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.1.7. W-LV-7, Lower Village, 95 Spence Road

Area W-LV-7, a portion of a privately owned property located east of the Main Road-Hinesburg Hollow Road intersection, is near a proven gravel aquifer area identified during Phase 1 and is located in the same

overall geologic context (Figure 8). The area of interest is about 2 acres in size, and there is a good possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the opposite side of the Huntington River as the majority of developed parcels in the Lower Village, so a stream crossing would be necessary. The identified area is above the 100-year floodplain of the Huntington River, though much of the land to the west is within the floodplain. There are no onsite wastewater systems within 500 feet of the potential water source area. There is a mapped hazardous waste small-quantity generator (Jim's Body Shop) and a 4,000 gpd leachfield nearby, though both are located on the opposite side of the Huntington River. An analysis of the two-year time of travel area leading to this source area would be necessary to ensure the source would not be impacted. There is a large hill to the east of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.1.8. W-LV-8, Lower Village and Huntington Center, 3965 Main Road

Area W-LV-8, a portion of a privately owned property located west of Main Road and halfway between the Lower Village and Huntington Center village areas, is near a proven gravel aquifer area identified during Phase 1 and is located in the same overall geologic context (Figure 8). This location is approximately equidistant from both the Lower Village and Huntington Center, so there is a reasonable possibility that a community water system that serves both of these village could utilize the same source site, treatment / disinfection systems, and water storage reservoir. The area of interest is about 2 acres in size, and there is a good possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the same side of the Huntington River as the majority of developed parcels in the Lower Village but on the opposite side of the river from Huntington Center, so a stream crossing would be necessary for a community water system in the Center. The identified area is above the 100-year floodplain of the Huntington River, though much of the land to the east is within the floodplain. There are no known onsite wastewater systems within 500 feet of this area, nor are there any nearby mapped hazardous waste sites. There is a large hill to the west of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.1.9. W-LV-9, Lower Village, 680 Mayo Road

Area W-LV-9, the undeveloped portion of a privately owned property located near the northern edge of the Lower Village study area on Mayo Road, is not in or near a proven gravel aquifer area, but is within an area of relatively high-yielding drilled bedrock wells identified during Phase (Figure 8a). The intent for this location is not to site a community-scale water supply source, but instead to serve a small number of

properties (less than 10 connections) in instances where existing water supplies could potentially be compromised if up-gradient community wastewater treatment sites were constructed and operated. The area of interest is about half an acre in size, and there is a good possibility that the entire Zone 1 wellhead protection area could be controlled through negotiations with a single property owner. No stream or river crossings would be needed, as there are no streams between the source area and the properties along Bridge Street that would likely be served. The identified area is well above the 100-year floodplain of the Huntington River, and there are no known onsite wastewater systems within 500 feet of this area, nor are there any nearby mapped hazardous waste sites. The source is at a higher elevation as compared to the properties that would be served, so gravity distribution and pressurization of the water system is feasible. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2. Huntington Center Water Supply Source Options

F.2.1. W-HC-1, Huntington Center, 4345 Main Road

Area W-HC-1, a portion of a privately owned property located north of Main Road at the northern edge of the Huntington Center village area, is near a proven gravel aquifer area identified during Phase 1 and is located in the same overall geologic context (Figure 9). The area of interest is about 1.75 acres in size, and there is a good possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the same side of the Huntington River as the majority of developed parcels in Huntington Center but on the opposite side of Brush Brook, so a stream crossing would be necessary for a community water system in the Center. The identified area is above the 100-year floodplain of the Huntington River. There are no onsite wastewater systems within 500 feet of the identified potential water source area, although onsite wastewater systems located closer to Main Road reduce the area available for ideal community water source locations. There are also no nearby mapped hazardous waste sites nearby—but much of this potential source area is also identified as potential shared wastewater treatment sites. There is a hill to the east of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2.2. W-HC-2, Huntington Center, 4501 Main Road

Area W-HC-2, a portion of a privately owned property also located north of Main Road near the northern edge of the Huntington Center village area, is near a proven gravel aquifer area identified during Phase 1 and is located in the same overall geologic context (Figure 9). The area of interest is about 1.25 acres in size, and there is a good possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is on the same side

of the Huntington River as the majority of developed parcels in Huntington Center but on the opposite side of Brush Brook, so a stream crossing would be necessary. The identified area is above the 100-year floodplain of the Huntington River. There are no onsite wastewater systems within 500 feet of the identified potential water source area, although nearby onsite wastewater systems reduce the area available for ideal community water source locations. There are also no mapped hazardous waste sites nearby—but much of this potential source area is identified as potential shared wastewater treatment sites. There is a hill to the east of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2.3. W-HC-3, Huntington Center, 4905 Main Road

Area W-HC-3, a portion of a privately owned property located west of Main Road near the middle of Huntington Center village area, is within a proven gravel aquifer area identified during Phase 1 (Figure 9). The area of interest is about 0.6 acres in size, but there are several small, adjoining parcels and there is little possibility that the entire Zone 1 wellhead protection area (the 500-foot radius buffer) could be controlled through negotiations with a single property owner. The site is essentially in the middle of the "core" area of Huntington Center, so no stream crossings would be necessary. The identified area is above the 100-year floodplain of the Huntington River. There are only two up-gradient onsite wastewater systems within 500 feet of the identified potential water source area, but one belongs to the Brewster Pierce Memorial School, and there are several other leachfields within the 500-foot radius. A hydrogeologic analysis completed by Wagner, Heindel, & Noyes in early 1990s in connection with the expansion of the school did indicate that gravel aquifer and surficial sand/gravel aquifer are not hydraulically connected, but it would be necessary to complete a longer-term, more detailed analysis of the potential connection between the surficial and confined gravel aquifers if this site were chosen as the community water supply source. There are no nearby mapped hazardous waste sites nearby—but much of this potential source area is also identified as a potential shared wastewater treatment site. There is a hill to the southeast of the source site with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2.4. W-HC-4, Huntington Center, 4930-62 Main Road

Area W-HC-4, a portion of the Town-owned property that hosts the Town Offices, Fire Department, and Town Garage, is located west of Main Road near the center of the Huntington Center village area. This area is adjacent to a proven gravel aquifer area and is located in the same geologic context (Figure 9). The area of interest is small, about 0.2 acres in size, and the requirement to control land 500' around the source would be challenging to meet due to the property's geometry and current development pattern. The site is also in the middle of the "core" area of Huntington Center, so no stream crossings would be

necessary. The identified area is above the 100-year floodplain of the Huntington River, although it is close to the river and the floodplain is located immediately to the west. Currently, the presence of a leachfield in the recreational field, and the locations of several other leachfields along Main Road, would make this site unsuitable. There is a mapped Underground Storage Tank location associated with the Town Garage, immediately to the east and up-gradient from the site; and the recreational field is also identified as a potential shared wastewater treatment site. The nearest hill with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system is located across the Huntington River to the west. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2.5. W-HC-5, Huntington Center, 5395 Main Road

Area W-HC-5 is a portion of a larger privately owned field to the west of Main Road between Trapp Road and Shaker Mountain Road. This area is between two proven gravel aquifer areas and is located in the same geologic context (Figure 9). The area of interest is small, about 0.2 acres in size—primarily because any sites that maintain a 500-foot buffer on the same property as the source are located close to the 100-year floodplain. The site is on the same side of the river as the majority of developed properties in the Center, so no stream crossings would be necessary. The identified area is above the 100-year floodplain of the Huntington River, although it is close to the river and the floodplain is located immediately to the west. There are no nearby mapped hazardous facilities, but there are a few (1-3) upgradient leachfields. In addition, the site is near, but on the opposite side of the Huntington River from, the shared leachfields serving the Sunrise Drive vicinity. The nearest hill with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system is located across Main Road to the east (this parcel is under the same ownership as the potential community water source site). Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

F.2.6. W-HC-6, Huntington Center, 6136 Main Road

Area W-HC-6 is a portion of a larger privately owned field to the west of Main Road and south of the Huntington Center village area boundary. This area is not within a proven gravel aquifer area, but is located in the same geologic context (Figure 9). The area of interest is about 3 acres in size, and a source sited anywhere inside the identified area maintains a 500-foot buffer on the same property while keeping the source out of the mapped 100-year floodplain. A crossing of the Huntington River would not be necessary to utilize this water source, but two smaller stream crossings would be necessary—as would a crossing of the wetland and floodplain areas located between Main Road and the source area. There are no nearby mapped hazardous facilities, and no nearby leachfields. The nearest hill with enough topographic relief that reservoirs can be successfully sited for gravity distribution and pressurization of the water system is located to the north and west, and this this parcel is owned by a different landowner

than the source. Ledge removal is not anticipated in order to accommodate any water distribution systems that utilize this site.

APPENDIX G: DETAILED DESCRIPTIONS OF POTENTIAL WASTEWATER TREATMENT / DISPERSAL SITE OPTIONS

G.1. Lower Village Shared Wastewater Treatment Site Options

G.1.1. WW-LV-1, Lower Village, 680 Mayo Road

Area WW-LV-1, the undeveloped portion of a privately owned property located near the northern edge of the Lower Village study area on Mayo Road, is mapped by the NRCS as being underlain by Stetson gravelly fine sandy loam soils with slopes of 0-12% (Figure 2 and Table 3). The larger parcel contains 387 acres, but the area of interest is about 7 acres in size. This area is located about 300 feet south of the nearest mapped surface water body, an unnamed stream with a very small watershed area of roughly 370 acres (0.68 square miles). There are no mapped potable water supplies between this area and the nearest receiving water body. The presence of areas of less suitable soils and potentially steep slopes between this area and the likely receiving stream may further restrict this site's capacity. Area WW-LV-1 is located at a higher elevation than the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. The area is about 5,400 feet from the Main Road – Bridge Street intersection, and the highest elevation in the likely force-main route is about 130 feet higher in elevation than the main intersection. A limited amount of ledge removal (near the high point of the route along Mayo Road) may be necessary in order to accommodate force mains.

G.1.2. WW-LV-2, Lower Village, Intersection of Pond Road, Mayo Road, and Bridge Street

Area WW-LV-2, the undeveloped portion of a privately owned property located in the "Y" formed by Mayo and Pond Roads, is mapped by the NRCS as being underlain primarily by Hartland very fine sandy loam soils with slopes of 2-6% (Figure 2 and Table 3). The area of interest is about 4.7 acres in size. This area is located about 1,000 feet northeast of the Huntington River. The very small, unnamed stream apparently running along Pond Road to the east of the site is, based on field review, a stone-lined ditch with no consistent water flow other than during storm events. There are currently 2-3 mapped potable water supplies between this area and the Huntington River. Area WW-LV-2 is located at a higher elevation than the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. The area is about 3,400 feet from the Main Road – Bridge Street intersection, and the highest elevation in the likely force-main route is about 50 feet higher in elevation than the main intersection. Ledge removal is not anticipated; mapped water supply locations along Bridge Street, where well logs are available, indicate 30 or more feet of overburden above bedrock.

G.1.3. WW-LV-3, Lower Village, 190 Pond Road

Area WW-LV-3, the undeveloped portion of a privately owned property located on Pond Road immediately to the east of WW-LV-2, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 5-20% (Figure 2 and Table 3). The area of interest is about 11.3 acres in size. This area is located about 600 feet east-northeast of the Huntington River. The very small, unnamed stream apparently running along Pond Road to the east of the site is, based on field review, a stone-lined ditch with no consistent water flow other than during storm events. There are currently 2-3 mapped potable water supplies between this area and the Huntington River. Area WW-LV-3 is located at a higher elevation than the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. The area is about 2,800 feet from the Main Road – Bridge Street intersection, and the highest elevation in the likely force-main route is about 25 feet higher in elevation than the main intersection. Ledge removal is not anticipated; mapped water supply locations along Bridge Street, where well logs are available, indicate 30 or more feet of overburden above bedrock.

G.1.4. WW-LV-4, Lower Village, Bridge Street

Area WW-LV-4, a privately owned property located on Bridge Street immediately to the south of WW-LV-3, is also mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 5-20% (Figure 2 and Table 3). This property was listed as unimproved in the 2011 Grand List, but a permit has been issued for the construction of a 4-bedroom single family residence on this lot. The area of interest is about 5.1 acres in size. This area is located about 300 feet east-northeast of the Huntington River, and based on surface topography, the river is the most likely receiving stream. There is, however, another small, unnamed stream located about 220 feet south of the area of interest, which has a watershed area of about 520 acres. There are currently 1-2 mapped potable water supplies between this area and the Huntington River. Area WW-LV-4 is located at a higher elevation than the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. The area is about 2,200 feet from the Main Road – Bridge Street intersection, and the highest elevation in the likely force-main route is about 15 feet higher in elevation than the main intersection. Ledge removal is not anticipated; mapped water supply locations along Bridge Street, where well logs are available, indicate 30 or more feet of overburden above bedrock.

G.1.5. WW-LV-5, Lower Village, Main Road at Ledge View Drive

Area WW-LV-5, a privately owned property located west of Main Road and just north of the Main Road – Ledge View Drive intersection, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 5-12% (Figure 2 and Table 3). The area of interest is about 2 acres in size. This area is located about 160 feet southwest of the Huntington River, and based on surface

topography, the river is the most likely receiving stream. There are no mapped potable water supplies between this area and the Huntington River. Area WW-LV-5 is located at a slightly lower elevation than the core area of the Lower Village, so a gravity-based collection system may be feasible. The area is about 2,900 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated if this site is utilized for wastewater treatment coming from the village core to the south; mapped water supply locations along Main Road between the Bridge Street intersection and this site, where well logs are available, indicate 50 or more feet of overburden above bedrock. However, if this site is utilized to provide capacity for the Huntington Acres area, ledge removal will likely be necessary along Main Road.

G.1.6. WW-LV-6, Lower Village, Maplewood Cemetery

Area WW-LV-6, a Town-owned property located west of Main Road and just north of the Main Road – Ledge View Drive intersection, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam and Hartland very fine sandy loam soils with slopes of 0-6% (Figure 2 and Table 3). The area of interest is about 4.4 acres in size, located on the eastern portion of the property closer to Main Road; however, this area is already occupied by burial sites.

G.1.7. WW-LV-7, Lower Village, 2160 Main Road

Area WW-LV-7, a privately owned property located west of the Main Road –Bridge Street intersection, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam, Agawam fine sandy loam, and Hartland very fine sandy loam soils with slopes of 0-6% (Figure 2 and Table 3). The area of interest is about 3.4 acres in size. This area is located about 575 feet west-southwest of the Huntington River, and based on surface topography, the river is the most likely receiving stream. In the current condition, there are many mapped potable water supplies between this area and the Huntington River; if this area is considered as a shared wastewater dispersal site, a community water supply system will be necessary for the down-gradient area. WW-LV-7 is located at a slightly higher elevation than the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. Depending on where the property is accessed from Main Road, the area is about 250-800 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road near the Bridge Street intersection, where well logs are available, indicate 50 or more feet of overburden above bedrock.

G.1.8. WW-LV-8, Lower Village, 3840 Main Road

Area WW-LV-8, a privately owned property located southwest of the Main Road –Raven Ridge Road intersection, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 2 and Table 3). The area of interest is about 8.1 acres in size. This area is located about 750 feet west of the Huntington River, and based on surface topography, the river is the

most likely receiving stream. In the current condition, there are many mapped potable water supplies between this area and the Huntington River. If this area is considered as a shared wastewater dispersal site, a community water supply system will be necessary for the down-gradient area. WW-LV-8 is located approximately 40 feet higher in elevation than many of the properties which would be served by a wastewater treatment system at this site, so it would be necessary to pump the wastewater up to the dispersal field. The area is about 900 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road near the Bridge Street intersection, where well logs are available, indicate 50 or more feet of overburden above bedrock.

G.1.9. WW-LV-9, Lower Village, 700 East Street

Area WW-LV-9, a privately owned property located south of East Road on the eastern edge of the Lower Village zoning district area, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 2 and Table 3). The area of interest is about 8.1 acres in size. This area is located about 100 feet north of Fargo Brook, the likely receiving stream, which has a watershed area of about 1,360 acres. There are no mapped potable water supplies between this area and the nearest receiving water body. WW-LV-9 is higher in elevation than many of the properties which would be served by a wastewater treatment system at this site—with the exception of Huntington Woods Road—and even for this street, it would be necessary to pump the wastewater a short distance to the dispersal field. The area is about 3,200 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated; mapped water supply locations along East Street, where well logs are available, indicate 40 or more feet of overburden above bedrock.

G.1.10. WW-LV-10, Lower Village, 2879 Main Road

Area WW-LV-10, a privately owned property located east of Main Road near Cummings Drive, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5%, or by Colton and Stetson soils with steep slopes (30-60%) (Figure 2 and Table 3). Ground slopes measured from the USGS 1:24,000 topographic map indicate that maximum slopes of 15-20% are more likely across the area mapped by NRCS as steeply sloping. The potentially steep slopes may restrict the capacity of this site and/or make site access for construction activities challenging. The area of interest is about 4.5 acres in size. This area is located about 200 feet west of the Huntington River, the likely receiving stream, and is adjacent to the 100-year floodplain in an area where the river channel is actively migrating. There are no mapped potable water supplies between this area and the nearest receiving water body. There are, however, areas of less permeable soils located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. WW-LV-10 is lower in elevation than nearby properties which could be served by a wastewater treatment system at this site, making a gravity-based collection system potentially feasible. Depending on the route of access from Main Road, the area is 2,700-3,300 feet from the Main Road – Bridge Street intersection. Ledge removal is not

anticipated; mapped water supply locations along Main Road near and south of the Bridge Street intersection, where well logs are available, indicate 40 or more feet of overburden above bedrock.

G.1.11. WW-LV-11, Lower Village, 189 Cummings Drive

Area WW-LV-11, a privately owned property located south of Cummings Drive, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5%, (Figure 2 and Table 3). The area of interest is about 3.6 acres in size—although the property owner has indicated plans to subdivide the property, and these plans may already be in the permitting process. Either the Huntington River (about 900 feet east) or an unnamed tributary to Hollow Brook (about 250 feet south) may be the receiving stream; the area of interest is located almost directly across the boundary between the two streams' watersheds. Depending on the groundwater flow direction from this site, there are 6-12 mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system will be necessary for the down-gradient area. WW-LV-11 is higher in elevation than nearby properties which could be served by a wastewater treatment system at this site, and the area is about 4,000 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road near and south of the Bridge Street intersection, where well logs are available, indicate 30 or more feet of overburden above bedrock.

G.1.12. WW-LV-12, Lower Village, 164 Hinesburg Hollow Road

Area WW-LV-12, a privately owned property located north of Hinesburg Hollow Road near the Main Road intersection, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 12-20%--or by Colton and Stetson soils with slopes of 30-60%, (Figure 2 and Table 3). Ground slopes measured from the USGS 1:24,000 topographic map indicate that maximum slopes of 15-20% are more likely across the area mapped by NRCS as steeply sloping. The potentially steep slopes may restrict the capacity of this site and/or make site access for construction activities challenging. The area of interest is about 3.2 acres in size. Either Hollow Brook (about 500 feet south) or an unnamed tributary to Hollow Brook (about 120 feet east) may be the receiving stream; the area of interest is located near the topographic boundary between the two streams' watersheds. A force main stream crossing beneath the unnamed tributary to Hollow Brook would be needed in order to utilize this site for shared wastewater treatment and dispersal. There are two mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system will be necessary for the down-gradient area. WW-LV-12 is at a similar or higher elevation compared to nearby properties which could be served by a wastewater treatment system at this site, and the area is about 5,400 feet from the Main Road – Bridge Street intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road and Hinesburg Hollow Road, where well logs are available, indicate 25 or more feet of overburden above bedrock.

G.2. Huntington Center Shared Wastewater Treatment Site Options

G.2.1. WW-HC-1, Huntington Center, 4345 Main Road

Area WW-HC-1, a privately owned property located north of Main Road at the northern end of the Huntington Center village area, is mapped by the NRCS as being underlain primarily by Hartland very fine sandy loam soils with slopes of 2-6% (Figure 3 and Table 3). The area of interest is about 5.8 acres in size. Either the Huntington River (750 feet southwest) or an unnamed tributary to the Huntington River (about 120 feet north) may be the receiving stream. If this site is of interest, an early opinion on which water body will likely be considered the "receiving stream" for purposes of compliance with the Indirect Discharge Rules will be of critical importance. There are also areas of less permeable soils located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There is one mapped water supply location potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-1 is at a slightly lower elevation compared to the area to the south which could be served by a wastewater treatment system at this site, so a collection system that is at least partially gravity-based may be feasible. The area is about 2,500 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.2. WW-HC-2, Huntington Center, 4501 Main Road

Area WW-HC-2, a privately owned property located north of Main Road near the northern end of the Huntington Center village area, is in many respects similar to WW-HC-1. The area is mapped by the NRCS as being underlain primarily by Hartland very fine sandy loam soils with slopes of 2-6% (Figure 3 and Table 3). The area of interest is larger, about 10.6 acres in size. Again, either the Huntington River (700 feet southwest) or an unnamed tributary to the Huntington River (about 150 feet north) may be the receiving stream. If this site is of interest, an early opinion on which water body will likely be considered the "receiving stream" for purposes of compliance with the Indirect Discharge Rules will be of critical importance. There are areas of less permeable soils, including two small wetlands along the northern edge of the area, located between the area of interest and potential receiving waters, which may decrease the overall capacity of the site. There is one mapped water supply location potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-2 is at a slightly lower elevation compared to the area to the south which could be served by a wastewater treatment system at this site, so a collection system that is at least partially gravity-based may be feasible. The area is about 1,700 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated;

mapped water supply locations along Main Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.3. WW-HC-3, Huntington Center, 95 Camel's Hump Road

Area WW-HC-3 is a privately owned property located north of Camel's Hump Road near its intersection with Main Road. The area is mapped by the NRCS as being underlain primarily by a large area of Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). The area of interest is 4.6 acres in size. A subdivision permit was located for this parcel during Phase 1 work (Table 4), though if constructed as permitted, the new single family residence would not be within the area of interest. Testing results recorded with this permit indicate that the soils on the southern half of the parcel are loose to friable, sandy loam to coarse sandy gravel, and highly conductive but with relatively shallow depths to seasonal groundwater (54-60"). No testing was completed on the northern portion of the property. Capacity estimates for this property indicate that if a system is designed for this property, it will likely fall under the WSPWSR (for flows of less than 6,500 gpd) rather than the IDRs.

If the system is permitted under the IDRs, either Brush Brook (about 200 feet north) or the Huntington River (700 feet west) may be the receiving stream for an indirect discharge at this site. The watershed area of Brush Book in the area of the likely indirect discharge is over 5,800 acres, so the stream's assimilative capacity for an indirect discharge is not likely a major concern. As with many of the other potential dispersal sites in Huntington Center, there are areas of less permeable soils located between the area of interest and potential receiving waters, which may decrease the overall capacity of the site. There are 2-3 mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-3 is at a similar elevation as the surrounding area which could be served by a wastewater treatment system at this site, so a collection system that is at least partially gravity-based may be feasible. The area is about 500 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.4. WW-HC-4, Huntington Center, 410 Camel's Hump Road

Area WW-HC-4, a privately owned property located on both sides of Camel's Hump Road near the eastern edge of the Huntington Center village area, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). The area of interest is about 19 acres in size (10.6 acres on the north side of the road, and 8.4 acres on the south side). Brush Brook, located about 100 feet north of the site, is the likely receiving stream. The watershed area of Brush Book in the area of the likely indirect discharge is over 5,800 acres, so the stream's assimilative capacity for an indirect discharge is not likely a major concern. There are areas of less permeable soils located

between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There is one mapped water supply location potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-4 is higher in elevation than nearby properties which could be served by a wastewater treatment system at this site, and the area is about 900 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Camel's Hump Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.5. WW-HC-5, Huntington Center, 4905 Main Road

Area WW-HC-5, a privately owned property located north of the Brewster Pierce Memorial School and extending to Main Road, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). The area of interest is about 3.4 acres in size. No site-specific information was available for this area, but testing completed along its southern boundary on the adjacent school property indicates that a thickness of 13-18 feet of sands and gravels overlies silt in this area, and that groundwater along this boundary is generally encountered at 12-18 feet below the ground surface. Either the Huntington River, located about 1000 feet west of the site, or Brush Brook to the north, may be the receiving stream; the groundwater flow divide between the two streams runs southeast to northwest diagonally through the site WW-HC-6 and this one. There are areas of less permeable soils located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There are 10-12 mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-5 is at a similar or higher elevation compared to nearby properties which could be served by a wastewater treatment system at this site, and depending on access, the area is about 600-1000 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Camel's Hump Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.6. WW-HC-6, Huntington Center, School Street

Area WW-HC-6, the recreational area associated with the municipally owned Brewster Pierce Memorial School, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). The area of interest is about 1.1 acres in size, not including the area already occupied by the school's wastewater systems. Site specific testing completed on this property in the 1990s indicates that a thickness of 10-18 feet of sands and gravels overlies silt in this area, and that groundwater is generally encountered at 6-12 feet below the ground surface. The Huntington River, located about 1000 feet west of the site, is likely the receiving stream. There are areas of less

permeable soils located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There are 8-12 mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, a community water supply system or off-site water supply source will be necessary for the down-gradient area. WW-HC-6 is at a similar or higher elevation compared to nearby properties which could be served by a wastewater treatment system at this site, and depending on access, the area is about 950-1800 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Camel's Hump Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.7. WW-HC-7, Huntington Center, 4930-60 Main Road, Town Office / Fire Department / Garage

Area WW-HC-7, the recreational area associated with the Town Office, Town Highway Department garage, and the Fire Department, is mapped by the NRCS as being underlain primarily by Hadley very fine sandy loam soils with slopes of 0-5% and a shallow water table at 4-6 feet below ground surface (Figure 3 and Table 3). The area of interest is about 2 acres in size, including the area already occupied by the municipal buildings' wastewater systems. Site specific testing completed on this property in the 1990s indicates that a thickness of 90-100 inches (7.5-8.3 feet) of sands and gravels overlies silt in this area, and that seasonal high groundwater is generally encountered at 36-75 inches (3-6.25 feet) below the ground surface. Given these limitations, and the existing use of the property as a recreational field, a design including a pre-treatment system and a subsurface drip irrigation filtrate leachfield is recommended to gain the most capacity.

The Huntington River, located about 150 feet west of the site, is likely the receiving stream, and the site is adjacent to the river's 100-year floodplain. There are areas of less permeable soils located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There are no mapped water supply locations potentially down-gradient from the site. WW-HC-6 is at a lower elevation compared to nearby properties which could be served by a wastewater treatment system at this site, so a gravity-based collection system is likely feasible. The area is about 1,100 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Camel's Hump Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.8. WW-HC-8, Huntington Center, 5120 Main Road

Area WW-HC-8, a privately owned property located west of Main Road near the Main Road – Trapp Road intersection, is mapped by the NRCS as being underlain primarily by Agawam fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). The area of interest is about 2.2 acres in size. Either the Huntington River (400 feet west) or a small, unnamed tributary with a watershed area of about 400 acres

(250 feet west of the area) may be considered the receiving stream. If this site is of interest, an early opinion on which water body will likely be considered the "receiving stream" for purposes of compliance with the Indirect Discharge Rules will be of critical importance. There are areas of less permeable soils, including a wetland, located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. There are no mapped water supply location potentially down-gradient from the site. WW-HC-8 is slightly higher in elevation than nearby properties which could be served by a wastewater treatment system at this site, and the area is about 1,200 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Camel's Hump Road, where well logs are available, indicate 75 or more feet of overburden above bedrock.

G.2.9. WW-HC-9, Huntington Center, 315 Shaker Hill Road

Area WW-HC-9, a privately owned property located on both sides of Shaker Hill Road near the southern edge of the Huntington Center village area, is mapped by the NRCS as being underlain primarily by Stetson gravelly fine sandy loam soils with slopes of 5-12% and Agawam fine sandy loam soils with slopes of 0-5% (Figure 3 and Table 3). A small area of potentially steeply sloping Colton and Stetson soils are located near the southern edge of the area of interest. The entire area of interest is about 14.1 acres in size (4.1 acres on the north side of the road, and 10 acres on the south side). The Huntington River or Carpenter Brook (with a watershed area of 1,770 acres) are the likely receiving streams. If Carpenter Brook is the receiving stream for the majority of any proposed wastewater system, and the proposed system has a design flow of more than 15,000 gpd, the brook's assimilative capacity for an indirect discharge may be of concern. There are areas of less permeable soils, as well as a mapped wetland, located between the area of interest and the Huntington River, which may decrease the overall capacity of the site. Portions of the site are also adjacent to the mapped 100-year floodplain for the Huntington River. There are no mapped water supply locations potentially down-gradient from the site. WW-HC-8 is higher in elevation than nearby properties which could be served by a wastewater treatment system at this site, and the area is about 5,500 feet from the Main Road – Camel's Hump Road intersection. Ledge removal is not anticipated; mapped water supply locations along Main Road and Shaker Hill Road, where well logs are available, indicate 50 or more feet of overburden above bedrock.

G.3. Hanksville Shared Wastewater Treatment Site Options

G.3.1. WW-HV-1, 7372 Main Road

Area WW-HV-1, a privately owned property located on Main Road at the northern edge of the Hanksville village area, is mapped by the NRCS as being underlain primarily by Hartland very fine sandy loam soils with slopes of 2-6% (Figure 4 and Table 3). The entire area of interest is about 1.4 acres in size. The Huntington River is the likely receiving stream. There are two mapped water supply locations potentially down-gradient from the site. If this area is considered as a shared wastewater dispersal site, off-site water

supply sources will be necessary for the down-gradient area. WW-HV-1 is lower in elevation than properties to the south which could be served by a wastewater treatment system at this site, so gravity-based collection systems are potentially feasible. The area is about 4,600 feet from the Main Road – Beane Road intersection. A force main stream crossing beneath an unnamed tributary to the Huntington River would be needed in order to utilize this site for shared wastewater treatment and dispersal. Ledge removal will probably be necessary along portions of the likely collection system route; mapped water supply locations along Main Road, where well logs are available, indicate 8-20 feet of overburden above bedrock and bedrock outcrops are visible in several locations along Main Road.

APPENDIX H: DO NOTHING SCENARIO, WATER AND WASTEWATER COST BASIS DETAILS

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 1, LV-W-A

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	180	$12	$2,160
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,710**

Replacement Drilled Gravel Well (Best Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**

Replacement Drilled Bedrock Well (Worst Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	1000	$12	$12,000
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #1 - Total Estimated Cost				**$23,900**

Replacement Drilled Gravel Well (Worst Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Lower Village Areas.

Details for water supply construction/replacement costs, no-action scenario and properties outside municipal service areas
Lower Village, Huntington, Vermont
Last update: 5/3/2012 anm

Scenario and water supply type	Total current / known	Current estimated (existing but type not known)	Total new water supplies at build-out	Percentage of wells expected to requrire construction or replacement*	Cost per current or future well replacement	Total cost
Lower Village, No Action						
Huntington FD#1	47	0	0	100%	$6,900	$324,300
Drilled gravel wells	30	31	5	77%	$6,900	$350,175
Drilled bedrock wells best case	41	73	107	74%	$8,700	$1,426,800
Drilled bedrock wells worst case	21	9	34	77%	$23,900	$1,171,100
TOTAL to replace all current wells in project area and construct new wells during build-out						$3,272,375
Lower Village, LV-W-B outside municipal service areas						
Huntington FD#1	47	0	0	100%	$6,900	$324,300
Drilled gravel wells	19	16	3	77%	$6,900	$201,825
Drilled bedrock wells best case	39	72	100	74%	$8,700	$1,352,850
Drilled bedrock wells worst case	17	9	21	72%	$23,900	$812,600
TOTAL to replace all current wells in project area and construct new wells during build-out						$2,691,575
Lower Village, LC-W-C outside municipal service areas						
Drilled gravel wells	7	8	9	100%	$6,900	$165,600
Drilled bedrock wells best case	16	42	33	84%	$8,700	$665,550
Drilled bedrock wells worst case	14	9	8	63%	$23,900	$466,050
TOTAL to replace all current wells in project area and construct new wells during build-out						$1,297,200

Note: *Total cost estimate includes the construction cost of 100% of wells constructed for new development during build-out.
Total cost estimate includes the replacement of 75% of existing drilled gravel wells with new gravel wells, and replacement of 50% of existing drilled bedrock wells with new bedrock wells (best case or worst case, based on actual location of existing wells).
Existing shallow wells or springs are estimated to be replaced with drilled gravel or bedrock wells as appropriate, based on actual location of existing shallow wells/springs.
Build-out life cycle is expected to be approximately 50 years.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 1, HC-W-A

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	130	$12	$1,560
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,110**

Replacement Drilled Gravel Well (Best Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**

Replacement Drilled Bedrock Well (Worst Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	425	$12	$5,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #1 - Total Estimated Cost				**$17,000**

Replacement Drilled Gravel Well (Worst Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Huntington Center Area.

Details for water supply construction/replacement costs, no-action scenario and properties outside municipal service areas
Huntington Center, Huntington, Vermont
Last update: 5/3/2012 anm

Scenario and water supply type	Total current / known	Current estimated (existing but type not known)	Total new water supplies at build-out	Percentage of wells expected to requrire construction or replacement*	Cost per current or future well replacement	Total cost
Huntington Center, No Action						
Drilled gravel wells	11	7	9	83%	$6,900	$155,250
Drilled bedrock wells best case	28	21	100	84%	$8,700	$1,083,150
Drilled bedrock wells worst case	0	0	0	0%	$23,900	$0
TOTAL to replace all current wells in project area and construct new wells during build-out						$1,238,400
Huntington Center, HC-W-B outside munic areas						
Drilled gravel wells	11	7	9	83%	$6,900	$155,250
Drilled bedrock wells best case	28	21	87	82%	$8,700	$970,050
Drilled bedrock wells worst case	0	0	0	0%	$23,900	$0
TOTAL to replace all current wells in project area and construct new wells during build-out						$1,125,300
Huntington Center, LC-W-C outside munic areas						
Drilled gravel wells	5	2	2	81%	$6,900	$50,025
Drilled bedrock wells best case	17	9	39	80%	$8,700	$452,400
Drilled bedrock wells worst case	0	0	0	0%	$23,900	$0
TOTAL to replace all current wells in project area and construct new wells during build-out						$502,425

Note: *Total cost estimate includes the construction cost of 100% of wells constructed for new development during build-out.
Total cost estimate includes the replacement of 75% of existing drilled gravel wells with new gravel wells, and replacement of 50% of existing drilled bedrock wells with new bedrock wells (best case or worst case, based on actual location of existing wells).
Existing shallow wells or springs are estimated to be replaced with drilled gravel or bedrock wells as appropriate, based on actual location of existing shallow wells/springs.
Build-out life cycle is expected to be approximately 50 years.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 1, HV-W-A

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	130	$12	$1,560
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,110**

Replacement Drilled Gravel Well (Best Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**

Replacement Drilled Bedrock Well (Worst Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	425	$12	$5,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #1 - Total Estimated Cost				**$17,000**

Replacement Drilled Gravel Well (Worst Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Huntington Center Area.

Details for water supply construction/replacement costs, no-action scenario and properties outside municipal service areas
Hanksville, Huntington, Vermont
Last update: 6/8/2012 anm

Scenario and water supply type	Total current / known	Current estimated (existing but type not known)	Total new water supplies at build-out	Percentage of wells expected to requrire construction or replacement	Cost per current or future well replacement	Total cost
Hanksville, No Action						
Drilled gravel wells	0	0	0	0%	$6,900	$0
Drilled bedrock wells best case	23	21	55	78%	$8,700	$669,900
Drilled bedrock wells worst case	3	0	3	75%	$23,900	$107,550
TOTAL to replace all current wells in project area and construct new wells during build-out						$777,450
Hanksville, HC-W-B outside munic areas						
Drilled gravel wells	0	0	0	0%	$6,900	$0
Drilled bedrock wells best case	23	21	50	77%	$8,700	$626,400
Drilled bedrock wells worst case	3	0	3	75%	$23,900	$107,550
TOTAL to replace all current wells in project area and construct new wells during build-out						$733,950

Note: Total cost estimate includes the construction cost of 100% of wells constructed for new development during build-out.
Total cost estimate includes the replacement of 75% of existing drilled gravel wells with new gravel wells, and replacement of 50% of existing drilled bedrock wells with new bedrock wells (best case or worst case, based on actual location of existing wells).
Existing shallow wells or springs are estimated to be replaced with drilled gravel or bedrock wells as appropriate, based on actual location of existing shallow wells/springs.
Build-out life cycle is expected to be approximately 50 years.

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Scenario 1, LV-WW-A

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Details for wastewater system construction/replacement costs, no-action scenario and properties outside municipal service areas
Lower Village
Last update: 4/13/2012 anm

Scenario and wastewater system type	Total current / known	Current estimated (existing but type not known)	Total new systems at build-out	Cost per current or future system replacement	Permitting/ engineering per current or future system	Total construction cost	Total engineering/ permitting
Lower Village, No Action							
In-ground septic systems	129	100	100	$10,000	$2,000	$3,290,000	$658,000
Raised or mound septic systems	3	3	40	$15,000	$2,750	$816,500	$126,500
Advanced treatment, performance based system, or best fix	3	3	6	$20,000	$3,500	$282,000	$42,000
Connections to shared leachfields (or leachfield site)	11	0	0	$10,000	$2,000	$132,000	$22,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$4,520,500	$848,500
Lower Village, LV-WW-B outside munic areas							
In-ground septic systems	72	55	96	$10,000	$2,000	$2,230,000	$446,000
Raised or mound septic systems	3	3	27	$15,000	$2,750	$585,750	$90,750
Advanced treatment, performance based system, or best fix	1	3	6	$20,000	$3,500	$235,000	$35,000
Connections to shared leachfields (or leachfield site)	11	0	0	$10,000	$2,000	$132,000	$22,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$3,182,750	$593,750
Lower Village, LC-WW-C outside munic areas							
In-ground septic systems	72	55	44	$10,000	$2,000	$1,710,000	$342,000
Raised or mound septic systems	3	3	16	$15,000	$2,750	$390,500	$60,500
Advanced treatment, performance based system, or best fix	1	3	6	$20,000	$3,500	$235,000	$35,000
Connections to shared leachfields (or leachfield site)	11	0	0	$10,000	$2,000	$132,000	$22,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$2,467,500	$459,500

Note: Total cost estimate includes the construction cost of 100% of wastewater systems constructed for new development during build-out.
Total cost estimate includes the replacement of 100% of existing wastewater systems with like systems (so an in-ground, conventional leachfield is assumed to be replaced by a similar leachfield).
Build-out life cycle is expected to be approximately 50 years.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 1, HC-WW-A

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Details for wastewater system construction/replacement costs, no-action scenario and properties outside municipal service areas
Huntington Center
Last update: 4/13/2012 anm

Scenario and wastewater system type	Total current / known	Current estimated (existing but type not known)	Total new systems at build-out	Cost per current or future system replacement	Permitting/ engineering per current or future system	Total construction cost	Total engineering/ permitting
Huntington Center, No Action							
In-ground septic systems	22	32	76	$10,000	$2,000	$1,300,000	$260,000
Raised or mound septic systems	0	0	33	$15,000	$2,750	$585,750	$90,750
Advanced treatment, performance based system, or best fix	0	0	0	$20,000	$3,500	$0	$0
Connections to shared leachfields (or leachfield site)	13	0	0	$10,000	$2,000	$156,000	$26,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$2,041,750	$376,750
Huntington Center, HC-WW-B outside munic areas							
In-ground septic systems	12	13	63	$10,000	$2,000	$880,000	$176,000
Raised or mound septic systems	0	0	33	$15,000	$2,750	$585,750	$90,750
Advanced treatment, performance based system, or best fix	0	0	0	$20,000	$3,500	$0	$0
Connections to shared leachfields (or leachfield site)	13	0	0	$10,000	$2,000	$156,000	$26,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$1,621,750	$292,750
Huntington Center, HC-WW-C outside munic areas							
In-ground septic systems	12	10	20	$10,000	$2,000	$420,000	$84,000
Raised or mound septic systems	0	0	20	$15,000	$2,750	$355,000	$55,000
Advanced treatment, performance based system, or best fix	0	0	0	$20,000	$3,500	$0	$0
Connections to shared leachfields (or leachfield site)	13	0	0	$10,000	$2,000	$156,000	$26,000
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$931,000	$165,000

Note: Total cost estimate includes the construction cost of 100% of wastewater systems constructed for new development during build-out.
Total cost estimate includes the replacement of 100% of existing wastewater systems with like systems (so an in-ground, conventional leachfield is assumed to be replaced by a similar leachfield).
Build-out life cycle is expected to be approximately 50 years.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 1, HV-WW-A

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Details for wastewater system construction/replacement costs, no-action scenario and properties outside municipal service areas
Hanksville
Last update: 4/13/2012 anm

Scenario and wastewater system type	Total current / known	Current estimated (existing but type not known)	Total new systems at build-out	Cost per current or future system replacement	Permitting/ engineering per current or future system	Total construction cost	Total engineering/ permitting
Hanksville, No Action							
In-ground septic systems	24	22	33	$10,000	$2,000	$790,000	$158,000
Raised or mound septic systems	0	0	21	$15,000	$2,750	$372,750	$57,750
Advanced treatment, performance based system, or best fix	1	0	1	$20,000	$3,500	$47,000	$7,000
Connections to shared leachfields (or leachfield site)	0	0	0	$10,000	$2,000	$0	$0
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$1,209,750	$222,750
Hanksville, HC-WW-B outside munic areas							
In-ground septic systems	24	6	28	$10,000	$2,000	$580,000	$116,000
Raised or mound septic systems	0	0	21	$15,000	$2,750	$372,750	$57,750
Advanced treatment, performance based system, or best fix	1	0	1	$20,000	$3,500	$47,000	$7,000
Connections to shared leachfields (or leachfield site)	0	0	0	$10,000	$2,000	$0	$0
TOTAL to replace all current wastewater systems in project area and construct new systems during build-out						$999,750	$180,750

Note: Total cost estimate includes the construction cost of 100% of wastewater systems constructed for new development during build-out.
Total cost estimate includes the replacement of 100% of existing wastewater systems with like systems (so an in-ground, conventional leachfield is assumed to be replaced by a similar leachfield).
Build-out life cycle is expected to be approximately 50 years.

APPENDIX I: OPINIONS OF PROBABLE COST, COMMUNITY WATER SUPPLY ALTERNATIVES

"Basis of Cost Estimate" Summary Sheet

The opinion of probable costs for the Scenario's provided, are based on multiple assumptions made during the preparation of the cost estimate. The critical assumptions are as follows:

1. No fire -fighting flows or storage
2. No bedrock removal for construction of transmission mains
3. One Water shut off, box, corporation and water meter per each connection
4. Each service line is ¾" diameter pipe and extends to the roadway right of way limits
5. The alignments of the water lines will require 9' of pavement replacement per linear foot of pipe laid. Pavement repair costs assumes pavement in ALL roadway areas, whether the road is currently paved or not.
6. Each river crossing assumes 200' of directional drilling @ $350/foot.
7. 8" diameter transmission main
8. 4" diameter individual street transmission main
9. The engineering and permitting is estimated @ 30% of the total construction costs

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-W-B.1

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	180	$12	$2,160
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,710**

Replacement Drilled Gravel Well (Best Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**

Replacement Drilled Bedrock Well (Worse Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	1000	$12	$12,000
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worse Case Scenario #1 - Total Estimated Cost				**$23,900**

Replacement Drilled Gravel Well (Worse Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worse Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Lower Village Areas.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-W-B.2b

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$20,000	$20,000
Control Building with Appurtenances	l.s.	1	$70,000	$70,000
Disinfection Treatment System	l.s.	1	$10,000	$10,000
Electric Service	l.f.	1,200	$25	$30,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Source To Reservoir Piping (2")	l.f.	700	$45	$31,500
Access Road	l.f.	500	$30	$15,000
Subtotal				**$221,500**
RESERVOIR / STORAGE				
20,000 Gallon Concrete Storage Tank	gal	20,000	$1.25	$25,000
Land Acquisition (Incl. R.O.W.)	l.s.	0.5	$60,000	$30,000
Piping/Clearing/Site Work	l.s.	1	$25,000	$25,000
Roadway / Access	l.f.	500	$30	$15,000
Rock Removal	c.y.	500	$125	$62,500
Subtotal				**$157,500**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	8,500	$65	$552,500
4" Diameter Water Main	l.f.	1,000	$55	$55,000
Pressure Reducing Valve	each	12	$500	$6,000
Blow-Off Hydrants	each	6	$3,000	$18,000
Service Lines	l.f.	850	$40	$34,000
4" Gate Valves	each	4	$750	$3,000
8' Gate Valves	each	8	$1,500	$12,000
Curb Stop/Box/Corporation/Meter	each	34	$2,000	$68,000
River Crossing	l.f.	200	$350	$70,000
Pavement Repair	s.y.	7,500	$25	$187,500
Subtotal				**$1,006,000**

SUBTOTAL	**$1,385,000**
Contingency (15% of Construction Costs)	**$207,750**
Total Construction Costs With Contingency	**$1,592,750**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$477,825**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$2,071,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-W-B.2c

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$10,000	$10,000
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Subtotal				**$60,000**
RESERVOIR / STORAGE				
4,000 Gallon Concrete Storage Tank	gal	4,000	$1.25	$5,000
Land Acquisition (Incl. R.O.W.)	~Included Above~			$0
Piping/Clearing/Site Work	l.s.	1	$20,000	$20,000
Roadway / Access	l.f.	200	$30	$6,000
Rock Removal	c.y.	100	$125	$12,500
Subtotal				**$43,500**
DISTRIBUTION SYSTEM				
4" Diameter Water Main	l.f.	2,900	$55	$159,500
Blow-Off Hydrants	each	1	$3,000	$3,000
Curb Stop/Box/Corporation/Meter	each	6	$2,000	$12,000
Roadway Repair	s.y.	1,800	$25	$45,000
4" Gate Valve	each	1	$750	$750
Service Line	each	150	$40	$6,000
Subtotal				**$226,250**

SUBTOTAL	**$329,750**
Contingency (15% of Construction Costs)	**$49,463**
Total Construction Costs With Contingency	**$379,213**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$113,764**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$493,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-W-B.2d

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$7,500	$7,500
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Subtotal				**$57,500**
RESERVOIR / STORAGE				
1,500 Gallon Concrete Storage Tank	gal	1,500	$1.25	$1,875
Land Acquisition (Inc. above)	~Included Above~			$0
Piping/Clearing/Site Work	l.s.	1	$20,000	$20,000
Roadway / Access	l.f.	200	$30	$6,000
Rock Removal	c.y.	100	$125	$12,500
Subtotal				**$40,375**
DISTRIBUTION SYSTEM				
2" Diameter Water Main	l.f.	2,900	$38	$110,200
Blow-Off Hydrants	each	1	$3,000	$3,000
Roadway Repair	s.y.	1,800	$25	$45,000
Curb Stop/Box/Corporation/Meter	each	3	$2,000	$6,000
Water Service Lines	l.f.	75	$40	$3,000
Subtotal				**$167,200**

SUBTOTAL	**$265,075**
Contingency (15% of Construction Costs)	**$39,761**
Total Construction Costs With Contingency	**$304,836**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$91,451**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$396,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-W-C.1

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	180	$12	$2,160
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,710**
Replacement Drilled Gravel Well (Best Case Scenario #2)	**Unit**	**Quantity**	**Unit Price**	**Total Amount**
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**
Replacement Drilled Bedrock Well (Worst Case Scenario #1)				
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	1000	$12	$12,000
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #1 - Total Estimated Cost				**$23,900**
Replacement Drilled Gravel Well (Worst Case Scenario #2)				
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Lower Village Areas.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-W-C.2a

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	l.f.	1,200	$25	$30,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (2")	l.f.	1,700	$45	$76,500
Subtotal				**$321,500**
RESERVOIR / STORAGE				
120,000 Gallon Concrete Storage Tank	gal	120,000	$1.25	$150,000
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$30,000	$30,000
Roadway / Access	l.f	1,000	$30	$30,000
Rock Removal	c.y.	500	$125	$62,500
Subtotal				**$317,500**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	12,800	$65	$832,000
4" Diameter Water Main	l.f.	11,000	$55	$605,000
Blow-Off Hydrants	each	14	$3,000	$42,000
Curb Stop/Box/Corporation/Meter	each	208	$2,000	$416,000
Road Construction / Paving	s.y.	21,000	$25	$525,000
River Crossings	l.f.	600	$350	$210,000
4" Gate Valves	each	10	$750	$7,500
8' Gate Valves	each	15	$1,500	$22,500
Water Service Lines	l.f.	5,200	$40	$208,000
Pressure Reducing Valve	each	110	$500	$55,000
Subtotal				**$2,923,000**

SUBTOTAL	**$3,562,000**
Contingency (15% of Construction Costs)	**$534,300**
Total Construction Costs With Contingency	**$4,096,300**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$1,228,890**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$5,325,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-W-C.2b

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (2")	l.f.	1,200	$45	$54,000
Subtotal				**$274,000**
RESERVOIR / STORAGE				
120,000 Gallon Concrete Storage Tank	gal	120,000	$1.25	$150,000
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$30,000	$30,000
Roadway / Access	l.f.	1,200	$30	$36,000
Rock Removal	c.y.	500	$125	$62,500
Subtotal				**$323,500**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	13,500	$65	$877,500
4" Diameter Water Main	l.f.	11,000	$55	$605,000
Blow-Off Hydrants	each	14	$3,000	$42,000
Curb Stop/Box/Corporation/Meter	each	208	$2,000	$416,000
Road Construction / Paving	s.y.	23,800	$25	$595,000
River Crossings	l.f.	400	$350	$140,000
4" Gate Valves	each	10	$750	$7,500
8' Gate Valves	each	15	$1,500	$22,500
Water Service Lines	l.f.	5,200	$40	$208,000
Pressure Reducing Valve	each	110	$500	$55,000
Subtotal				**$2,968,500**

SUBTOTAL	**$3,566,000**
Contingency (15% of Construction Costs)	**$534,900**
Total Construction Costs With Contingency	**$4,100,900**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$1,230,270**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$5,331,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-W-C.2c

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	L.F.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (2")	l.f.	1,200	$45	$54,000
Subtotal				**$274,000**
RESERVOIR / STORAGE				
160,000 Gallon Concrete Storage Tank	gal	160,000	$1.25	$200,000
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$35,000	$35,000
Roadway / Access	l.f.	1,200	$30	$36,000
Rock Removal	c.y.	750	$125	$93,750
Subtotal				**$409,750**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	21,200	$65	$1,378,000
4" Diameter Water Main	l.f.	12,500	$55	$687,500
Blow-Off Hydrants	each	18	$3,000	$54,000
Curb Stop/Box/Corporation/Meter	each	270	$2,000	$540,000
Road Construction / Paving	s.y.	32,500	$25	$812,500
River Crossings	l.f.	800	$350	$280,000
4" Gate Valves	each	14	$750	$10,500
8' Gate Valves	each	17	$1,500	$25,500
Water Service Lines	l.f.	6,750	$40	$270,000
Pressure Reducing Valve	each	135	$500	$67,500
Subtotal				**$4,125,500**

SUBTOTAL	**$4,809,250**
Contingency (15% of Construction Costs)	**$721,388**
Total Construction Costs With Contingency	**$5,530,638**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$1,659,191**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$7,190,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
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Scenario 3, HC-W-C.1

Replacement Drilled Bedrock Well (Best Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	50	$21	$1,050
Well Construction (Drilling) without Casing	v.f.	130	$12	$1,560
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #1 - Total Estimated Cost				**$8,110**

Replacement Drilled Gravel Well (Best Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,000	$1,000
Submersible Well Pump	l.s.	1	$800	$800
1" Diameter Service Line	l.f.	50	$30	$1,500
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Best Case Scenario #2 - Total Estimated Cost				**$6,900**

Replacement Drilled Bedrock Well (Worst Case Scenario #1)	Unit	Quantity	Unit Price	Total Amount
Well Construction (Drilling) With Casing	v.f.	100	$21	$2,100
Well Construction (Drilling) without Casing	v.f.	425	$12	$5,100
Electrical/Controls/Wiring/Switches	l.s.	1	$1,800	$1,800
Submersible Well Pump	l.s.	1	$1,200	$1,200
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Filter (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #1 - Total Estimated Cost				**$17,000**

Replacement Drilled Gravel Well (Worst Case Scenario #2)	Unit	Quantity	Unit Price	Total Amount
Well Construction	v.f.	250	$21	$5,250
Electrical/Controls/Wiring/Switches	l.s.	1	$1,500	$1,500
Submersible Well Pump	l.s.	1	$1,000	$1,000
1" Diameter Service Line	l.f.	100	$30	$3,000
Ion Exchange Softener (Softener)	l.s.	1	$1,500	$1,500
Hydro-pneumatic Pressure Tank	each	1	$800	$800
Permitting/Engineering/Certification	l.s.	1	$1,500	$1,500
Worst Case Scenario #2 - Total Estimated Cost				**$14,550**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. Best and worse case scenario's above are based on depths and yields of water supplies identified in the Water/Wastewater Capacity report for the Huntington Center Area.

Water/Wastewater Capacity Evaluation for Huntington's Villages
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Scenario 3, HC-W-C.2a

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (3")	l.f.	5,500	$50	$275,000
Subtotal				**$495,000**
RESERVOIR / STORAGE				
35,000 Gallon Concrete Storage Tank	gal	35,000	$1.25	$43,750
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$25,000	$25,000
Roadway / Access	l.f.	550	$30	$16,500
Rock Removal	c.y.	500	$125	$62,500
Subtotal				**$192,750**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	3,400	$65	$221,000
4" Diameter Water Main	l.f.	1,500	$55	$82,500
Blow-Off Hydrants	each	4	$3,000	$12,000
Curb Stop/Box/Corporation/Meter	each	62	$2,000	$124,000
Road Construction / Paving	s.y.	4,900	$25	$122,500
4" Gate Valves	each	6	$750	$4,500
8' Gate Valves	each	4	$1,500	$6,000
Water Service Lines	l.f.	1,550	$40	$62,000
Pressure Reducing Valve	each	10	$500	$5,000
Subtotal				**$639,500**

SUBTOTAL	**$1,327,250**
Contingency (15% of Construction Costs)	**$199,088**
Total Construction Costs With Contingency	**$1,526,338**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$457,901**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,984,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, HC-W-C.2b

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (2")	l.f.	1,000	$45	$45,000
Subtotal				**$265,000**
RESERVOIR / STORAGE				
35,000 Gallon Concrete Storage Tank	gal	35,000	$1.25	$43,750
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$30,000	$30,000
Roadway / Access	l.f.	1,000	$30	$30,000
Rock Removal	c.y.	500	$125	$62,500
Subtotal				**$211,250**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	11,000	$65	$715,000
4" Diameter Water Main	l.f.	1,500	$55	$82,500
Blow-Off Hydrants	each	4	$3,000	$12,000
Curb Stop/Box/Corporation/Meter	each	62	$2,000	$124,000
Road Construction / Paving	s.y.	11,500	$25	$287,500
River Crossings	l.f.	200	$350	$70,000
4" Gate Valves	each	5	$750	$3,750
8' Gate Valves	each	4	$1,500	$6,000
Water Service Lines	l.f.	1,550	$40	$62,000
Pressure Reducing Valve	each	10	$500	$5,000
Subtotal				**$1,367,750**

SUBTOTAL	**$1,844,000**
Contingency (15% of Construction Costs)	**$276,600**
Total Construction Costs With Contingency	**$2,120,600**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$636,180**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$2,757,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, HC-W-C.2c

SOURCE DEVELOPMENT	Unit	Quantity	Unit Price	Total Amount
Well Construction	l.s.	1	$15,000	$15,000
Quantity/Quality Testing	l.s.	1	$25,000	$25,000
Control Building with Appurtenances	l.s.	1	$125,000	$125,000
Disinfection Treatment System	l.s.	1	$20,000	$20,000
Electric Service	l.f.	200	$25	$5,000
Land Acquisition (Incl. R.O.W.)	acre	0.5	$60,000	$30,000
Reservoir Feed Piping (2")	l.f.	1,200	$45	$54,000
Subtotal				**$274,000**
RESERVOIR / STORAGE				
160,000 Gallon Concrete Storage Tank	gal	160,000	$1.25	$200,000
Land Acquisition (Incl. R.O.W.)	l.s.	0.75	$60,000	$45,000
Piping/Clearing/Site Work	l.s.	1	$35,000	$35,000
Roadway / Access	l.f.	1,200	$30	$36,000
Rock Removal	c.y.	750	$125	$93,750
Subtotal				**$409,750**
DISTRIBUTION SYSTEM				
8" Diameter Water Main	l.f.	21,200	$65	$1,378,000
4" Diameter Water Main	l.f.	12,500	$55	$687,500
Blow-Off Hydrants	each	18	$3,000	$54,000
Curb Stop/Box/Corporation/Meter	each	270	$2,000	$540,000
Road Construction / Paving	s.y.	32,500	$25	$812,500
River Crossings	each	800	$350	$280,000
4" Gate Valves	each	14	$750	$10,500
8' Gate Valves	each	17	$1,500	$25,500
Water Service Lines	l.f.	6,750	$40	$270,000
Pressure Reducing Valve	each	135	$500	$67,500
Subtotal				**$4,125,500**

SUBTOTAL	**$4,809,250**
Contingency (15% of Construction Costs)	**$721,388**
Total Construction Costs With Contingency	**$5,530,638**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$1,659,191**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$7,190,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" for assumptions.

APPENDIX J: OPINIONS OF PROBABLE COST, COMMUNITY WASTEWATER TREATMENT /DISPERSAL ALTERNATIVES

"Basis of Cost Estimate" Summary Sheet

The opinion of probable costs for the Scenario's provided, are based on multiple assumptions made during the preparation of the cost estimate. The critical assumptions are as follows:

1. Bedrock removal is assumed only in (LV-WW-B.2a, LV-WW-C.2a) and Hanksville (HV-WW-B.2) scenarios. This is based on visual observations of Bedrock outcrops located in the vicinity of the proposed collections systems routes. No bedrock removal is anticipated for any of the other scenarios.
2. Based on the design flows for a disposal system, the permitting and construction requirements will vary. For scenarios with design flows over 6,500 gallons per day, an Indirect Discharge Permit from the State of Vermont is required. The Indirect Discharge permit requires that dual alternating fields with full design flow capacities be constructed. If the design flows are less than 6,500 gallons per day, then the system is required to obtain a small scale wastewater permit which requires a disposal field designed to handle the design flows and an equally sized replacement system designated. Therefore, the gallons assumed in the "trenched in-ground fields" line item, is for the entire amount of disposal field required to be constructed. If the scenario requires an Indirect Discharge Permit, the design flows noted in the line items is double that of the actual design flows and if a small scale Wastewater Permit is required than the line item will note the actual design flow for the given scenario.
3. Land acquisitions are based on the assumed minimum amount of acreage required to construct and operate the disposal fields. The cost of the land noted in the estimate is based on review of the real estate prices in the Town of Huntington and neighboring towns during the 2011 early 2012 property values. The land is estimated at a permitted building lot price per acre.
4. Primary treatment will be performed by a septic tank at each connection location. The septic tank effluent will enter the collection system either through gravity or pumping of the effluent. No grinder pumps are assumed in the estimates. Septic tank effluent will enter the system and be pumped or gravity fed to the disposal field location, where dosing pump stations or siphon chambers will pressurize and dose the field as required.
5. Each service line assumes 50' of length to reach the new septic tank
6. Each pump station assumes 100' of electrical service conduit
7. The alignments of the sewer lines will require 9' of pavement replacement per linear foot of pipe laid. Pavement repair costs assumes pavement in ALL roadway areas, whether the road is currently paved or not.
8. The engineering and permitting is estimated @ 30% of the total construction costs

Water/Wastewater Capacity Evaluation for Huntington's Villages
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Scenario 2, LV-WW-B.1

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

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Scenario 2, LV-WW-B.2a

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,050	$60	$183,000
4" Diameter Sewer Services	l.f.	850	$50	$42,500
48" Diameter Concrete Manholes	v.f.	63	$500	$31,500
Electric Service - Lift Stations	l.f.	200	$25	$5,000
"Wye" Service Connections	each	17	$200	$3,400
1.5" Diameter Force Main	l.f.	3,800	$38	$144,400
Pavement Repair	s.y.	4,800	$25	$120,000
1,000 Gallon Septic Tank	each	17	$2,500	$42,500
3,500 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$16,000	$16,000
2,000 Gallon Pump Station w/appurtenances (PS#2)	each	1	$12,000	$12,000
Rock Removal	c.y.	1,000	$125	$125,000
Subtotal				**$725,300**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(1) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	4,369	$19	$83,011
Land Acquisition (Incl. R.O.W.)	acre	0.50	$60,000	$30,000
Roadway/Access Road	l.f.	50	$30	$1,500
Clearing/Site Work	acre	1	$5,000	$2,500
Electrical Service	l.f.	150	$25	$3,750
1,500 Gallon Pump Station w/appurtenances (PS#3)	each	1	$10,000	$10,000
Subtotal				**$130,761**
SUBTOTAL				**$856,061**
Contingency (15% of Construction Costs)				**$128,409**
Total Construction Costs With Contingency				**$984,470**
Engineering and Permitting Estimated @ 30% of Total Construction Costs				**$295,341**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)				**$1,280,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

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Scenario 2, LV-WW-B.2b

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,500	$60	$210,000
4" Diameter Sewer Services	l.f.	1,750	$50	$87,500
6" Diameter Sewer Service	l.f.	150	$55	$8,250
48" Diameter Concrete Manholes	v.f.	35	$500	$17,500
Electric Service - Lift Stations	l.f.	600	$25	$15,000
"Wye" Service Connections	each	38	$200	$7,600
2" Diameter Force Main	l.f.	3,600	$40	$144,000
3,000 Gallon Grease Trap	each	1	$4,000	$4,000
Pavement Repair	s.y.	3,500	$25	$87,500
1,000 Gallon Septic Tank	each	38	$2,500	$95,000
2,500 Gallon Duplex Pump Station w/appurtenances (PS#5)	each	1	$14,000	$14,000
6,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$21,000	$21,000
4,000 Gallon Duplex Pump Station w/appurtenances(PS#3)	each	1	$17,000	$17,000
1,500 Gallon Pump Station w/appurtenances (PS# 2&4)	each	2	$10,000	$20,000
Subtotal				**$748,350**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(4) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	21,600	$19	$410,400
2,000 Gallon Pump Station w/appurtenances (PS#6)	each	1	$12,000	$12,000
Land Acquisition (Incl. R.O.W.)	acre	2	$60,000	$120,000
Roadway/Access Road	l.f.	150	$30	$4,500
Clearing/Site Work	acre	2	$5,000	$10,000
Electrical Service	l.f.	300	$25	$7,500
Subtotal				**$564,400**
SUBTOTAL				**$1,312,750**
Contingency (15% of Construction Costs)				**$196,913**
Total Construction Costs With Contingency				**$1,509,663**
Engineering and Permitting Estimated @ 30% of Total Construction Costs				**$452,899**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)				**$1,963,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

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Scenario 2, LV-WW-B.2c

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	5,925	$60	$355,500
4" Diameter Sewer Services	l.f.	2,950	$50	$147,500
48" Diameter Concrete Manholes	v.f.	154	$500	$77,000
Electric Service - Lift Stations	l.f.	500	$25	$12,500
"Wye" Service Connections	each	21	$200	$4,200
3" Diameter Force Main	l.f.	4,200	$45	$189,000
Pavement Repair	s.y.	5,150	$25	$128,750
1,000 Gallon Septic Tank	each	58	$2,500	$145,000
1,500 Gallon Septic Tank	each	2	$3,500	$7,000
1,000 Gallon Grease Trap	each	2	$2,500	$5,000
8,000 Gallon Duplex Pump Station w/appurtenances (PS#2)	each	1	$26,000	$26,000
6,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$21,000	$21,000
4,000 Gallon Duplex Pump Station w/appurtenances (PS#3)	each	1	$17,000	$17,000
1,500 Gallon Pump Station w/appurtenances (PS#4)	each	1	$10,000	$10,000
Bridge Crossing	l.f.	125	$350	$43,750
Subtotal				**$1,189,200**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(6) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	31,890	$19	$605,910
3,000 Gallon Pump Station w/appurtenances (PS#5)	each	1	$14,000	$14,000
Land Acquisition (Incl. R.O.W.)	acre	3	$60,000	$180,000
Roadway/Access Road	l.f.	200	$30	$6,000
Clearing/Site Work	acre	3	$5,000	$15,000
Electrical Service	l.f.	200	$25	$5,000
Subtotal				**$825,910**

SUBTOTAL	**$2,015,110**
Contingency (15% of Construction Costs)	**$302,267**
Total Construction Costs With Contingency	**$2,317,377**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$695,213**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$3,013,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-WW-B.2d

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,000	$60	$180,000
4" Diameter Sewer Services	l.f.	1,050	$50	$52,500
48" Diameter Concrete Manholes	v.f.	77	$500	$38,500
Electric Service - Lift Stations	l.f.	200	$25	$5,000
"Wye" Service Connections	each	21	$200	$4,200
2" Diameter Force Main	l.f.	865	$40	$34,600
3" Diameter Force Main	l.f.	800	$45	$36,000
Pavement Repair	s.y.	2,100	$25	$52,500
1,000 Gallon Septic Tank	each	21	$2,500	$52,500
6,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$21,000	$21,000
Subtotal				**$476,800**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(1) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	5,200	$19	$98,800
1,500 Gallon Pump Station w/appurtenances (PS#2)	each	1	$10,000	$10,000
Land Acquisition (Incl. R.O.W.)	acre	1.5	$60,000	$90,000
Roadway/Access Road	l.f.	250	$30	$7,500
Electrical Service	l.f.	300	$25	$7,500
Subtotal				**$213,800**

SUBTOTAL	**$690,600**
Contingency (15% of Construction Costs)	**$103,590**
Total Construction Costs With Contingency	**$794,190**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$238,257**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,032,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-WW-B.2e

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	4,570	$60	$274,200
4" Diameter Sewer Services	l.f.	1,300	$50	$65,000
48" Diameter Concrete Manholes	v.f.	91	$500	$45,500
Electric Service - Lift Stations	l.f.	500	$25	$12,500
"Wye" Service Connections	each	26	$200	$5,200
2" Diameter Force Main	l.f.	3,525	$40	$141,000
1.5" Diameter Force Main	l.f.	800	$38	$30,400
Pavement Repair	s.y.	2,000	$25	$50,000
1,000 Gallon Septic Tank	each	26	$2,500	$65,000
2,000 Gallon Duplex Pump Station w/appurtenances (PS#4)	each	1	$12,000	$12,000
2,500 Gallon Duplex Pump Station w/appurtenances (PS#1&3)	each	2	$14,000	$28,000
1,500 Gallon Pump Station w/appurtenances (PS#2)	each	1	$10,000	$10,000
1,200 Gallon Pump Station w/appurtenances (PS#5)	each	1	$9,000	$9,000
Subtotal				**$747,800**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(1) Trenched In-Ground Fields (170'(L) x (100'(W)	gal	6,370	$19	$121,030
1,500 Gallon Pump Station w/appurtenances (PS#6)	each	1	$10,000	$10,000
Land Acquisition (Incl. R.O.W.)	acre	1	$60,000	$60,000
Clearing/Site Work	acre	1	$5,000	$2,500
Roadway/Access Road	l.f.	100	$30	$3,000
Electrical Service	l.f.	200	$25	$5,000
Subtotal				**$201,530**

SUBTOTAL	**$949,330**
Contingency (15% of Construction Costs)	**$142,400**
Total Construction Costs With Contingency	**$1,091,730**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$327,519**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,419,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are base on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, LV-WW-C.1

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-WW-C.2a

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,050	$60	$183,000
4" Diameter Sewer Services	l.f.	850	$50	$42,500
48" Diameter Concrete Manholes	v.f.	63	$500	$31,500
Electric Service - Lift Stations	l.f.	200	$25	$5,000
"Wye" Service Connections	each	17	$200	$3,400
1.5" Diameter Force Main	l.f.	3,800	$38	$144,400
Pavement Repair	s.y.	4,800	$25	$120,000
1,000 Gallon Septic Tank	each	17	$2,500	$42,500
3,500 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$16,000	$16,000
2,000 Gallon Pump Station w/appurtenances (PS#2)	each	1	$12,000	$12,000
Rock Removal	c.y.	1,000	$125	$125,000
Subtotal				**$725,300**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(1) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	4,369	$19	$83,011
Land Acquisition (Incl. R.O.W.)	acre	0.50	$60,000	$30,000
Roadway/Access Road	l.f.	50	$30	$1,500
Clearing/Site Work	acre	1	$5,000	$2,500
Electrical Service	l.f.	150	$25	$3,750
1,500 Gallon Pump Station w/appurtenances (PS#3)	each	1	$10,000	$10,000
Subtotal				**$130,761**

SUBTOTAL	**$856,061**
Contingency (15% of Construction Costs)	**$128,409**
Total Construction Costs With Contingency	**$984,470**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$295,341**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,280,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-WW-C.2b

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,500	$60	$210,000
4" Diameter Sewer Services	l.f.	2,800	$50	$140,000
6" Diameter Sewer Services	l.f.	200	$55	$11,000
48" Diameter Concrete Manholes	v.f.	70	$500	$35,000
Electric Service - Lift Stations	l.f.	500	$25	$12,500
"Wye" Service Connections	each	56	$200	$11,200
2" Diameter Force Main	l.f.	2,700	$40	$108,000
1.5" Diameter Force Main	l.f.	800	$38	$30,400
Pavement Repair	s.y.	3,100	$25	$77,500
1,000 Gallon Septic Tank	each	56	$2,500	$140,000
1,500 Gallon Septic Tank	each	1	$3,500	$3,500
2,500 Gallon Septic Tank	each	1	$5,200	$5,200
2,500 Gallon Grease Trap	each	1	$6,000	$6,000
2,000 Gallon Duplex Pump Station w/appurtenances (PS#2&4)	each	2	$12,000	$24,000
5,500 Gallon Duplex Pump Station w/appurtenances (PS#5)	each	1	$22,000	$22,000
3,500 Gallon Duplex Pump Station w/appurtenances (PS#3)	each	1	$16,000	$16,000
9,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$28,000	$28,000
Subtotal				**$880,300**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(8) Trenched In-Ground Fields (125'(L) x (100'(W)	gal	34,462	$19	$654,778
Land Acquisition (Incl. R.O.W.)	acre	4	$60,000	$240,000
2,000 Gallon Pump Station w/appurtenances (PS#6)	each	1	$12,000	$12,000
Roadway/Access Road	l.f.	175	$30	$5,250
Clearing/Site Work	acre	4	$5,000	$20,000
Electrical Service	l.f.	225	$25	$5,625
Subtotal				**$937,653**
SUBTOTAL				**$1,817,953**
Contingency (15% of Construction Costs)				**$272,693**
Total Construction Costs With Contingency				**$2,090,646**
Engineering and Permitting Estimated @ 30% of Total Construction Costs				**$627,194**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)				**$2,718,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-WW-C.2c

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	5,910	$60	$354,600
4" Diameter Sewer Services	l.f.	2,950	$50	$147,500
6" Diameter Sewer Services	l.f.	300	$55	$16,500
48" Diameter Concrete Manholes	v.f.	154	$500	$77,000
Electric Service - Lift Stations	l.f.	500	$25	$12,500
"Wye" Service Connections	each	85	$200	$17,000
3" Diameter Force Main	l.f.	1,500	$45	$67,500
2" Diameter Force Main	l.f.	2,025	$40	$81,000
1.5" Diameter Force Main	l.f.	350	$38	$13,300
Bridge Crossing	l.f.	125	$350	$43,750
Pavement Repair	s.y.	4,700	$25	$117,500
1,000 Gallon Septic Tank	each	56	$2,500	$140,000
1,500 Gallon Septic Tank	each	1	$3,500	$3,500
2,500 Gallon Septic Tank	each	1	$5,200	$5,200
2,500 Gallon Grease Trap	each	1	$6,000	$6,000
1,500 Gallon Pump Station w/appurtenances (PS#2)	each	1	$10,000	$10,000
15,000 Gallon Duplex Pump Station w/appurtenances (PS#4)	each	1	$39,000	$39,000
7,000 Gallon Duplex Pump Station w/appurtenances (PS#1&3)	each	2	$25,000	$50,000
Subtotal				**$1,201,850**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(10) Trenched In-Ground Fields (130'(L) x (116'(W)	gal	55,042	$19	$1,045,798
Land Acquisition (Incl. R.O.W.)	acre	6	$60,000	$360,000
2,500 Gallon Pump Station w/appurtenances (PS#5)	each	1	$13,000	$13,000
Roadway/Access Road	l.f.	225	$30	$6,750
Electrical Service	l.f.	225	$25	$5,625
Subtotal				**$1,431,173**
SUBTOTAL				**$2,633,023**
Contingency (15% of Construction Costs)				**$394,953**
Total Construction Costs With Contingency				**$3,027,976**
Engineering and Permitting Estimated @ 30% of Total Construction Costs				**$908,393**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)				**$3,936,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, LV-WW-C.2d

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,000	$60	$180,000
4" Diameter Sewer Services	l.f.	1,300	$50	$65,000
48" Diameter Concrete Manholes	v.f.	63	$500	$31,500
Electric Service - Lift Stations	l.f.	100	$25	$2,500
"Wye" Service Connections	each	26	$200	$5,200
2" Diameter Force Main	l.f.	1,900	$40	$76,000
Pavement Repair	s.y.	2,100	$25	$52,500
1,000 Gallon Septic Tank	each	26	$2,500	$65,000
12,500 Gallon Duplex Pump Station w/appurtenances	each	1	$37,000	$37,000
Subtotal				**$514,700**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(4) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	20,580	$19	$391,020
Land Acquisition (Incl. R.O.W.)	acre	3	$60,000	$180,000
2,000 Gallon Pump Station w/appurtenances	each	1	$12,000	$12,000
Roadway/Access Road	l.f.	275	$30	$8,250
Electrical Service	l.f.	300	$25	$7,500
Subtotal				**$598,770**

SUBTOTAL	**$1,113,470**
Contingency (15% of Construction Costs)	**$167,021**
Total Construction Costs With Contingency	**$1,280,491**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$384,147**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,665,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HC-WW-B.1

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HC-WW-B.2a

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,350	$60	$201,000
4" Diameter Sewer Services	l.f.	1,600	$50	$80,000
48" Diameter Concrete Manholes	v.f.	100	$500	$50,000
Electric Service - Lift Stations	each	100	$25	$2,500
"Wye" Service Connections	each	32	$200	$6,400
3" Diameter Force Main	l.f.	1,200	$45	$54,000
Pavement Repair	s.y.	3,350	$25	$83,750
1,000 Gallon Septic Tank	each	32	$2,500	$80,000
11,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$35,000	$35,000
1,000 Gallon Grease Trap	each	1	$2,500	$2,500
Subtotal				**$595,150**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(4) Trenched In-Ground Fields (140'(L) x (100'(W)	gal	18,190	$19	$345,610
2,000 Gallon Pump Station w/appurtenances (PS#2)	each	1	$12,000	$12,000
Land Acquisition (Incl. R.O.W.)	acre	2	$60,000	$120,000
Roadway/Access Road	l.f.	200	$30	$6,000
Electrical Service	l.f.	400	$25	$10,000
Subtotal				**$493,610**

SUBTOTAL	**$1,088,760**
Contingency (15% of Construction Costs)	**$163,314**
Total Construction Costs With Contingency	**$1,252,074**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$375,622**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,628,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HC-WW-B.2b

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	3,350	$60	$201,000
4" Diameter Sewer Services	l.f.	1,600	$50	$80,000
48" Diameter Concrete Manholes	v.f.	92	$500	$46,000
Forcemain Stream Crossing	l.f.	100	$150	$15,000
Electric Service - Lift Station	l.f.	100	$25	$2,500
"Wye" Service Connections	each	32	$200	$6,400
3" Diameter Force Main	l.f.	1,550	$45	$69,750
Pavement Replacement/ Repair	s.y.	4,950	$25	$123,750
1,000 Gallon Grease Trap	each	1	$2,500	$2,500
1,000 Gallon Septic Tanks	each	32	$2,500	$80,000
11,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$35,000	$35,000
Subtotal				**$661,900**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(4) Trenched In-Ground Fields (140'(L) x (100'(W) Each	gal	18,190	$19	$345,610
2,500 Gallon Pump Station w/appurtenances (PS#2)	each	1	$13,000	$13,000
Land Acquisition (Incl. R.O.W.)	acre	2	$60,000	$120,000
Roadway/Access Road	l.f.	300	$30	$9,000
Electrical Service	l.f.	500	$25	$12,500
Subtotal				**$500,110**

SUBTOTAL	**$1,162,010**
Contingency (15% of Construction Costs)	**$174,302**
Total Construction Costs With Contingency	**$1,336,312**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$400,893**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,737,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HC-WW-C.1

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, HC-WW-C.2a

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	4,050	$60	$243,000
4" Diameter Sewer Services	l.f.	3,050	$50	$152,500
48" Diameter Concrete Manholes	v.f.	120	$500	$60,000
Forcemain River Crossing	l.f.	100	$150	$15,000
Electric Service - Lift Stations	l.f.	200	$25	$5,000
"Wye" Service Connections	each	61	$200	$12,200
3" Diameter Force Main	l.f.	2,750	$45	$123,750
Pavement Replacement/ Repair	s.y.	6,800	$25	$170,000
1,000 Gallon Grease Trap	each	1	$2,500	$2,500
1,000 Gallon Septic Tanks	each	61	$2,500	$152,500
13,000 Gallon Duplex Pump Station w/appurtenances (PS#2)	each	1	$40,000	$40,000
10,000 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$32,000	$32,000
Subtotal				**$1,008,450**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(8) Trenched In-Ground Fields (150'(L) x (100'(W) Each	gal	36,380	$19	$691,220
2,000 Gallon Pump Station w/appurtenances (PS# 3&4)	each	2	$12,000	$24,000
Land Acquisition (Incl. R.O.W.)	acre	4	$60,000	$240,000
Roadway/Access Road	l.f.	500	$30	$15,000
Electrical Service	l.f.	500	$25	$12,500
Subtotal				**$982,720**

SUBTOTAL	**$1,991,170**
Contingency (15% of Construction Costs)	**$298,676**
Total Construction Costs With Contingency	**$2,289,846**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$686,954**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$2,977,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 3, HC-WW-C.2b

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	4,500	$60	$270,000
4" Diameter Sewer Services	l.f.	3,050	$50	$152,500
48" Diameter Concrete Manholes	v.f.	110	$500	$55,000
Forcemain River Crossing	l.f.	200	$350	$70,000
Electric Service - Lift Stations	l.f.	200	$25	$5,000
"Wye" Service Connections	each	61	$200	$12,200
3" Diameter Force Main	l.f.	5,800	$45	$261,000
Pavement Replacement/ Repair	s.y.	8,000	$25	$200,000
1,000 Gallon Grease Trap	each	1	$2,500	$2,500
1,000 Gallon Septic Tanks	each	61	$2,500	$152,500
15,500 Gallon Duplex Pump Station w/appurtenances (PS#1)	each	1	$40,000	$40,000
10,000 Gallon Duplex Pump Station w/appurtenances (PS#2)	each	1	$55,000	$55,000
Subtotal				**$1,275,700**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(8) Trenched In-Ground Fields (140'(L) x (100'(W) Each	gal.	36,380	$19	$691,220
2,500 Gallon Pump Station w/appurtenances (PS# 3&4)	each	2	$13,000	$26,000
Land Acquisition (Incl. R.O.W.)	acre	4	$60,000	$240,000
Roadway/Access Road	l.f.	500	$30	$15,000
Electrical Service	l.f.	500	$25	$12,500
Subtotal				**$984,720**

SUBTOTAL	**$2,260,420**
Contingency (15% of Construction Costs)	**$339,063**
Total Construction Costs With Contingency	**$2,599,483**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$779,845**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$3,379,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HV-WW-B.1

Wastewater Disposal System Design (Typical) - 3 Bedroom Single Family House	Typical Installed Cost Range $$
In-Ground Trench System (Gravity)	$7,000-$10,000
In-Ground Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$9,000-$12,000
In-Ground Infiltrator System (Gravity)	$8,000-$11,000
In-Ground Infiltrator System (Pressurized)	$10,000-$13,000
At-Grade Trench System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$10,000-$13,000
Mound Bed System (Pressurized) (W/ 750 gallon pump station & appurtenances)	$12,000-$20,000
Engineering/Permitting/Testing/Inspection	$2,000-$3,500

Costs Included In Estimates
1) New 1000 Gallon Precast Concrete Septic Tanks With Access Risers & Effluent Filter
2) Piping,connections and 100' of piping
3) Construction of a typically sized disposal field for a three bedroom single family house
4) No pretreatment of effluent before discharge to disposal fields

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The range of costs are based on scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The range of prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices beyond the planning phase. The prices will likely vary based on the actual design, site conditions.

Water/Wastewater Capacity Evaluation for Huntington's Villages
Town of Huntington, Vermont
Opinion of Probable Project Costs
Scenario 2, HV-WW-B.2

COLLECTION SYSTEM	Unit	Quantity	Unit Price	Total Amount
8" Diameter Sewer Main	l.f.	5,900	$60	$354,000
4" Diameter Sewer Services	l.f.	800	$50	$40,000
48" Diameter Concrete Manholes	v.f.	135	$500	$67,500
Stream Crossings	l.f.	150	$150	$22,500
Electric Service - Lift Station	l.f.	200	$25	$5,000
"Wye" Service Connections	each	16	$200	$3,200
3" Diameter Force Main	l.f.	1,100	$45	$49,500
Pavement Replacement/ Repair	s.y.	6,400	$25	$160,000
Rock Removal	c.y.	1,200	$125	$150,000
1,000 Gallon Septic Tanks	each	16	$2,500	$40,000
2,000 Gallon Pump Station w/ appurtenances (PS#1)	each	1	$12,000	$12,000
2,500 Gallon Pump Station w/ appurtenances (PS#2)	each	1	$13,000	$13,000
Subtotal				**$916,700**
WASTEWATER DISPOSAL AREA DEVELOPMENT				
(1) Trenched In-Ground Fields (160'(L) x (100'(W) Each	gal.	4,112	$19	$78,128
2,500 Gallon Pump Station w/appurtenances (PS#3)	each	1	$13,000	$13,000
Land Acquisition (Incl. R.O.W.)	acre	1	$60,000	$60,000
Roadway/Access Road	l.f.	200	$30	$6,000
Electrical Service	l.f.	100	$25	$2,500
Subtotal				**$159,628**

SUBTOTAL	**$1,076,328**
Contingency (15% of Construction Costs)	**$161,449**
Total Construction Costs With Contingency	**$1,237,777**
Engineering and Permitting Estimated @ 30% of Total Construction Costs	**$371,333**
TOTAL OPINION OF PROBABLE COSTS (nearest $1,000)	**$1,609,000**

Notes: The estimate is based on PLANNING phase estimates for construction and engineering. The quantities noted in the estimate are based on GIS scaled unit quantities from scenario's developed by Green Mountain Engineering (GME) & Stone Environmental (SEI) as part of the Water/Wastewater Capacity Study. The unit prices are based on the review of previous projects construction costs which are similar in scope. GME bears no responsibility for prices and quantities noted in the estimate, beyond the planning phase. The quantities and unit prices will likely vary based on the actual design, site conditions. See attached "Basis of Cost Estimate" sheet for assumptions.

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1: Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
1	How many people normally live at your property (or, if this is a business, how many employees normally work at your property)?		
	0 or blank	4	3%
	1-2	79	53%
	3-4	53	35%
	5-6	10	7%
	7-10	1	1%
	11-20	1	1%
	21-30	1	1%
2	If this is a residence or residential property, how many bedrooms does it have?		
	0, blank, or non-residential	8	5%
	1	4	3%
	2	29	19%
	3	86	57%
	4	18	12%
	5-6	3	2%
3	How many days per year, on average, is this property in use?		
	0 or blank	5	3%
	30 or less	2	1%
	31-60	3	2%
	91-180	1	1%
	More than 180	9	6%
	Full time, 365 days	129	86%
4	What type of wastewater disposal system do you have?		
	Holding tank only	6	4%
	Septic tank and leachfield (“septic system”)	139	93%
	No wastewater system on property	1	1%
	Unknown or blank	1	1%
	Other	2	1%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
5	How old is your wastewater system (or what year was it installed)? If the wastewater system's age is unknown, when was the residence or business constructed?		
	Unknown or blank	28	19%
	2007-2011 (Within last 5 years)	8	5%
	2001-2006 (6-10 years ago)	20	13%
	1997-2001 (11-15 years ago)	16	11%
	1991-1996 (16-20 years ago)	26	17%
	1980-1990 (21-30 years ago)	33	22%
	1970-1980 (31-40 years ago)	15	10%
	Before 1970 (More than 40 years ago)	5	3%
6	Does your wastewater system have a permit that you are aware of? If yes, what is the permit number?		
	Yes	27	18%
	No	45	30%
	Unsure (or blank)	77	51%
7	Do you have a copy of any sketches, plans, or permits of your septic system available for reference?		
	Yes	45	30%
	No	75	50%
	Unsure (or blank)	29	19%
8	Please indicate the size and construction of your septic tank or holding tank by checking as many boxes as apply:		
	500 gallons	9	6%
	1,000 gallons	76	51%
	1,500 gallons	5	3%
	Unsure of size	59	39%
	Concrete	106	71%
	Metal	2	1%
	Fiberglass or Plastic	6	4%
	Unsure of construction	34	23%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
9	How deep below the surface is the top of your septic tank?		
	0-1 foot	20	13%
	1-2 feet	48	32%
	2-3 feet	41	27%
	More than 3 feet	14	9%
	Unsure	26	17%
10	Is there any additional treatment after your septic tank?		
	Yes	126	84%
	No	13	9%
	Unsure (or blank)	9	6%
11	If “yes”, what? Please indicate all that apply:		
	In-ground leach field	116	77%
	Drywell(s)	12	8%
	Sand mound or raised leach field	4	3%
	Shared / cluster leachfield	5	3%
12	Is your wastewater system shared with another building or property?		
	No	136	91%
	Yes (describe in comment)	12	8%
13	Please describe below any upgrades or repairs that have been performed on your septic system within the last ten years:		
	Replaced the septic tank	9	6%
	Replaced the leachfield	11	7%
	Other repair (describe in comment)	24	16%
	None or blank	108	72%
14	How often is your septic tank pumped out?		
	2 years or less	21	14%
	3-4 years	33	22%
	5-7 years	39	26%
	More than 7 years	10	7%
	Unknown	31	21%
	Other number or range, describe in comment	14	9%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
Path: O:\Proj-11\WRM\2522-W Huntington\Data\Survey\Survey.mdb [rptTablexx_SurveyResults]

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
15	Year that septic tank was last pumped, if known:		
	2010-2011	54	36%
	2008-2009	25	17%
	2006-2007	9	6%
	2005	5	3%
	2000	4	3%
	Before 2000	5	3%
	Unknown or blank	46	31%
16	What company pumps your septic tank?		
	Drummac	2	1%
	Senesac	1	1%
	Unknown or blank	65	43%
	Bundy	7	5%
	Clark's Septic	11	7%
	EnviroTech	4	3%
	Hartigan	3	2%
	P + P Septic	52	35%
	RotoRooter	1	1%
	Wright's	1	1%
17	Other than septic tank pumping, do you have any maintenance routine for your system?		
	Add yeast	7	5%
	Add Rid-Ex	30	20%
	Other additive	3	2%
	Have someone inspect the system	9	6%
	Other maintenance	7	5%
	None	93	62%
18	Has your septic system ever backed up?		
	Yes	7	5%
	No	136	91%
	Unsure	5	3%
19	Does it give off odors?		
	Yes	4	3%
	No	136	91%
	Unsure	8	5%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
20	Do you have wet areas in your yard?		
	Yes	20	13%
	No	122	81%
	Unsure (or blank)	6	4%
21	If you do have wet areas in your yard, when do they occur?		
	Spring snowmelt only	5	3%
	After heavy rains	10	7%
	Other (describe in comment)	120	80%
22	What is the source of your household water?		
	Connection to the Huntington Fire District No. 1 system	18	12%
	Drilled well	111	74%
	Dug well	17	11%
	Spring	6	4%
23	How old is your water supply, or when was it installed?		
	2007-2011 (Within last 5 years)	9	6%
	2001-2006 (6-10 years ago)	17	11%
	1997-2001 (11-15 years ago)	13	9%
	1991-1996 (16-20 years ago)	17	11%
	1981-1990 (21-30 years ago)	31	21%
	1970-1980 (31-40 years ago)	19	13%
	Before 1970 (More than 40 years ago)	16	11%
	Unsure or unknown	27	18%
24	Approximately how deep is your well or spring?		
	0-10 feet	6	4%
	10-25 feet	7	5%
	25-50 feet	3	2%
	50-100 feet	16	11%
	100-200 feet	19	13%
	200-300 feet	19	13%
	More than 300 feet	21	14%
	Unsure	58	39%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
Path: O:\Proj-11\WRM\2522-W Huntington\Data\Survey\Survey.mdb [rptTablexx_SurveyResults]

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
25	If your water supply is a drilled well, is it a bedrock well or a gravel well?		
	Bedrock well	39	26%
	Gravel well	16	11%
	Unsure	58	39%
	Blank	36	24%
26	What is the estimated yield for your well (usually reported to you in gallons per minute)?		
	Less than 1	3	2%
	1-5	19	13%
	5-10	8	5%
	10-20	5	3%
	21-50	9	6%
	More than 50	7	5%
	Unsure	32	21%
	Blank	66	44%
27	Does your well's protective cover have an ID tag attached? What is the ID number?		
	Yes	35	23%
	No	26	17%
	Unsure (or blank)	88	59%
28	Is your water supply shared with another building or property?		
	Yes	33	22%
	No	113	75%
	Unsure (or blank)	3	2%
29	Do you have any aesthetic concerns with your water supply (taste, color, or smell)?		
	Yes	41	27%
	No	100	67%
	Unsure (or blank)	8	5%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
Path: O:\Proj-11\WRM\2522-W Huntington\Data\Survey\Survey.mdb [rptTablexx_SurveyResults]

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
30	Do you have any type of water treatment system?		
	Filter	53	35%
	Ultraviolet (UV) disinfection	10	7%
	Water softener	25	17%
	Other	3	2%
	None	78	52%
31	Have you ever had contamination problems with the water supply system(s) on your property?		
	Yes (describe in comment)	26	17%
	No	111	74%
	Unsure (or blank)	12	8%
32	Have you ever run low, or out, of water?		
	Never	136	91%
	Every few years	8	5%
	Yearly	5	3%
33	Has the property had any other problems with water, or has work been done on the water system in the last 10 years?		
	Yes (describe in comment)	33	22%
	No	99	66%
	Unsure (or blank)	17	11%
34	Do you have any plans to change the way your property is used (subdivide your property, change the use of your property, etc.)?		
	No	135	90%
	Yes (describe in comment)	14	9%
35	If you had access to additional wastewater treatment or water supply capacity, is there anything you would want to do with your property that you can't do now?		
	No	136	91%
	Yes (describe in comment)	13	9%
36	Are you interested in receiving information or training about the best ways to use and maintain your water supply or wastewater treatment system?		
	No	68	45%
	Yes	61	41%
	Unsure	20	13%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
Path: O:\Proj-11\WRM\2522-W Huntington\Data\Survey\Survey.mdb [rptTablexx_SurveyResults]

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont

TABLE 1 (cont.): Summary of Survey Responses Regarding Needs
Surveys Distributed: 398, Surveys Completed: 150, Response Rate: 38%

Survey Question	Response	Number of Responses	% of Responses
37	Have you considered upgrading your septic system or water supply?		
	No	110	73%
	Yes	28	19%
	Unsure	11	7%
38	What factors have prevented you from completing that upgrade?		
	Recent construction or upgrade/replacement	2	1%
	Current system operates properly	23	15%
	Concern about costs	29	19%
	Concern about lack of sufficient area for replacement	1	1%
	Other (describe in comment)	12	8%
	Blank	87	58%
39	Do you have any comments regarding water supply or wastewater management in Huntington?		
	No comment or blank	117	78%
	Current conditions are fine	3	2%
	Recent improvements made to protect water supply	3	2%
	Concern about stream bank conditions (dumping of yard waste, erosion, etc.)	2	1%
	Concern about future of shared wastewater system	1	1%
	Concern about Huntington F.D. No. 1 water system (water quality and/or distribution network)	7	5%
	Concern about cost of potential improvements	2	1%
	No interest in implementing community water and/or wastewater systems	6	4%
	Support for evaluating community water and/or wastewater options in villages	11	7%
40	Are you interested in receiving an evaluation?		
	Yes	50	33%
	No (or blank)	99	66%
41	Site sketch completed?		
	Yes	127	85%
	No	21	14%

Source: Property owner surveys, Stone Environmental, 2011.
Date/init: 11/14/2011 anm
Path: O:\Proj-11\WRM\2522-W Huntington\Data\Survey\Survey.mdb [rptTablexx_SurveyResults]

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2: Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
Lower Huntington Village				
CEMETERY_LO		CEMETERY	None	
05-031.300	0 AGNES DRIVE	LAND	Drilled well	Onsite septic tanks, shared leachfield
05-031.300	0 AGNES DRIVE	LAND	None	in-ground shared trenches
05-031.300	0 AGNES DRIVE	LAND		
05-031.350	33 AGNES DRIVE	1.0 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
05-031.310	54 AGNES DRIVE	1.1 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
05-031.360	63 AGNES DRIVE	1.0 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
05-031.320	72 AGNES DRIVE	1.2 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
05-031.370	105 AGNES DRIVE	1.4 AC & DWL	Shared drilled well	Onsite septic tanks, shared leachfield
05-031.330	128 AGNES DRIVE	11.1 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
05-004.610	31 BLACKBIRD SWALE	3.331 AC & DWL	Drilled well	Septic tank and leachfield
05-004.620	113 BLACKBIRD SWALE	3.348 AC & DWL	Drilled well	Septic tank and leachfield
BS_145	145 BLACKBIRD SWALE	1.49 AC & DWL	Drilled well	Septic tank and leachfield
05-004.600	246 BLACKBIRD SWALE	3.73 AC & DWL	Drilled well	Septic tank and leachfield
05-007.400	0 BRIDGE STREET	7.4 AC		Septic tank and leachfield
16-044.000	16 BRIDGE STREET	0.42 AC & DWL	Shared drilled well	
16-043.000	52 BRIDGE STREET	0.47 AC & 2 FAM DWL (HOUSE NOS 52 & 54)	Shared drilled well	Other
16-042.000	74 BRIDGE STREET	0.24 AC		
16-040.000	75 BRIDGE STREET	0.4 AC & MH		
16-039.000	86 BRIDGE STREET	0.3 AC & DWL	Drilled well	
16-038.000	96 BRIDGE STREET	1.3 AC & DWL	Drilled well	Septic tank and leachfield

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
16-037.000	105 BRIDGE STREET	0.45 AC & DWL	Drilled well	Septic tank and leachfield
16-036.100	106 BRIDGE STREET	1.24 AC & DWL	Shared drilled well	Septic tank and leachfield
16-036.200	120 BRIDGE STREET	2.16 AC & DWL	Shared drilled well	Septic tank and leachfield
16-035.000	160 BRIDGE STREET	0.4 AC & DWL	Drilled well	Septic tank and leachfield
16-028.000	195 BRIDGE STREET	1 AC & DWL		
16-027.000	210 BRIDGE STREET	0.72 AC & DWL		
16-026.000	219 BRIDGE STREET	0.7 AC & DWL		
16-025.000	220 BRIDGE STREET	0.45 AC & 2 FAM DWL		
16-024.000	233 BRIDGE STREET	1.75 AC & DWL	Drilled well	Septic tank and leachfield
16-023.000	280 BRIDGE STREET	0.17 AC & DWL	drilled well	Septic tank and leachfield
16-022.000	285 BRIDGE STREET	1 AC & MH	Drilled well	Septic tank and leachfield
16-021.000	300 BRIDGE STREET	0.35 AC & DWL		
05-011.000	315 BRIDGE STREET	2.8 AC & DWL	Drilled well	Septic tank and leachfield
05-011.200	318 BRIDGE STREET	21.8 AC & DWL	Drilled well	
05-011.100	320 BRIDGE STREET	83.2 AC & DWL	Drilled well	
05-009.000	451 BRIDGE STREET	10.07 AC & DWL	Shared drilled well	Septic tank and leachfield
05-010.000	452 BRIDGE STREET	1.1 AC & 2 FAM	Drilled well	Septic tank and leachfield
05-008.000	549 BRIDGE STREET	1.1 AC & DWL		
02-038.000	39 CHALET HEIGHTS	1 AC & DWL	Drilled well	Septic tank and leachfield
02-032.000	50 CHALET HEIGHTS	1 AC & DWL		
02-037.000	55 CHALET HEIGHTS	1 AC & DWL		
02-036.000	79 CHALET HEIGHTS	1 AC & DWL	Shared drilled well	Septic tank and leachfield
02-033.000	80 CHALET HEIGHTS	1 AC & DWL	Drilled well	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
02-034.000	110 CHALET HEIGHTS	1 AC & DWL	Shared drilled well (off	Septic tank and leachfield
02-034.100	116 CHALET HEIGHTS	1 AC & DWL	Shared drilled well (off	Septic tank and leachfield
02-035.100	120 CHALET HEIGHTS	1.29 AC & DWL	Drilled well	Septic tank and leachfield
05-023.100	0 CUMMINGS DRIVE	88.5 AC		
05-022.100	88 CUMMINGS DRIVE	3.1 AC & DWL	Drilled well	Septic tank and leachfield
05-023.700	91 CUMMINGS DRIVE	2.3 AC & DWL	Drilled well	Septic tank and leachfield
05-023.000	189 CUMMINGS DRIVE	10.2 AC & DWL	Drilled well	Septic tank and leachfield
05-023.800	240 CUMMINGS DRIVE	30.88 AC & SHELL	Drilled well	Septic tank and leachfield
16-045.000	1 EAST STREET	0.35 AC DWL	Shared drilled well	
16-049.000	45 EAST STREET	1.0 AC & DWL	Drilled well	Septic tank and leachfield
16-050.000	46 EAST STREET	0.55 AC & DWL	Drilled well	
16-051.200	75 EAST STREET	1.3 AC & DWL & GAR	Drilled well	Septic tank and leachfield
16-052.000	80 EAST STREET	1.1 AC & DWL	Drilled well	
16-053.000	100 EAST STREET	1.1 AC & DWL	Dug well	Septic tank and leachfield
16-051.100	101 EAST STREET	0.97 AC & MH & SHED	Drilled well	Septic tank and leachfield
16-054.000	129 EAST STREET	1.1 AC & DWL & GAR	Dug well	Septic tank and leachfield
16-055.000	140 EAST STREET	1.1 AC & MH	Drilled well	Septic tank and leachfield
16-056.000	170 EAST STREET	0.3 AC & DWL	Drilled well	
16-057.100	235 EAST STREET	1.88 AC & MH	Drilled well	Septic tank and leachfield
16-058.000	240 EAST STREET	1.07 AC & DWL		
16-057.200	265 EAST STREET	1.16 AC & DWL	Shared drilled well	Septic tank and leachfield
16-067.000	305 EAST STREET	0.92 AC & DWL		
16-086.000	355 EAST STREET	1 AC & MH		

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
16-066.000	416 EAST STREET	1.59 AC & MH		
16-087.000	440 EAST STREET	1.8 AC & DWL	Shallow well	Septic tank and leachfield
16-088.000	451 EAST STREET	0.25 AC & MH		
16-089.000	454 EAST STREET	2.5 AC & DWL	Dug well	Septic tank and leachfield
16-090.000	500 EAST STREET	5.4 AC & DWL		
16-090.000	500 EAST STREET	5.4 AC & DWL	Drilled well	
05-093.000	691 EAST STREET	6.0 AC & DWL	Drilled well	Septic tank and leachfield
05-092.100	700 EAST STREET	53.5 AC & DWL		
05-094.200	769 EAST STREET	5.06 AC & DWL	Drilled well	Septic tank and leachfield
05-094.100	771 EAST STREET	15.34 AC & DWL	Drilled well	Septic tank and leachfield
05-022.000	56 EVERGREEN DRIVE	2.13 AC & DWL	Drilled well	Septic tank and leachfield
05-022.200	86 EVERGREEN DRIVE	1.29 AC & DWL	Drilled well	Septic tank and leachfield
05-023.300	106 EVERGREEN DRIVE	5.87 AC & DWL	Drilled well	Septic tank and leachfield
16-063.000	20 FARGO DRIVE	1.32 AC & MH	Drilled well	Septic tank and leachfield
16-065.000	31 FARGO DRIVE	1.0 AC & DWL	Drilled well	Septic tank and leachfield
16-064.000	80 FARGO DRIVE	1.64 AC & DWL		
02-067.000	187 GILLETTE POND ROAD	1.75 AC & DWL	Drilled well	Septic tank and leachfield
02-061.000	190 GILLETTE POND ROAD	354 AC & DWL	Drilled well	Septic tank and leachfield
02-066.000	225 GILLETTE POND ROAD	2.1 AC & DWL	Drilled well	Septic tank and leachfield
02-065.000	235 GILLETTE POND ROAD	2.38 AC & DWL	Drilled well	Septic tank and leachfield
02-064.000	305 GILLETTE POND ROAD	3.28 AC & DWL	Drilled well	Septic tank and leachfield
02-063.000	307 GILLETTE POND ROAD	5.9 AC & DWL	Drilled well	
16-047.000	19 HASKINS DRIVE	0.93 AC & MH		

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
16-048.000	83 HASKINS DRIVE	2 AC & MHS (HOUSE NOS 83 & 86)		
16-029.000	75 HEMLOCK HILL DRIVE	1.4 AC & DWL	Drilled well	Septic tank and leachfield
16-030.100	84 HEMLOCK HILL DRIVE	1 AC & MH		
16-030.000	119 HEMLOCK HILL DRIVE	12.1 AC & DWL		
16-034.000	130 HEMLOCK HILL DRIVE	1 AC & MH		
16-033.000	158 HEMLOCK HILL DRIVE	1.3 AC & MH	Drilled well	
16-031.000	185 HEMLOCK HILL DRIVE	0.8 AC & DW		
16-032.000	186 HEMLOCK HILL DRIVE	2.3 AC & MH		
05-027.020	15 HINESBURG HOLLOW ROAD	3.0 AC	Drilled well	Septic tank and leachfield
05-027.000	20 HINESBURG HOLLOW ROAD	1.3 AC & DWL		
05-027.010	60 HINESBURG HOLLOW ROAD	1.34 AC & DW	Drilled well	Septic tank and leachfield
05-028.000	86 HINESBURG HOLLOW ROAD	6.1 AC & DWL	Drilled well	Septic tank and leachfield
05-027.110	97 HINESBURG HOLLOW ROAD	1 AC & DW	Drilled well	Septic tank and leachfield
05-029.000	100 HINESBURG HOLLOW ROAD	0.50 AC & MH	drilled well	Septic tank and leachfield
05-030.000	130 HINESBURG HOLLOW ROAD	1 AC & DWL	Drilled well	
05-031.100	164 HINESBURG HOLLOW ROAD	67.4 AC & DWL	Drilled well	Septic tank and leachfield
05-031.200	346 HINESBURG HOLLOW ROAD	100 AC & DWL		
02-013.100	0 HUNTINGTON ACRES	0.8 AC & SHED		
02-009.000	25 HUNTINGTON ACRES	1 AC & DWL		
02-009.100	34 HUNTINGTON ACRES	1 AC & DWL	Drilled well	
02-010.000	57 HUNTINGTON ACRES	1 AC & DWL	Dug well	Septic tank and leachfield
02-011.000	97 HUNTINGTON ACRES	1.5 AC & DWL		

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
02-012.000	135 HUNTINGTON ACRES	1 AC & DWL		
02-013.000	160 HUNTINGTON ACRES	0.78 AC & DWL	Spring	Holding tank only
02-014.000	165 HUNTINGTON ACRES	1.25 AC & DWL	Dug well	Septic tank and leachfield
02-015.000	181 HUNTINGTON ACRES	1 AC & 2 FAM DWL		
02-018.000	216 HUNTINGTON ACRES	1 AC & DWL	Drilled well	Septic tank and leachfield
02-019.000	225 HUNTINGTON ACRES	2 AC & DWL	Drilled well	
16-091.000	29 HUNTINGTON WOODS	1.25 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-092.000	81 HUNTINGTON WOODS	3.41 AC & DWL	Huntington FD No. 1	
16-093.000	91 HUNTINGTON WOODS	1.1 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-115.000	100 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-094.000	105 HUNTINGTON WOODS	1.0 AC & DWL	Huntington FD No. 1	
16-095.000	125 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-114.000	130 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-113.000	150 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-096.000	155 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-112.000	170 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-097.000	175 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-098.000	195 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-111.000	200 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-110.000	224 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-099.000	225 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-100.000	245 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-109.000	250 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
16-108.000	270 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-101.000	275 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-102.000	299 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-107.000	300 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
16-103.000	315 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-106.000	320 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-104.000	327 HUNTINGTON WOODS	DWL	Huntington FD No. 1	Septic tank and leachfield
16-105.000	330 HUNTINGTON WOODS	0.92 AC & DWL	Huntington FD No. 1	
05-023.110	0 IN BEND OF RIVER	2.4 AC		
16-062.000	17 JOHNS DRIVE	2 AC & DWL	Drilled well	
16-059.000	24 JOHNS DRIVE	1.19 AC & DWL	Drilled well	Septic tank and leachfield
16-061.000	49 JOHNS DRIVE	3.17 AC & DWL	Drilled well	Septic tank and leachfield
16-060.000	50 JOHNS DRIVE	2.63 AC & DWL		
02-021.200	56 LAPIERRE DRIVE	5.01 AC	Drilled well	Septic tank and leachfield
02-020.000	56 LAPIERRE DRIVE	10.16 AC & DWL	Drilled well	Septic tank and leachfield
02-021.400	135 LAPIERRE DRIVE	4.64 AC & DWL	Shared drilled well	Septic tank and leachfield
02-028.300	16 LAVALLEE DRIVE	1.01 AC & DWL	Drilled well	Septic tank and leachfield
02-022.100	60 LAVALLEE DRIVE	1.4 AC & DWL	Drilled well	Septic tank and leachfield
02-022.000	75 LAVALLEE DRIVE	1.4 AC & DWL	Drilled well	Septic tank and leachfield
02-028.100	80 LAVALLEE DRIVE	2 AC & DWL	Drilled well	
02-028.500	85 LAVALLEE DRIVE	2 AC & DWL		
02-028.200	145 LAVALLEE DRIVE	2.6 AC & DWL	Drilled well	Septic tank and leachfield
02-023.000	225 LAVALLEE DRIVE	10.3 AC & DWL		

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
02-024.000	270 LAVALLEE DRIVE	1.0 AC & DWL	Drilled well	Septic tank and leachfield
02-025.000	320 LAVALLEE DRIVE	1.2 AC & DWL	Drilled well	Septic tank and leachfield
02-027.000	401 LAVALLEE DRIVE	1.5 AC & DWL	Drilled well	Septic tank and leachfield
02-026.000	410 LAVALLEE DRIVE	10.01 AC & DWL	Drilled well	Septic tank and leachfield
05-004.300	17 LEDGE VIEW DRIVE	6.25 AC & DWL	Drilled well	Septic tank and leachfield
05-006.200	201 LEDGE VIEW DRIVE	5.14 AC & DWL		
05-006.100	440 LEDGE VIEW DRIVE	78.9 AC & DWLS		
16-015.000	0 LOWER VILLAGE	0.12 AC GREEN		
05-003.000	0 LOWER VILLAGE	12.5 AC & MAPLEWOOD CEMETERY		
16-019.000	0 MAIN ROAD	3 AC		
05-015.000	0 MAIN ROAD	44 AC	Drilled well	No wastewater system on property
15-016.000	0 MAIN ROAD	0.35 AC & GAR	Village co-op?	
05-004.400	0 MAIN ROAD	11.23 AC		
02-016.000	865 MAIN ROAD	1 AC & DWL		
02-017.000	905 MAIN ROAD	1 AC & DWL & GAR		
02-021.300	930 MAIN ROAD	3.47 AC & DWL	Drilled well	Septic tank and leachfield
02-028.000	1000 MAIN ROAD	5.78 AC & DWL		
02-029.000	1105 MAIN ROAD	1 AC & DWL & OUTBLDGS	Spring	Septic tank and leachfield
02-030.000	1107 MAIN ROAD	1 AC & DWL		
02-031.100	1121 MAIN ROAD	1.66 AC & DWL	Drilled well	Septic tank and leachfield
02-031.200	1145 MAIN ROAD	1.53 AC & DWL		
02-031.300	1165 MAIN ROAD	1.57 AC & DWL	Drilled well	Septic tank and leachfield

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
02-031.400	1189 MAIN ROAD	1.77 AC & DWL		
02-031.500	1215 MAIN ROAD	1.96 AC & DWL		
02-031.600	1235 MAIN ROAD	14.5 AC & DWL	Drilled well	Septic tank and leachfield
02-046.100	1300 MAIN ROAD	2.61 AC & DWL	Drilled well	Septic tank and leachfield
02-046.000	1330 MAIN ROAD	27.92 AC & DWL	Drilled well	Septic tank and leachfield
02-047.000	1370 MAIN ROAD	1.57 AC & DWL & SHED	Shallow well	Septic tank and leachfield
05-001.000	1486 MAIN ROAD	61 AC & DWL & SHED	Drilled well	Septic tank and leachfield
05-004.200	1735 MAIN ROAD	10 AC & DWL & GAR		
05-002.000	1780 MAIN ROAD	1.5 AC & DWL		
05-004.100	2030 MAIN ROAD	4.67 AC & DWL & OUTBLDGS	Drilled well	Septic tank and leachfield
05-005.000	2044 MAIN ROAD	4.219 AC & DWL	Drilled well	Septic tank and leachfield
16-001.000	2100 MAIN ROAD	0.35 AC & DWL & GAR	Drilled well	Septic tank and leachfield
16-003.000	2115 MAIN ROAD	0.48 AC & DWL	Drilled well	Septic tank and leachfield
16-002.000	2126 MAIN ROAD	0.86 AC & DWL & SHED	Drilled well	
05-012.000	2160 MAIN ROAD	11.02 AC	Drilled well	
16-004.000	2165 MAIN ROAD	0.33 AC & DWL & GAR	Drilled well	
16-007.000	2175 MAIN ROAD	0.2 AC & STORE/APT	Drilled well	
16-006.000	2180 MAIN ROAD	0.39 AC & DWL & SHED		
16-009.000	2190 MAIN ROAD	0.3 AC & DWL		
16-008.000	2195 MAIN ROAD	0.12 AC & DWL		
16-010.000	2206 MAIN ROAD	0.40 AC & DWL	Dug well	Septic tank and leachfield
16-011.000	2209 MAIN ROAD	11.56 AC & COML	Drilled well	Septic tank and leachfield

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
16-013.000	2224 MAIN ROAD	0.40 AC & DWL	Drilled well	Septic tank and leachfield
16-012.000	2225 MAIN ROAD	0.12 AC & 2 APT	Drilled well	Septic tank and leachfield
16-005.000	2235 MAIN ROAD	0.45 AC & UNION MEETING HOUSE	Drilled well	Septic tank and leachfield
16-014.100	2236 MAIN ROAD	0.8 AC & DWL & GAR		
16-014.200	2246 MAIN ROAD	0.2 AC & APT & STORE		
16-016.000	2300 MAIN ROAD	0.09 AC & SWITCHING BLDG		
05-014.000	2380 MAIN ROAD	1.0 AC & DWL		
16-017.000	2505 MAIN ROAD	1.10 AC & MH & GAR & SHEDS		
16-018.000	2531 MAIN ROAD	0.6 AC & DWL	Drilled well	Septic tank and leachfield
05-016.000	2580 MAIN ROAD	1.1 AC & DWL & GAR	Drilled well	
05-017.000	2640 MAIN ROAD	1.49 AC & DWL		
05-018.000	2670 MAIN ROAD	2.1 AC & DWL		
05-019.000	2700 MAIN ROAD	1.0 AC & MH	Drilled well	
05-020.000	2726 MAIN ROAD	1.03 AC & DWL	Shared drilled well	Septic tank and leachfield
05-023.200	2728 MAIN ROAD	1.01 AC DWL & GARAGE	Drilled well	Septic tank and leachfield
16-020.000	2765 MAIN ROAD	0.30 AC & DWL	Drilled well	
05-021.000	2850 MAIN ROAD	1.0 AC & DWL	Drilled well	Septic tank and leachfield
05-021.100	2855 MAIN ROAD	2.13 AC & BLDGS	Drilled well	Septic tank and leachfield
05-023.500	2879 MAIN ROAD	17.97 AC & DWL	Drilled well	
05-023.400	2914 MAIN ROAD	1.1 AC & DWL	Drilled well	
05-024.000	2934 MAIN ROAD	1.1 AC & DWL & GAR	Drilled well	Septic tank and leachfield
05-024.100	2935 MAIN ROAD	1.1 AC & DWL	Drilled well	Septic tank and leachfield

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
05-023.600	2975 MAIN ROAD	1 AC & DUPLEX & GAR	Drilled well	Septic tank and leachfield
05-025.000	2990 MAIN ROAD	4.0 AC & DWL	Drilled well	Septic tank and leachfield
05-026.100	3019 MAIN ROAD	1.3 AC & MH	Drilled well	Septic tank and leachfield
05-026.000	3067 MAIN ROAD	1.003 AC & DWL	Drilled well	Septic tank and leachfield
05-026.200	3069 MAIN ROAD	1.003 AC & MH	Drilled well	Septic tank and leachfield
05-039.000	3121 MAIN ROAD	1.5 AC & DWL		
05-007.000	39 MAYO ROAD	57.63 AC & DWL	Spring	Septic tank and leachfield
05-007.000	39 MAYO ROAD	57.63 AC & DWL	Shallow well	
05-007.100	81 MAYO ROAD	10.58 AC & DWL	Drilled well	
05-007.200	83 MAYO ROAD	6.12 AC & DWL	Drilled well	Septic tank and leachfield
02-047.010	250 MAYO ROAD	3.75 AC & DWL	Drilled well	Septic tank and leachfield
02-069.000	300 MAYO ROAD	7.5 AC & DWL	Drilled well	Septic tank and leachfield
02-070.000	434 MAYO ROAD	10.61 AC & DWL	Drilled well	Septic tank and leachfield
02-007.200	680 MAYO ROAD	387.0 AC & DWL		
UNKNOWN	0 RAVEN RIDGE	LAND OFF END OF RAVEN RIDGE		
05-013.400	0 RAVEN RIDGE	1 AC		
05-013.100	0 RAVEN RIDGE	1.0 AC		
05-013.200	50 RAVEN RIDGE	1 AC & DWL & GAR		
05-013.300	84 RAVEN RIDGE	1.0 AC & DWL	Drilled well	Septic tank and leachfield
05-013.900	99 RAVEN RIDGE	1.0 AC & DWL		
05-013.800	131 RAVEN RIDGE	1.0 AC & DWL	Shared drilled well	Septic tank and leachfield
05-013.500	180 RAVEN RIDGE	1 AC & DWL		

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
05-013.600	200 RAVEN RIDGE	1.03 AC & DWL	Drilled well	Septic tank and leachfield
05-013.700	215 RAVEN RIDGE	1 AC & DWL	Drilled well	Septic tank and leachfield
16-074.000	0 ROBERTS PARK ROAD	0.15 AC & WELLHEAD		
16-085.000	50 ROBERTS PARK ROAD	1 AC & DW	Huntington FD No. 1	
16-068.000	59 ROBERTS PARK ROAD	0.96 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-084.000	90 ROBERTS PARK ROAD	1.1 AC & DW	Huntington FD No. 1	Septic tank and leachfield
16-083.000	120 ROBERTS PARK ROAD	0.92 AC & MH	Huntington FD No. 1	Septic tank and leachfield
16-082.000	160 ROBERTS PARK ROAD	0.93 AC & DW	Huntington FD No. 1	Septic tank and leachfield
16-081.000	194 ROBERTS PARK ROAD	0.91 AC & MH	Huntington FD No. 1	
16-075.000	201 ROBERTS PARK ROAD	1.0 AC & DW	Huntington FD No. 1	Septic tank and leachfield
16-076.000	225 ROBERTS PARK ROAD	0.93 AC & DW	Huntington FD No. 1	
16-080.000	230 ROBERTS PARK ROAD	0.92 AC & DW	Huntington FD No. 1	Septic tank and leachfield
16-077.100	255 ROBERTS PARK ROAD	0.78 AC & DW	Huntington FD No. 1	Septic tank and leachfield
16-079.000	260 ROBERTS PARK ROAD	1.15 AC & DW	Huntington FD No. 1	
16-077.000	273 ROBERTS PARK ROAD	1.19 AC & MH	Huntington FD No. 1	Septic tank and leachfield
16-078.000	274 ROBERTS PARK ROAD	1.35 AC & DW	Huntington FD No. 1	
16-069.000	33 ROBERTS PARK WEST	0.92 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-073.000	36 ROBERTS PARK WEST	1.2 AC & DWL	Huntington FD No. 1	Septic tank and leachfield
16-070.000	61 ROBERTS PARK WEST	0.92 AC & DUPLEX	Huntington FD No. 1	
16-072.000	84 ROBERTS PARK WEST	0.92 AC & DW	Huntington FD No. 1	
16-071.000	85 ROBERTS PARK WEST	1.1 AC & MH	Huntington FD No. 1	
05-040.000	95 SPENCE ROAD	198 AC & DWL	Dug well	Septic tank and leachfield
02-045.000	39 TEXAS HILL ROAD	2 AC & DWL	Drilled well	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
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Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
02-039.000	176 TEXAS HILL ROAD	1 AC & DWL		
02-040.000	210 TEXAS HILL ROAD	1.06 AC & DWL		
02-044.000	239 TEXAS HILL ROAD	28.29 AC & DWL	Shallow well	Septic tank and leachfield
02-041.100	266 TEXAS HILL ROAD	1.84 AC & DWL	Drilled well	Septic tank and leachfield
02-041.000	414 TEXAS HILL ROAD	3.5 AC & DWL	Drilled well	
05-112.300	33 WINDY PINES DRIVE	1.3 AC & DWL	Drilled well	Septic tank and leachfield
05-112.400	37 WINDY PINES DRIVE	1 AC & DWL	Drilled well	Septic tank and leachfield
05-112.200	48 WINDY PINES DRIVE	1.0 AC & DWL	Drilled well	Septic tank and leachfield
05-112.500	49 WINDY PINES DRIVE	18.9 AC & DWL	Drilled well	Septic tank and leachfield

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
Huntington Center				
15-025.000	21 CAMELS HUMP ROAD	0.71 AC & DWL	Drilled well	
15-020.000	36 CAMELS HUMP ROAD	0.65 AC & DWL	Drilled well	Septic tank and leachfield
15-024.000	43 CAMELS HUMP ROAD	1.00 AC & DWL	Drilled well	Unknown or blank
15-021.000	72 CAMELS HUMP ROAD	0.45 AC & DWL	Shallow well	
08-001.020	95 CAMELS HUMP ROAD	10.1 AC & DWL	Drilled well	Septic tank and leachfield
15-022.000	100 CAMELS HUMP ROAD	1.2 AC & DWL	Dug well	Septic tank and leachfield
09-025.000	410 CAMELS HUMP ROAD	1296.1 AC DWLS & OUTBLDGS	Drilled well	
09-025.000	410 CAMELS HUMP ROAD	1296.1 AC DWLS & OUTBLDGS		
09-025.000	410 CAMELS HUMP ROAD	1296.1 AC DWLS & OUTBLDGS	None	
05-062.200	555 CAMELS HUMP ROAD	27.1 AC & DWL	Drilled well	Septic tank and leachfield
08-001.010	0 CREAMERY LOT HUNTINGTON	0.5 AC		
08-015.200	234 LERNER ROAD	15.65 AC & DW	Drilled well	Septic tank and leachfield
05-061.000	4340 MAIN ROAD	10.11 AC & DWL	Drilled well	Septic tank and leachfield
05-061.100	4345 MAIN ROAD	117.98 AC & MH & BARNS	Shared drilled well	Septic tank and leachfield
05-062.300	4501 MAIN ROAD	98.5 AC & DWL	Dug well	Septic tank and leachfield
05-062.400	4582 MAIN ROAD	30.2 AC & DWL	Drilled well	
15-029.000	4711 MAIN ROAD	0.08 AC & DWL	village co-op?	
15-028.000	4723 MAIN ROAD	0.2 AC & DWL & SHED	Shared drilled well	
15-027.000	4727 MAIN ROAD	0.18 AC & DWL	Shared drilled well	
15-026.000	4745 MAIN ROAD	0.26 AC & DWL	Shared drilled well	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
15-001.000	4780 MAIN ROAD	79.2 AC & DWL	Shared drilled well	
15-001.000	4780 MAIN ROAD	79.2 AC & DWL	Shared drilled well	Septic tank and leachfield
15-002.000	4794 MAIN ROAD	0.25 AC & DWL	Drilled well	Septic tank and leachfield
15-003.000	4804 MAIN ROAD	0.45 AC & DWL	Drilled well	Septic tank and leachfield
15-019.000	4815 MAIN ROAD	0.3 AC & DWL	Drilled well	Septic tank and leachfield
15-004.000	4830 MAIN ROAD	0.75 AC & DWL	Drilled well	Septic tank and leachfield
15-018.000	4839 MAIN ROAD	0.14 AC & TOWN HALL	Village co-op?	Septic tank and leachfield
15-017.000	4859 MAIN ROAD	0.9 AC & DWL	Drilled well	Septic tank and leachfield
15-005.000	4870 MAIN ROAD	11.2 AC & DWL	Drilled well	Septic tank and leachfield
15-006.000	4890 MAIN ROAD	2.0 AC & DUPLEX	Drilled well	Septic tank and leachfield
15-015.000	4905 MAIN ROAD	5.6 AC & DWL	Drilled well	
15-007.000	4910 MAIN ROAD	CHURCH	Drilled well	Septic tank and leachfield
15-008.000	4930 MAIN ROAD	7.9 AC & TOWN OFF & GAR & FIRE STATION (E911 4962 & 4960)	Drilled well	Septic tank and leachfield
15-014.000	4935 MAIN ROAD	1.0 AC & DUPLEX	Drilled well	
15-013.000	4987 MAIN ROAD	0.98 AC & DWL	Drilled well	
15-009.000	5000 MAIN ROAD	0.35 AC & DWL	Spring	
15-010.000	5010 MAIN ROAD	0.06 AC & OLD FIRE STATION		
15-012.000	5015 MAIN ROAD	0.23 AC & DWL	Drilled well	
15-011.000	5024 MAIN ROAD	0.4 AC & DWL	Drilled well	Septic tank and leachfield
08-003.000	5095 MAIN ROAD	1.2 AC & DWL	Drilled well	
08-002.000	5120 MAIN ROAD	236.3 AC & SHED		

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
08-002.000	5120 MAIN ROAD	236.3 AC & SHED	None	
08-004.000	5175 MAIN ROAD	0.66 AC & DWL		
08-010.000	5180 MAIN ROAD	1 AC & DWL	Drilled well	Septic tank and leachfield
08-008.000	5225 MAIN ROAD	0.77 AC & DWL	Drilled well	
08-012.000	5235 MAIN ROAD	0.88 AC & SHOP	None	
08-011.000	5250 MAIN ROAD	4.6 AC & DWL		
08-013.000	5290 MAIN ROAD	1.1 AC & MH	Drilled well	Septic tank and leachfield
08-014.200	5340 MAIN ROAD	2 AC & TRI-PLEX (HOUSE NOS 5340, 5342, 5344	Drilled well	Septic tank and leachfield
08-014.100	5395 MAIN ROAD	91.2 AC & DWL & MH	Drilled well	
08-014.140	5487 MAIN ROAD	10.25 AC & DWL	Drilled well	
08-015.000	5656 MAIN ROAD	1.4 AC & MH		
08-016.000	5704 MAIN ROAD	1 AC & MH		
08-021.200	6010 MAIN ROAD	12.85 AC & DWL		
08-014.360	14 MEADOW VIEW DRIVE	1.008 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.370	37 MEADOW VIEW DRIVE	1.049 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.380	51 MEADOW VIEW DRIVE	1.001 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.390	66 MEADOW VIEW DRIVE	1.003 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.400	77 MEADOW VIEW DRIVE	1.005 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.410	87 MEADOW VIEW DRIVE	1.005 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.130	52 PILLSBURY WAY	10.1 AC & DWL		
08-014.120	87 PILLSBURY WAY	10.45 AC & DWL	Drilled well	
15-023.000	120 SCHOOL STREET	7.5 AC & BREWSTER PIERCE MEMORIAL SCHOOL	Drilled well	Septic tank and leachfield

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
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Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
08-014.310	0 SHAKER MOUNTAIN ROAD	104.19 AC	None	in-ground shared trenches
08-015.100	97 SHAKER MOUNTAIN ROAD	1.9 AC & DWL & AUTO REPAIR SHOP	Drilled well	
08-014.340	98 SHAKER MOUNTAIN ROAD	1.008 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.320	114 SHAKER MOUNTAIN ROAD	1.008 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.330	138 SHAKER MOUNTAIN ROAD	1.008 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-014.350	152 SHAKER MOUNTAIN ROAD	1.008 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-019.100	315 SHAKER MOUNTAIN ROAD	76.3 AC & DWL & FARM BLDGS		
08-020.000	541 SHAKER MOUNTAIN ROAD	2.5 AC & DWL	Drilled well	
08-019.200	2509 SHAKER MOUNTAIN ROAD	11 AC		
08-014.320	342 SUNRISE DRIVE	1.18 AC & DWL	Drilled well	Onsite septic tanks, shared leachfield
08-007.000	50 TRAPP ROAD	0.56 AC & DWL		
08-005.000	97 TRAPP ROAD	1.12 AC & DWL & GAR	Drilled well	
08-006.000	110 TRAPP ROAD	18 AC & DWL & OUTBLDG	Dug well	Septic tank and leachfield

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
Hanksville				
11-034.000	30 BEANE ROAD	10.44 AC & DWL	Drilled well	Septic tank and leachfield
11-028.000	103 BEANE ROAD	0.5 AC & DWL		
11-029.000	114 BEANE ROAD	1 AC & DW		
11-030.100	240 BEANE ROAD	0.9 AC & DWL	Drilled well	Septic tank and leachfield
11-031.200	358 BEANE ROAD	2.21 AC & DWL	Drilled well	Septic tank and leachfield
11-031.100	362 BEANE ROAD	6.01 AC & DWL	Drilled well	Septic tank and leachfield
11-032.100	381 BEANE ROAD	7.1 AC & FOUNDATION	Drilled well	Septic tank and leachfield
11-030.200	394 BEANE ROAD	1.6 AC		
11-033.000	394 BEANE ROAD	2.12 AC & DWL		
11-033.000	394 BEANE ROAD	2.12 AC & DWL		Septic tank and leachfield
11-021.100	36 CARSE ROAD	11.9 AC & DWL & OUTBLDGS	Dug well	Septic tank and leachfield
11-018.000	87 CARSE ROAD	10 AC & DWL	Drilled well	
11-020.000	221 CARSE ROAD	97.5 AC & DWL	Drilled well	Septic tank and leachfield
12-004.000	289 CARSE ROAD	1.0 AC & DWL		
11-014.000	0 MAIN ROAD	1.50 AC		
11-024.000	0 MAIN ROAD	26.9 AC	Drilled well	Septic tank and leachfield
08-017.000	0 MAIN ROAD	9.2 AC	None	
11-007.200	7372 MAIN ROAD	167.6 AC & DWL & MH		
11-004.000	7439 MAIN ROAD	1.3 AC & MH		
11-005.000	7475 MAIN ROAD	3.5 AC & DWL		
11-006.000	7604 MAIN ROAD	0.62 AC & DWL	Drilled well	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
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Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
11-007.000	7650 MAIN ROAD	12.31 AC & DWL		
11-007.100	7652 MAIN ROAD	1.13 AC & DWL		
11-009.000	7735 MAIN ROAD	2.7 AC & DW	Dug well	Septic tank and leachfield
11-008.000	7770 MAIN ROAD	2.2 AC & MH	Shallow well	Septic tank and leachfield
11-010.000	7773 MAIN ROAD	1.12 AC & MH	Drilled well	
11-011.000	7787 MAIN ROAD	1 AC & DWL	Dug well	Septic tank and leachfield
11-011.100	7818 MAIN ROAD	5.54 AC & DWL	Drilled well	
11-013.000	7885 MAIN ROAD	0.3 AC & DWL		
11-015.000	7906 MAIN ROAD	1 AC & DWL	Spring	Septic tank and leachfield
11-012.000	7926 MAIN ROAD	70.46 AC & DWL		
11-017.000	8080 MAIN ROAD	25.67 AC & MH		
11-022.000	8196 MAIN ROAD	3 AC & DWL		
11-023.000	8235 MAIN ROAD	0.5 AC & DWL	Drilled well	
11-024.100	8264 MAIN ROAD	1.7 AC & DWL	Shallow well	
11-025.000	8368 MAIN ROAD	1.5 AC & DWL	Spring	Septic tank and leachfield
11-025.000	8368 MAIN ROAD	1.5 AC & DWL	Spring	Septic tank and leachfield
11-026.000	8420 MAIN ROAD	28.0 AC & DWL		
11-026.100	8438 MAIN ROAD	1.01 AC & DWL	Dug well	Septic tank and leachfield
11-027.000	8494 MAIN ROAD	20.9 AC & DWL	Drilled well	
11-035.000	8507 MAIN ROAD	2.47 AC & DWL		
11-037.000	8602 MAIN ROAD	1.5 AC & DW		
11-039.200	8605 MAIN ROAD	1.09 AC & DWL	Drilled well	Septic tank and leachfield
11-039.300	8641 MAIN ROAD	2.23 AC & MH	Drilled well	Septic tank and leachfield

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 2 (continued): Study Area Description

Parcel ID	Property Location	Property Description	Water System Type	Wastewater System Type
11-038.000	8642 MAIN ROAD	1 AC & MH	Drilled well	
11-039.400	8643 MAIN ROAD	1.58 AC & DW	Drilled well	Septic tank and leachfield
11-003.000	344 MOODY ROAD	186.27 AC DWL & COTTAGE	Drilled well	
12-002.000	856 MOODY ROAD	0.9 AC & DWL		
12-010.000	960 MOODY ROAD	13.7 AC & DWL	Drilled well	Septic tank and leachfield
11-032.200	425 MOUNTAINSIDE LANE	8.0 AC	Drilled well	Septic tank and leachfield
11-039.100	13 WEAVER ROAD	9.95 AC & DWL		Septic tank and leachfield
11-039.100	13 WEAVER ROAD	9.95 AC & DWL		
11-040.100	117 WEAVER ROAD	1.6 AC & DWL		
11-040.000	163 WEAVER ROAD	1.0 AC & DWL	Drilled well	Septic tank and leachfield
11-041.000	195 WEAVER ROAD	2.5 AC & CAMP		
CEMETERY_CE		CEMETERY	None	

Source: Town of Huntington Grand List, 2011; property owner survey results, 2011; Stone permit reviews, 2011.
Notes: If data were unavailable, the value was left blank.
Path: O:\Proj-11\WRM\2522-W Huntington\GIS\GISData\Derived\WWInfrastructure.mdb [rptTable02_StudyAreaProperties]
Date/init: 10/27/2011 anm

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Lower Village										
Adams and Windsor loamy sands	AdD	12	30	6	6	N	60	60	Conventional Subsurface	0.6
Adams and Windsor loamy sands	AdE	30	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	0.8
Agawam fine sandy loam	AgA	0	5	6	6	N	60	60	Conventional Subsurface	7.3
Alluvial land	An	999	999	99.9	99.9	U	999	999	Not Ranked	1.7
Au Gres fine sandy loam	Au	0	5	0.5	1.5	N	60	60	Filtrate + Mound w/Curtain Drain	0.6
Cabot extremely stony silt loam	CbA	0	3	0	2	Y	60	60	Performance Based System or Not Suited	0.5
Cabot extremely stony silt loam	CbD	3	25	0	2	Y	60	60	Performance Based System or Not Suited	0.2
Colton and Stetson soils	CsD	20	30	6	6	N	60	60	Conventional,Excessive Slope/Permeability	0.3
Colton and Stetson soils	CsE	30	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	3.7
Colton gravelly loamy sand	CoA	0	5	6	6	N	60	60	Conventional Subsurface	1.1
Colton gravelly loamy sand	CoB	5	12	6	6	N	60	60	Conventional Subsurface	0.6
Duane and Deerfield soils	DdA	0	5	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	1.4
Duane and Deerfield soils	DdC	12	20	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	0.3
Hadley very fine sandy loam	Hf	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	5.5
Hadley very fine sandy loam, frequently floode	Hh	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	8.2
Hartland very fine sandy loam	HlB	2	6	6	6	N	60	60	Conventional Subsurface	4.3
Hartland very fine sandy loam	HlC	6	12	6	6	N	60	60	Conventional Subsurface	0.2
Hartland very fine sandy loam	HlD	12	25	6	6	N	60	60	Conventional Subsurface	0.3
Hartland very fine sandy loam	HlE	25	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	1.9

Source: National Resource Conservation Service (NRCS), Stone Field Notes

STONE ENVIRONMENTAL, INC.

Notes: % Area was calculated using data from NRCS and Geographic Information Systems (GIS) by dividing the total area (acres) of each soil series in the study by the total land area (acres) within the study area.

Path: O:\Proj-11\WRM\2522-W Huntington\Data\GISData\WW_Analysis.mdb [rptTable03_SoilsSummary]

Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3 (continued)
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Hinesburg fine sandy loam	HnD	15	25	2	4	N	60	60	Mound or Filtrate + At-grade	0.5
Hinesburg fine sandy loam	HnE	25	60	2	4	N	60	60	Performance Based System or Not Suited	0.5
Limerick silt loam	Le	0	3	0	1.5	Y	60	60	Performance Based System or Not Suited	1.7
Livingston clay	Lh	0	2	0	0.5	Y	60	60	Performance Based System or Not Suited	0.1
Lyman-Marlow very rocky loams	LyD	5	30	2	6	N	10	60	Filtrate + Mound w/Curtain Drain	7.2
Lyman-Marlow very rocky loams	LyE	30	60	2	6	N	10	60	Performance Based System or Not Suited	2.8
Marlow extremely stony loam	MeC	5	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	1.2
Marlow extremely stony loam	MeE	20	60	2	3.5	N	60	60	Performance Based System or Not Suited	1.7
Marlow stony loam	MaB	5	12	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.1
Marlow stony loam	MaC	12	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.1
Muck and Peat	Mp	0	1	-1	0	Y	60	60	Not Suited	0.7
Munson and Raynham silt loams	MyB	2	6	0	2	Y	60	60	Performance Based System or Not Suited	1.4
Munson and Raynham silt loams	MyC	6	12	0	2	Y	60	60	Performance Based System or Not Suited	0.4
Peru extremely stony loam	PsC	0	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	6.9
Peru extremely stony loam	PsE	20	60	1	2	N	60	60	Performance Based System or Not Suited	2.5
Peru stony loam	PeB	5	12	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	1.8
Peru stony loam	PeC	12	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	1.3
Pits, sand and Pits, gravel	Gpi	999	999	6	6	U	60	60	Not Ranked	0.3
Stetson gravelly fine sandy loam	StA	0	5	6	6	N	60	60	Conventional Subsurface	9.6
Stetson gravelly fine sandy loam	StB	5	12	6	6	N	60	60	Conventional Subsurface	7.8

Source: National Resource Conservation Service (NRCS), Stone Field Notes

STONE ENVIRONMENTAL, INC.

Notes: % Area was calculated using data from NRCS and Geographic Information Systems (GIS) by dividing the total area (acres) of each soil series in the study by the total land area (acres) within the study area.

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Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3 (continued)
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Stetson gravelly fine sandy loam	StC	12	20	6	6	N	60	60	Conventional Subsurface	5.3
Winooski very fine sandy loam	Wo	0	3	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	3.8
Huntington Center										
Agawam fine sandy loam	AgA	0	5	6	6	N	60	60	Conventional Subsurface	6.0
Au Gres fine sandy loam	Au	0	5	0.5	1.5	N	60	60	Filtrate + Mound w/Curtain Drain	3.0
Cabot extremely stony silt loam	CbD	3	25	0	2	Y	60	60	Performance Based System or Not Suited	0.0
Cabot stony silt loam	CaC	3	15	0	2	Y	60	60	Performance Based System or Not Suited	1.5
Colton and Stetson soils	CsE	30	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	1.8
Duane and Deerfield soils	DdA	0	5	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	3.2
Duane and Deerfield soils	DdB	5	12	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	0.6
Hadley very fine sandy loam	Hf	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	16.7
Hadley very fine sandy loam, frequently floode	Hh	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	11.0
Hartland very fine sandy loam	HlB	2	6	6	6	N	60	60	Conventional Subsurface	5.5
Hinesburg fine sandy loam	HnA	0	3	2	4	N	60	60	Mound or Filtrate + At-grade	3.0
Hinesburg fine sandy loam	HnC	8	15	2	4	N	60	60	Mound or Filtrate + At-grade	0.8
Hinesburg fine sandy loam	HnE	25	60	2	4	N	60	60	Performance Based System or Not Suited	0.8
Livingston clay	Lh	0	2	0	0.5	Y	60	60	Performance Based System or Not Suited	0.1
Lyman-Marlow very rocky loams	LyD	5	30	2	6	N	10	60	Filtrate + Mound w/Curtain Drain	0.3
Lyman-Marlow very rocky loams	LyE	30	60	2	6	N	10	60	Performance Based System or Not Suited	0.1
Marlow extremely stony loam	MeC	5	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.2

Source: National Resource Conservation Service (NRCS), Stone Field Notes

STONE ENVIRONMENTAL, INC.

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Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3 (continued)
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Marlow extremely stony loam	MeE	20	60	2	3.5	N	60	60	Performance Based System or Not Suited	0.0
Marlow stony loam	MaB	5	12	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.1
Marlow stony loam	MaC	12	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.2
Marlow stony loam	MaD	20	30	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.3
Munson and Belgrade silt loams	MuD	12	25	0.5	3.5	N	60	60	Filtrate + Mound w/Curtain Drain	1.4
Munson and Raynham silt loams	MyB	2	6	0	2	Y	60	60	Performance Based System or Not Suited	0.1
Munson and Raynham silt loams	MyC	6	12	0	2	Y	60	60	Performance Based System or Not Suited	2.8
Peacham stony silt loam	Pc	0	1	-1	0	Y	60	60	Not Suited	0.8
Peru extremely stony loam	PsC	0	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	0.2
Peru extremely stony loam	PsE	20	60	1	2	N	60	60	Performance Based System or Not Suited	1.8
Peru stony loam	PeB	5	12	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	2.5
Peru stony loam	PeC	12	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	0.6
Peru stony loam	PeD	20	30	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	1.7
Scantic silt loam	ScA	0	2	0	1	Y	60	60	Performance Based System or Not Suited	5.0
Stetson gravelly fine sandy loam	StA	0	5	6	6	N	60	60	Conventional Subsurface	13.5
Stetson gravelly fine sandy loam	StB	5	12	6	6	N	60	60	Conventional Subsurface	8.1
Stetson gravelly fine sandy loam	StC	12	20	6	6	N	60	60	Conventional Subsurface	1.2
Terrace escarpments, silty and clayey	TeE	999	999	99.9	99.9	U	999	999	Not Ranked	1.9
Winooski very fine sandy loam	Wo	0	3	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	1.8

Source: National Resource Conservation Service (NRCS), Stone Field Notes

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Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3 (continued)
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Hanksville										
Agawam fine sandy loam	AgA	0	5	6	6	N	60	60	Conventional Subsurface	4.0
Alluvial land	An	999	999	99.9	99.9	U	999	999	Not Ranked	0.1
Berkshire and Marlow extremely stony loams	BsC	3	20	2	6	N	60	60	Mound or Filtrate + At-grade	0.0
Cabot extremely stony silt loam	CbD	3	25	0	2	Y	60	60	Performance Based System or Not Suited	0.7
Cabot stony silt loam	CaC	3	15	0	2	Y	60	60	Performance Based System or Not Suited	1.1
Colton and Stetson soils	CsD	20	30	6	6	N	60	60	Conventional,Excessive Slope/Permeability	4.2
Colton and Stetson soils	CsE	30	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	10.7
Duane and Deerfield soils	DdA	0	5	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	1.2
Duane and Deerfield soils	DdB	5	12	1.5	3	N	60	60	Mound w/Curtain Drain or Filtrate + Mound	2.4
Hadley very fine sandy loam	Hf	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	5.7
Hadley very fine sandy loam, frequently floode	Hh	0	3	4	6	N	60	60	At-grade or Filtrate + Conventional	1.5
Hartland very fine sandy loam	HlB	2	6	6	6	N	60	60	Conventional Subsurface	3.8
Hartland very fine sandy loam	HlC	6	12	6	6	N	60	60	Conventional Subsurface	0.7
Hartland very fine sandy loam	HlE	25	60	6	6	N	60	60	Conventional,Excessive Slope/Permeability	0.0
Lyman-Marlow very rocky loams	LyD	5	30	2	6	N	10	60	Filtrate + Mound w/Curtain Drain	1.8
Lyman-Marlow very rocky loams	LyE	30	60	2	6	N	10	60	Performance Based System or Not Suited	0.6
Marlow extremely stony loam	MeC	5	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	0.5
Marlow extremely stony loam	MeE	20	60	2	3.5	N	60	60	Performance Based System or Not Suited	9.5
Marlow stony loam	MaB	5	12	2	3.5	N	60	60	Mound or Filtrate + At-grade	6.5

Source: National Resource Conservation Service (NRCS), Stone Field Notes

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Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 3 (continued)
Summary of Soil Characteristics Related to Onsite Wastewater Treatment

Series Name	Mapping Unit	Slope (Percent)		Water Table (Feet)		Hydric Soil	Depth to Bedrock (Inches)		Potential On-Site System Suitability	% Study Area
		Low	High	Low	High		Low	High		
Marlow stony loam	MaC	12	20	2	3.5	N	60	60	Mound or Filtrate + At-grade	5.7
Peru extremely stony loam	PsC	0	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	1.4
Peru extremely stony loam	PsE	20	60	1	2	N	60	60	Performance Based System or Not Suited	1.4
Peru stony loam	PeC	12	20	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	0.2
Peru stony loam	PeD	20	30	1	2	N	60	60	Filtrate + Mound w/Curtain Drain	0.3
Pits, sand and Pits, gravel	Gpi	999	999	6	6	U	60	60	Not Ranked	1.2
Stetson gravelly fine sandy loam	StA	0	5	6	6	N	60	60	Conventional Subsurface	14.5
Stetson gravelly fine sandy loam	StB	5	12	6	6	N	60	60	Conventional Subsurface	13.1
Stetson gravelly fine sandy loam	StC	12	20	6	6	N	60	60	Conventional Subsurface	1.9
Terrace escarpments, silty and clayey	TeE	999	999	99.9	99.9	U	999	999	Not Ranked	2.4

Source: National Resource Conservation Service (NRCS), Stone Field Notes

STONE ENVIRONMENTAL, INC.

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Date/Initials: 10/28/11 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 4: Vermont DEC Permit Information Summary

Parcel No.	Permit ID	Street Address	Date	Reason
Huntington Lower Village				
	4C0476	East Street		Creation of a 10 lot subdivision, on-site water and waste disposal systems.
	4C0476-1	East Street		1-lot subdivision
	4C0577	Main Road		9-lot subdivision, on-site water and waste disposal systems.
	4C0738	Main Road		Single lot subdivision (10th lot subdivision)
16-057.100	AM-4-0047	235 East Street	5/17/2000	3 BR SFR, 1.8 acres, on-site water and wastewater
	EC-4-0293	Lavallee Drive	4/8/1977	One lot subdivision, 10/3/79 revised permit issued
05-022.000	EC-4-0408	Cummings Drive	4/26/1978	1 lot subdivision
05-022.000	EC-4-0408-1	124 Cummings Drive	2/9/1998	Add 1 acre from DE-4-0975 to create 3.5A for prev. approved SFR
05-022.200	EC-4-0408-2	124 Cummings Drive	3/15/2002	Create Lot 2 1.3A proposed 4 bedroom single family dwelling, onsite w/s
02-025.000	EC-4-0478	320 Lavallee Drive	11/13/1978	One lot subdivision 1 acre
05-026.000	EC-4-0702	3067 Main Road	6/3/1982	A one-lot subdivision 2 acres
05-024.000	EC-4-0726	2934 Main Road	9/29/1982	One lot subdivision 1+/- acre
05-026.100	EC-4-0765	3019 Main Road	6/28/1983	A single lot subdivision, 310' x 272' x 180'
05-021.000	EC-4-0960	2850 Main Road	10/8/1985	One lot subdivision 1 acre, onsite water and wastewater
16-051.100	EC-4-0967	75 East Street	10/11/1985	Two-lot subdivision, each lot with onsite water and wastewater
05-023.200	EC-4-0968-1	2728 Main Road	11/20/1985	Remove D-4-585 for boundary line adjust. for prev. approved Parcels
05-023.200	EC-4-0968-1	2728 Main Road	5/25/1994	Two-lot subdivision, each lot with onsite water and wastewater
05-094.200	EC-4-1022	769 East Street	7/24/1986	One lot subdivision 5 acres, onsite water and wastewater
02-067.000	EC-4-1370	187-434 Pond Road, Mayo Road	4/26/1989	7 lot subdivision, lots 1.75 acres to 7.70 acres, on-site water & sewer systems.
02-069.000	EC-4-1370-1	187-434 Pond Road, Mayo Road	12/21/1992	amend boundary lines for prev. appr. Lot 7 after conveyance of 8,633sf, 7.5A remaining
02-047.010	EC-4-1370-2	187-434 Pond Road, Mayo Road	12/6/1996	1 lot subd w/ existing duplex,amend Lot 6, 600 gpd, on-site water/ww
16-036.200	EC-4-1516	106 & 120 Bridge Street	9/12/1990	1 lot subdiv. (2+/- acres) w/on-site water & sewage; removes DE-4-1406
16-036.200	EC-4-1516-1	106 & 120 Bridge Street	11/18/1991	Change location of sewage disposal system
05-023.700	EC-4-1536	Cummings Drive	4/19/1991	1 lot subdivision for garage 1A on-site water off-site sewage Palin Excavation.
05-023.700	EC-4-1536-1	91 Cummings Drive	12/9/1996	Create Lot #1 2.3A proposed SFR, onsite water & sewage disposal
05-023.700	EC-4-1536-2	91 Cummings Drive	1/27/1997	Lot 1 change location of replacement area & identify well location
05-112.200	EC-4-1863	1370 Main Road	12/28/1994	4 lot single fam. sub with on site water & sewage disposal
05-112.200	EC-4-1863-1	1370 Main Road	8/14/1996	Revised drill well location for Lot 3A for SFR , on-site water and sewer
05-112.400	EC-4-1863-2	1370 Main Road	1/16/1998	Allow shared water supply on Lot 2B for Lots 1B & 2B
05-004.300	EC-4-2133	17 Blackbird Swale Drive	2/25/1998	Create Lot 2 for proposed 3 BR SFR with onsite water & sewage disposal 6.3A
05-005.000	EC-4-2133-1	Blackbird Swale Drive	8/28/1998	Create Lot #4 for proposed 3 BR SFR with offsite ww & onsite water 1.03A
05-004.620	EC-4-2133-2	Blackbird Swale Drive	4/21/1999	Create Lots 5A, 5B (4 BR SFR), Lot 5C-7.4A proposed 3 bed sfr ons w/s
05-004.610	EC-4-2133-3	31 Blackbird Swale Drive	7/29/1999	Permit redesigned primary & replacement area onsite on Lot 5A

Source: DEC Regional Office permit database and file review, Sept.-Oct. 2011.
Path: O:\Proj-11\WRM\2522-W Huntington\Data\DEC Permits\PermitSum.xls
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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 4 (continued): Vermont DEC Permit Information Summary

Parcel No.	Permit ID	Street Address		Date	Reason
02-036.000	EC-4-2154		Chalet Heights	5/20/1998	Adjust boundary lines for Lots 6,7,8; permit shared well on Lot 7 with lots 6 & 8.
05-007.200	EC-4-2228	81	Mayo Road	1/5/1999	Create 3.78 acre lot for proposed 4BR SFR with onsite water & ww 600 gpd
16-077.000	HE-4-0267		Roberts Park Road	11/22/1999	Lot 11 1.19 acre parcel with SFR municipal water & onsite sewage disposal
16-077.100	HE-4-0268		Roberts Park Road	11/22/1999	Lot 10 .78 acre parcel with SFR, onsite sewage disposal & municipal water
16-035.000	HE-4-0281	160	Bridge Street	4/11/2000	SFR, onsite water & sewage disposal and easement for septic system .40A
05-023.200	WW-4-0152	2728	Main Road	7/18/1989	Const. a garage (max. 2 employees) on Lot 2 of EC-4-0968.
05-023.200	WW-4-0152-1	2728	Main Road	6/7/2004	Construct storage, relocate replacement area for SFR no increase, on site water/ww.
05-026.000	WW-4-0246	3069	Main Road	6/1/1990	contruct sewage system to put a trailer on a lot w/SFR, on-site water/ww
05-026.000	WW-4-0246-1	3069	Main Road	1/11/2005	2 lot subdivision
05-024.100	WW-4-0343	2395	Main Road	4/19/1991	Maintenance garage up to 10 emp + 1-2 BR, 1-3 BR onsite water/off sewage 1acre
05-024.100	WW-4-0343-1	2395	Main Road	4/11/2004	amending permit to change design flows from 900 to 560
16-005.000	WW-4-0690	2156	Main Road	1/12/1994	conv. church bldg. for use as Historical Society chge water & sewage disp.offsite
16-011.000	WW-4-1310	2225	Main Road	8/13/1999	Combine 3 parcels for 11.8A parcel, restore sfr to post office & 4 office/studio spaces 30 emp. mun water offsite septic
05-031.300	WW-4-1644	0, 33, 63	Agnes Road	11/26/2002	9 lot subdivision three 4 bedroom sfr & six 3 bedroom sfr onsite water offsite shared septic on Lot 1 each lot <10A
05-007.400	WW-4-1808		Bridge Street	4/8/2003	Boundary line adjustment for a previously approved SFR to be 7.4 acres
02-046.000	WW-4-1870		Windy Pines Drive	6/9/2003	Lot #3A permit change well loc for previously approved 3 BR SFR, 450 gpd
05-022.100	WW-4-2100	88	Cummings Drive	5/10/2004	Remove DE-4-2200-1 to construct a 4 BR SFR on a 3.2 acre parcel.
05-010.000	WW-4-2400	450	Bridge Street	7/6/2005	convert single family residence into a 2 unit duplex with a total of 4 bedrooms
05-007.000	WW-4-2428	300	Mayo Road	7/12/2005	change house and well location on Lot #7 with existing 3 BR SFR
05-023.700	WW-4-2488	91	Cummings Drive	11/30/2005	One lot subdivision, existing 3 BR SFR and proposed 3 BR SFR
05-023.800	WW-4-2883		Evergreen Drive (west)	3/5/2007	Create Lot # 1 being 30.88 acres for a proposed 3 BR SFR on-site water/ww
05-023.800	WW-4-2883-1	240	Cummings Drive	5/11/2011	4-BR SFR on-site drilled well water supply and wastewater disposal system.
05-025.000	WW-4-2938	2990	Main Road	11/5/2007	three lot subdivision; lots 1 and 3 with proposed 3 BR SFR and lot 2 with existing 2 BR SFR
05-007.000	WW-4-2991	39	Mayo Road	3/11/2008	2 lot subdivision; Lot # 1 with existing 3 BR SFR and Lot # 2 with proposed 3 BR SFR, on-site water and sewer
16-023.000	WW-4-3113	280	Bridge Street	7/11/2008	"best fix" replacement for existing 4 BR SFR with a failed system on 0.15 acres
01-090.000	WW-4-3252	239	Texas Hill Road	3/16/2009	Replace failed wastewater system for an existing 2 BR SFR on 28.29 acres
05-023.000	WW-4-3324	189	Cummings Drive	7/8/2009	3 lot subdivision; Lot #1-1 with existing 3 BR SFR, Lots #1-2 & 1-3 with proposed 4 BR SFR
16-087.000	WW-4-3327	440	East Street	7/13/2009	upgrade/ replacement of an existing failing disposal system
16-012.000	WW-4-3355	2225	Main Road	1/5/2010	best fix replacement for existing duplex, 4 BR, 0.64 acres, on site water supply
05-004.600	WW-4-3629	246	Blackbird Swale Drive	2/7/2011	Two-lot subdivision, 3 BR SFR with off-lot wastewater disposal area

Source: DEC Regional Office permit database and file review, Sept.-Oct. 2011.
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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 4 (continued): Vermont DEC Permit Information Summary

Parcel No.	Permit ID	Street Address	Date	Reason
Huntington Center				
08-014.310	EC-4-1361	114-152 Shaker Mountain Road	3/31/1989	8 Lot subdivision of 1 acres each +/- with on-site water and septic tanks. Retain 240ac
08-014.310	EC-4-1361-1	114-152 Shaker Mountain Road	7/26/1989	Change of pump station for sewage disposal.
08-014.310	EC-4-1361-2	114-152 Shaker Mountain Road	6/29/1992	2 lot single family sub. with onsite water community ww Lot 9 -1A Lot 10-1A
08-014.310	EC-4-1361-3	114-152 Shaker Mountain Road	10/2/1992	Amend well locations for Lots #1 through #8
08-014.310	EC-4-1361-4	Sunrise Drive	3/25/1996	12 lot single fam. sub. Lots 11 thru 22 each 1+A onsite water & com. Septic
08-001.020	EC-4-1804	95 Camels Hump Road	4/26/1994	2 lot single fam. sub. prop. 4 BR SFR ons. w/s Lot 1-9 A, Lot 2-1A ons.w/offs. s.
05-027.110	EC-4-2105	20 Hinesburg Hollow Road	10/17/1997	Retain Lot 2 a 3 acre parcel with Lot 1 remaining under EC-4-2105
15-007.000	PB-4-1046	Main Road	~1985	Addition to existing church, including new kitchen and bathrooms
15-023.000	PB-4-1052	120 School Street	10/7/1992	Convert existing porch into classroom for 20 students
15-023.000	PB-4-1052-1	120 School Street	8/29/1997	3900 sq. ft. addition to existing elementary school
15-023.000	WW-4-0392	120 School Street	10/7/1992	4 classroom add. with new sewage system onsite water & sewage 702 gpd
15-023.000	WW-4-0392-1	120 East Street/School Street	8/29/1997	After school program for 20 children & 2 staff no increase in onsite water/ww
15-023.000	WW-4-0392-2	120 School Street	4/12/1999	Addition of pre-school with 2 staff, 13 children no inc. on-site water/ww
15-008.000	WW-4-0454	4960 Main Road	12/23/1991	fire station 4800 sf onsite water and sewage disposal 720 gpd 7.9 acres
15-008.000	WW-4-0454-1	4960 Main Road	8/11/1992	amend permit for prev. approvd fire station for onsite drilled well 50 gpd
09-025.000	WW-4-1568	410 Camels Hump Road	10/16/2001	Repl. existing ww system and relocate 1 BR apt from existing house
09-025.000	WW-4-1568-1	410 Camels Hump Road	6/14/2005	Add 2 BR to a 4 BR residence, add 1 BR to make 2 BR apt. and adding a 2 be
09-025.000	WW-4-1568-2	410 Camels Hump Road	10/20/2006	re-allotment of 10 bedrooms; installation of new sewer lines / septic tanks
08-014.310	WW-4-1897	Sunrise Drive	1/9/2004	Boundary line adjustments for Lots 11-22 no other changes to lots.
15-006.000	WW-4-1938	4890 Main Road	10/12/2003	Permit existing 3 BR duplex with onsite water / ww 420 gpd 2 acre parcel.
15-006.000	WW-4-1938-1	4890 Main Road	6/11/2004	amend permit to identify new well location and replacement area location
08-014.200	WW-4-1958	5340 Main Road	10/20/2003	Permit existing 6-BR, 3 unit apt with onsite water/ww 810 gpd on 1.81 acres.
05-027.020	WW-4-2022	60 Hinesburg Hollow Road	1/2/2004	1-lot subdivision 1.3 acres in size with an existing 4-bedroom residence
05-027.020	WW-4-2022R	60 Hinesburg Hollow Road	1/13/2004	one lot subdivision of 1.3 acres with an existing 4 bedroom residence
05-062.200	WW-4-2588	555 Camels Hump Road	4/4/2006	Lot A with an existing 4 BR SFR to become 18.2 acres w/ designated repl. area
	WW-4-2588-1	555 Camels Hump Road	4/17/2007	construct a three bedroom SFR on Lot B being 8.9 acres on-site water/ww
05-062.200	WW-4-2588-2	555 Camels Hump Road	5/6/2009	Replace and upgrade failed wastewater system for existing 4 BR SFR, future two bedroom guest house and new drilled well and replacement area
05-062.200	WW-4-2588-3	555 Camels Hump Road	2/25/2010	Add 2 BR to existing 4 BR SFR, barn apartment to become 1 BR and relocate well
15-004.000	WW-4-3108	4830 Main Road	7/14/2008	New drilled well; variance requested for separation of well and leachfield

Source: DEC Regional Office permit database and file review, Sept.-Oct. 2011.
Path: O:\Proj-11\WRM\2522-W Huntington\Data\DEC Permits\PermitSum.xls
Date/init: 10/27/2011 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 4 (continued): Vermont DEC Permit Information Summary

Parcel No.	Permit ID	Street Address	Date	Reason
Hanksville				
11-008.000	EC-4-0730	7770 Main Road	9/27/1982	A single lot subdivision 2.2 acres
11-039.400	EC-4-1596	8643/ 13 Main Road/Weaver Rd	7/30/1991	4 lot subd. Lot 1 w/exist. SFR; lot 2 & 3 for constructn of sfr & lot 4 w/exist SFR
11-039.100	EC-4-1596-1	8643/ 13 Main Road/Weaver Rd	9/13/1991	Correct acreage and lot numbers
11-039.400	EC-4-1596-2	8643/ 13 Main Road/Weaver Rd	12/9/1993	boundary line adjust. lots 2 - 2.23A and 3 - 1.58A prev. appr. single fam. lots
11-021.100	HE-4-0180	36 Carse Road	9/8/1997	Single family residence onsite water & sewage disposal 3.9 acres
11-032.100	WW-4-1638	381 Beane Road	7/24/2002	Proposed 3 BR SFR, onsite water & sewage disposal 8.5A
11-032.100	WW-4-1638-1	379 Beane Road	1/27/2003	Create Lot 2 3 BR SFR, 1.4A, Lot 1 rem. with 3 BR SFR 7.1 acres.
11-032.100	WW-4-1638-2	379 Beane Road	8/28/2003	Lot #1 add workshop no emp, 7.12 AC w 3 BR SFR, onsite water/ww, 420 gpd
11-024.000	WW-4-2538	8368 Main Road	1/20/2006	construct 3 BR SFR on Lot #1 being 26 acres in size

Source: DEC Regional Office permit database and file review, Sept.-Oct. 2011.
Path: O:\Proj-11\WRM\2522-W Huntington\Data\DEC Permits\PermitSum.xls
Date/init: 10/27/2011 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
Table 5: Summary of Capacity Assessment Results, Lower Huntington Village

Description:

242	Single Family Residences
5	Multi-Family Homes or Apartments
4	Commercial Properties
1	Municipal / Institutional Properties
22	Undeveloped Land (or land with no water or wastewater facilities)
274	Properties Total

Water Supplies:

149	Individual or shared drilled wells
14	Individual or shared shallow wells/springs
47	Connections to the Huntington Fire District No. 1 system
22	Undeveloped locations with no on-site water supply
42	Locations with no water supply information

Factors Affecting Water Quantity Assessment:

Factor	Number of Properties Affected	% of Total
Reported annual water quantity issues	3	1%
Reported periodic water quantity issues	3	1%
Current well replaced an existing drilled well	20	7%
Current well deepened or hydrofractured	3	1%
No water quantity issues reported	59	22%
No water quantity information	186	68%

Factors Affecting Water Quality Assessment:

Factor	Number of Properties Affected	% of Total
Water quality (aesthetics)	28	10%
Water quality (coliform)	13	5%
Water quality (aesthetics and coliform)	3	1%
No water quality issues reported	64	23%
No water quality information	166	61%

Wastewater Treatment Systems:

129	In-ground septic systems
3	Raised or mound septic systems
3	Advanced treatment, performance based system, or best fix
11	Connections to shared leachfields (or leachfield site)
22	Locations with no on-site wastewater system
106	Locations with no wastewater system information

Factors Affecting Wastewater Capacity Assessment:

Factor	Number of Properties Affected	% of Total
Limited available area for existing system replacement	94	34%
Currently comply but future capacity may be limited	18	7%
Currently comply and may have additional capacity	162	59%
Owner's future plans have adequate capacity	10	4%
Owner's future plans need capacity	10	4%

Source: Survey results; Town Grand List data table; VT DEC permits and well database; VT DEC wells database; NRCS soils data.

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Date/init: 10/31/2011 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
Table 6: Summary of Needs Assessment Results, Huntington Center

Description:

59 Single Family Residences
3 Multi-Family Homes or Apartments
0 Commercial Properties
5 Municipal / Institutional Properties
5 Undeveloped Land (or land with no water or wastewater facilities)
72 Properties Total

Water Supplies:

55 Individual or shared drilled wells
5 Individual or shared shallow wells/springs
5 Undeveloped locations with no on-site water supply
7 Locations with no water supply information

Factors Affecting Water Quantity Assessment:

Factor	Number of Properties Affected	% of Total
Reported annual water quantity issues	0	0%
Reported periodic water quantity issues	0	0%
Current well replaced an existing drilled well	6	8%
Current well deepened or hydrofractured	1	1%
No water quantity issues reported	14	19%
No water quantity information	51	71%

Factors Affecting Water Quality Assessment:

Factor	Number of Properties Affected	% of Total
Water quality (aesthetics)	7	10%
Water quality (coliform)	2	3%
Water quality (aesthetics and coliform)	1	1%
No water quality issues reported	11	15%
No water quality information	51	71%

Wastewater Treatment Systems:

22 In-ground septic system
13 Connections to shared leachfields (or leachfield site)
5 Locations with no on-site wastewater system
32 Locations with no wastewater system information

Factors Affecting Wastewater Capacity Assessment:

Factor	Number of Properties Affected	% of Total
Limited available area for existing system replacement	22	31%
Currently comply but future capacity may be limited	9	13%
Currently comply and may have additional capacity	41	57%
Owner's future plans have adequate capacity	3	4%
Owner's future plans need capacity	4	6%

Source: Survey results; Town Grand List data table; VT DEC permits and well database; VT DEC wells database; NRCS soils data.

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Date/init: 10/31/2011 anm

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
Table 7: Summary of Needs Assessment Results, Hanksville

Description:

46 Single Family Residences
1 Mixed Commercial/Residential Property
5 Undeveloped Land (or land with no water or wastewater facilities)
52 Properties Total

Water Supplies:

26 Individual or shared drilled wells
11 Individual or shared shallow wells/springs
5 Undeveloped locations with no on-site water supply
10 Locations with no water supply information

Factors Affecting Water Quantity Assessment:

Factor	Number of Properties Affected	% of Total
Reported annual water quantity issues	0	0%
Reported periodic water quantity issues	0	0%
Current well replaced an existing drilled well	8	15%
Current well deepened or hydrofractured	0	0%
No water quantity issues reported	4	8%
No water quantity information	40	77%

Factors Affecting Water Quality Assessment:

Factor	Number of Properties Affected	% of Total
Water quality (aesthetics)	2	4%
Water quality (coliform)	0	0%
Water quality (aesthetics and coliform)	1	2%
No water quality issues reported	14	27%
No water quality information	35	67%

Wastewater Treatment Systems:

24 In-ground septic system
1 Advanced treatment, performance based system, or best fix
5 Locations with no on-site wastewater system
22 Locations with no wastewater system information

Factors Affecting Wastewater Capacity Assessment:

Factor	Number of Properties Affected	% of Total
Limited available area for existing system replacement	23	44%
Currently comply but future capacity may be limited	2	4%
Currently comply and may have additional capacity	27	52%
Owner's future plans have adequate capacity	0	0%
Owner's future plans need capacity	0	0%

Source: Survey results; Town Grand List data table; VT DEC permits and well database; VT DEC wells database; NRCS soils data.

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Date/init: 10/31/2011 anm

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 8: Representative Water Demands and Estimated Source Requirements, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Current Condition				
Single Family Residences	450 / dwelling (on average)	244 dwellings	139,950 / 279,900	
Multi-Family Homes / Apartments	150 / bedroom	5 properties, 20 bedrooms total	3,000 / 6,000	
Fuller House and Post Office	15 / employee	30 employees	450 / 900	
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 150 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 150 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Huntington Garage	450 / dwelling 15 / employee	1 dwelling 2 employees	480 / 960	
Liberty Head Post & Beam	15 / employee	6 employees	90 / 180	
Union Meeting House / Huntington Public Library	5 / seat * 25% of seats	280 seats	350 / 700	
Current Condition Total Water Demands			**146,480 / 292,960**	
Scenario 1: Do Nothing				LV-W-A
Existing Single Family Residences	450 / dwelling (on average)	244 dwellings	139,950 / 279,900	
Potential New Single Family Residences	450 / dwelling (on average)	145 dwellings	83,167 / 166,334	
Existing Multi-Family Homes / Apartments	150 / bedroom	5 properties, 20 bedrooms total	3,000 / 6,000	
Potential New Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
Fuller House and Post Office	15 / employee	30 employees	450 / 900	
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 8: Representative Water Demands and Estimated Source Requirements, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Huntington Garage	420 / dwelling 15 / employee	1 dwelling 2 employees	450 / 900	
Liberty Head Post & Beam	15 / employee	6 employees	90 / 180	
Union Meeting House / Huntington Public Library	5 / seat * 25% of seats	280 seats	350 / 700	
Scenario 1 Total Water Demand			**230,217 / 460,434**	
Scenario 2: Fix Existing Village Problems Only				
Alternative LV-W-B.2b, Properties within Shared Service Area				LV-W-B.2b
Single Family Residences	450 / dwelling (on average)	31 dwellings	13,500 / 27,000	
Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 150 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Fuller House and Post Office	15 / employee	30 employees	450 / 900	
Alternative LV-W-B.2c, Properties Within Shared Service Area				LV-W-B.2c
Single Family Residences	450 / dwelling (on average)	6 dwellings	3,450 / 6,900	
Alternative LV-W-B.2d, Properties Within Shared Service Area				LV-W-B.2d
Single Family Residences	450 / dwelling (on average)	3 dwellings	1,500 / 3,000	
Scenario 2 Total Shared Water Demand			**19,080 / 38,160**	
Properties Outside all Shared Service Areas				LV-W-B.1
Existing Single Family Residences	450 / dwelling (on average)	207 dwellings	123,000 / 246,000	
Potential New Single Family Residences	450 / dwelling (on average)	123 dwellings	70,549 / 141,097	
Existing Multi-Family Homes / Apartments	150 / bedroom	4 properties, 16 bedrooms total	2,400 / 4,800	
Potential New Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 8: Representative Water Demands and Estimated Source Requirements, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 150 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Huntington Garage	450 / dwelling 15 / employee	1 dwelling 2 employees	480 / 960	
Liberty Head Post & Beam	15 / employee	6 employees	90 / 180	
Union Meeting House / Huntington Public Library	5 / seat * 25% of seats	280 seats	350 / 700	
Scenario 2 Total Water Demand			**217,629 / 435,257**	
Scenario 3: Provide for Village Centered Vitality				
Properties within Village Core Shared Service Areas - Design Intent is 2X existing condition's water supply capacity				LV-W-C.2a, LV-W, C.2b, LV-W-C.2c
Existing Single Family Residences	450 / dwelling (on average)	56 dwellings	25,800 / 51,600	
Potential New Single Family Residences	450 / dwelling (on average)	25 dwellings	12,170 / 24,340	
Existing Multi-Family Homes / Apartments	150 / bedroom	2 properties, 10 bedrooms total	1,500 / 3,000	
Potential New Multi-Family Homes / Apts.	150 / bedroom	2 properties, 10 bedrooms total	1,500 / 3,000	
Fuller House and Post Office	15 / employee	30 employees	450 / 900	
Beaudry's Store, expanded use	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom 45 / seat, 3 meals/day	2 sets gas pumps 2 BR apartment 30 seats	2,430 / 4,860	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080 / 2,160	
Union Meeting House / Library	5 / seat * 25% of seats	280 seats	350 / 700	
Additional, un-allocated water supply capacity			15,240 / 30,480	
TOTAL			60,520 / 121,040	
Properties within Expanded Village Core Shared Service Area - Design Intent is 1.5X current water supply capacity				LV-W-C.2a, LV-W, C.2b, LV-W-C.2c
Existing Single Family Residences	450 / dwelling (on average)	41 dwellings	18,560 / 37,120	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 8: Representative Water Demands and Estimated Source Requirements, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Potential New Single Family Residences	450 / dwelling (on average)	10 dwellings	4,527 / 9,054	
Existing Multi-Family Homes / Apartments	150 / bedroom	1 property, 5 bedrooms total	750 / 1,500	
Potential New Multi-Family Homes / Apts.	150 / bedroom	1 property, 5 bedrooms total	750 1,500	
Huntington Garage	450 / dwelling 15 / employee	1 dwelling 2 employees	480 / 960	
Liberty Head Post & Beam	15 / employee	6 employees	90 / 180	
Additional, un-allocated water supply capacity			4,663 / 9,326	
TOTAL			29,820 / 59,640	
Properties within Huntington F.D. No. 1 Vicinity Service Area - Design Intent is 1X current water supply capacity				LV-W-C.2a, LV-W, C.2b, LV-W-C.2c
Existing Single Family Residences	450 / dwelling (on average)	59 dwellings	26,400 / 52,800	
Existing Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
TOTAL			27,000 / 54,000	
Scenario 3 Total Shared Water Demand			**117,340 / 234,680**	
Properties Outside Shared Service Areas				LV-W-C.1
Existing Single Family Residences	450 / dwelling (on average)	95 dwellings	50,400 / 100,800	
Potential New Single Family Residences	450 / dwelling (on average)	100 dwellings	53,053 106,105	
Existing Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
Scenario 3 Total Water Demands			**221,393 / 442,785**	

Notes: *Unitized average day flow for a single family residence is 150 gpd/bedroom.

**Peak day demand assumes a peaking factor of two times the average day flow.

Source: VT EPRs, Chapter 21, eff. December 1, 2010.

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Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 9: Representative Water Demands and Estimated Source Requirements, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Current Condition				
Single Family Residences	450 / dwelling (on average)	59 dwellings	30,828 / 61,656	
Multi-Family Homes / Apartments	150 / bedroom	3 properties, 12 bedrooms total	1,800 / 3,600	
Church	15 / employee 5 / seat x 25% No suppers	1-2 employees 100 seats	155 / 310	
Town Hall	5 / seat	100 seats	500 / 1,000	
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720 / 1,440	
Town Offices	15 / employee	10 employees	150 / 300	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502 / 7,004	
Current Condition Total Water Demands			**37,655 / 75,310**	
Scenario 1: Do Nothing				HC-W-A
Existing Single Family Residences	450 / dwelling (on average)	59 dwellings	30,828 / 61,656	
Potential New Single Family Residences	450 / dwelling (on average)	108 dwellings	56,431 / 112,862	
Existing Multi-Family Homes / Apartments	150 / bedroom	3 properties, 12 bedrooms total	1,800 / 3,600	
Potential New Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
Church	15 / employee 5 / seat x 25% No suppers	1-2 employees 100 seats	155 / 310	
Town Hall	5 / seat	100 seats	500 / 1,000	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 9: Representative Water Demands and Estimated Source Requirements, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720 / 1,440	
Town Offices	15 / employee	10 employees	150 / 300	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502 / 7,004	
Scenario 1 Total Water Demands			**94,686 / 189,372**	
Scenario 2: Fix Existing Village Problems Only				HC-W-B
No wastewater alternatives developed that require water alternatives for dispersal sites to be feasible.				
Existing Single Family Residences	450 / dwelling (on average)	59 dwellings	30,828 / 61,656	
Potential New Single Family Residences	450 / dwelling (on average)	95 dwellings	49,638 / 99,277	
Existing Multi-Family Homes / Apartments	150 / bedroom	3 properties, 12 bedrooms total	1,800 / 3,600	
Potential New Multi-Family Homes / Apartments	150 / bedroom	1 property, 4 bedrooms total	600 / 1,200	
Church	15 / employee 5 / seat x 25% No suppers	1-2 employees 100 seats	155 / 310	
Town Hall	5 / seat	100 seats	500 / 1,000	
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720 / 1,440	
Town Offices	15 / employee	10 employees	150 / 300	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502 / 7,004	
Scenario 2 Total Water Demands			**87,893 / 175,787**	
Scenario 3: Provide for Village Centered Vitality				

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 9: Representative Water Demands and Estimated Source Requirements, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Properties within Shared Service Area				HC-W-C.2a, HC-W-C.2b, HC-W-C.2c
Existing Single Family Residences	450 / dwelling (on average)	26 dwellings	13,200 / 26,400	
Potential New Single Family Residences	450 / dwelling (on average)	26 dwellings	13,200 / 26,400	
Existing Multi-Family Homes / Apartments	150 / bedroom	2 properties, 7 bedrooms total	1,050 / 2,100	
Potential New Multi-Family Homes / Apartments	150 / bedroom	2 properties, 7 bedrooms total	1,050 / 2,100	
Church with suppers	15 / employee 5 / seat x 25% 8 / seat for suppers	1-2 employees 100 seats	955 / 1,910	
Town Hall with expanded use	5 / seat 8 / seat for suppers	100 seats	1,300 / 2,600	
Town Garage / Fire Station	5 / person 15 / employee	20 persons 3 employees	145 / 290	
Town Offices	15 / employee	10 employees	150 / 300	
Old Fire Station	15 / employee	3 employees	45 / 90	
Additional, un-allocated water supply capacity			995 / 1,990	
Scenario 3 Total Shared Water Demand			**32,090 / 64,180**	
Developed Properties Outside Shared Service Area				HC-W-C.1
Existing Single Family Residences	450 / dwelling (on average)	33 dwellings	15,318 / 30,636	
Potential New Single Family Residences	450 / dwelling (on average)	60 dwellings	27,000 / 54,000	
Existing Multi-Family Homes / Apartments	150 / bedroom	1 property, 5 bedrooms total	750 / 1,500	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 9: Representative Water Demands and Estimated Source Requirements, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Average / Peak Day Demand (gallons per day)	Related Alternatives
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502 / 7,004	
Scenario 3 Total Water Demand			**78,660 / 157,320**	

Notes: *Unitized average day flow for a single family residence is 150 gpd/bedroom.

**Peak day demand assumes a peaking factor of two times the average day flow.

Source: VT EPRs, Chapter 21, eff. December 1, 2010.

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Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 10: Summary of Potential Community Water Supply Source Sites

Area Number	Description Details	Estimated Source Capacity, gpm*	Advantages	Disadvantages
W-LV-1	Kittredge, Anthony & Shawna, 1235 Main Rd., 14.5 AC & DWL	40-70+	• Within gravel aquifer area • On same side of river as most development	• Within 100-year floodplain • Privately owned • Up to 5 wastewater systems within 500’ of source • May not be able to control all land within 500' of source
W-LV-2	Town of Huntington, ~1900 Main Road, 12.5 AC & MAPLEWOOD CEMETERY	40-100+	• Adjacent to gravel aquifer area • On same side of river as most development • Above 100-year floodplain • Municipally owned	• Up to 2 wastewater systems within 500’ of source • May not be able to control all land within 500' of source • Politically challenging and probably unrealistic as source
W-LV-3	Jacques, Nellie, 57.63 AC & DWL (open field behind 39 Mayo Road)	40-100+	• Adjacent to gravel aquifer areas • Portions above 100-year floodplain elevation • No wastewater systems within 500’ of likely source	• Privately owned • River crossing necessary • Use as water supply source restricts capacity of up-gradient cluster sites
W-LV-4	Fecteau, James & Jessica, 1735 Main Rd., 10 AC & DWL & GAR (SW corner of parcel)	40-100+	• Adjacent to gravel aquifer area • On same side of river as most development • Above 100-year floodplain • No wastewater systems within 500’ of likely source	• Privately owned • Use as water source may restrict use of upgradient cluster site • May not be able to control all land within 500' of source • May be down-gradient from two former leaking petroleum tank sites
W-LV-5	Huntington Fire District No. 1, Roberts Park Rd., 0.15 AC	125+	• Known community water supply with proven capacity	• Water quality and distribution system capacity problems • Could not be permitted under current regulatory siting criteria

TABLE 10: Summary of Potential Community Water Supply Source Sites

Area Number	Description Details	Estimated Source Capacity, gpm*	Advantages	Disadvantages
W-LV-6	Cummings, Britt & Michelle, 2879 Main Rd., 17.97 AC & DWL	20-60+	• Within gravel aquifer area • On same side of river as most development • Above 100-year floodplain	• Privately owned • Also identified as possible cluster system site • May not be able to control all land within 500' of source • Up to 5 wastewater systems within 500’ of source • Cummings Rd.onsite systems within likely two-year time of travel area
W-LV-7	Cummin, Knox, 95 Spence Rd., 198 AC & DWL	20-60+	• Adjacent to gravel aquifer area • Portions above floodplain • No wastewater systems within 500’ of likely source • May be able to control all property within 500'	• Privately owned • River crossing necessary • Mapped hazardous waste small-quantity generator and 4,000 gpd leachfield nearby (west of river)
W-LV-8	Spence, Joseph and Beverly, 3965 Main Road, 187 AC & DWL & MHS & BARN & SHEDS	20-100+	• Same geologic context as proven gravel aquifer area • On same side of river as most development • Portions above floodplain • If capacity proven, could supply Lower Village and Huntington Center from single location • Sites possible that keep control radius on property	• Not within a proven gravel aquifer • Privately owned • River crossing necessary • Optimal source location is ~2,000’ south of Lower Village boundary

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 10: Summary of Potential Community Water Supply Source Sites

Area Number	Description Details	Estimated Source Capacity, gpm*	Advantages	Disadvantages
W-LV-9	Lynda Swannie, 680 Mayo Road, 387.0 AC & DWL	10-20	• In known area of relatively high-yielding bedrock wells • No stream crossing needed • Well above 100-year floodplain • Sites possible that keep control radius on property	• Not within a proven gravel aquifer • Privately owned • Intended to serve only a small service area (less than 10 connections)
W-HC-1	Taft, Bruce & Mary, 4345 Main Rd., 117.98 AC & MH & BARNS	30-100+	• Same geologic context as proven gravel aquifer area • On same side of river as most development • Above 100-year floodplain • Nearby bedrock wells also high-yielding	• Not within a proven gravel aquifer • Privately owned • Also identified as possible cluster wastewater system site • Existing wastewater systems reduce ideal siting locations
W-HC-2	Alan Campbell & Heidi Racht, 4501 Main Rd., 98.5 AC & DWL	30-100+	• Same geologic context as proven gravel aquifer area • On same side of river as most development • Above 100-year floodplain	• Not within a proven gravel aquifer • Privately owned • Also identified as possible cluster wastewater system site • Existing wastewater systems reduce ideal siting locations

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 10: Summary of Potential Community Water Supply Source Sites

Area Number	Description Details	Estimated Source Capacity, gpm*	Advantages	Disadvantages
W-HC-3	Taft, C. SR & JR & W. & B.; C. Weaver & C. Place, 4905 MAIN RD, 5.6 AC & DWL	20-80+	• Within gravel aquifer area • On same side of river as most development • Above 100-year floodplain • Prior hydrogeologic study indicates gravel and surficial aquifers not hydraulically connected	• Privately owned • Also identified as possible cluster wastewater system site • Location in middle of village "core" would severely restrict future development in 500' radius • Existing wastewater systems reduce ideal siting locations • School leachfield is directly upgrade • May not be able to control all land within 500' of source
W-HC-4	Town of Huntington, 4930/60/62 Main Rd., 7.9 AC & TOWN OFF & GAR & FIRE STATION	20-80+	• Municipally owned • Adjacent to gravel aquifer area • On same side of river as most development • Portions above floodplain	• Also identified as possible cluster wastewater system site • Existing wastewater systems eliminate ideal siting locations at current condition • May not be able to control all land within 500' of source
W-HC-5	Kenneth Pillsbury, 5395 Main Rd., 91.2 AC & DWL & MH	20-50+	• Adjacent to gravel aquifer area • On same side of river as most development • Portions above floodplain • Open land is outside village core area	• Source sites maintaining a 500’ buffer on the property are near floodplain • Up to 3 wastewater systems within 500’ of source • Location is near but across Huntington River from 2 large shared leachfields

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 10: Summary of Potential Community Water Supply Source Sites

Area Number	Description Details	Estimated Source Capacity, gpm*	Advantages	Disadvantages
W-HC-6	Maridell Tomlinson, 6136 Main Rd., 143 AC & DWL	20-50+	• Same geologic context as proven gravel aquifer area • On same side of river as most development • Portions above 100-year floodplain • Sites possible that keep control radius on property	• Not within a proven gravel aquifer • Privately owned • Wetlands and floodplains constrain source locations • North edge of property is ~4,500 ft. south of the village core and 1,300 ft. south of Village district boundary

Notes: gpm = gallons per minute

*Estimated well yields based on narrative in Section 9.2.2 of this report.

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 21, eff. December 1, 2010, and Stone Environmental, Inc. 2011-12 mapping and calculations.

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Date/init: 1/23/2012, anm; rev 5/11/2012

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 11: Representative Wastewater Flows, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Current Condition				
Single Family Residences	420 / dwelling (on average)	244 dwellings	124,130	
Multi-Family Homes / Apartments	140 / bedroom	5 properties, 20 bedrooms total	2,800	
Fuller House and Post Office	15 / employee	30 employees	450	
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Huntington Garage	420 / dwelling 15 / employee	1 dwelling 2 employees	450	
Liberty Head Post & Beam	15 / employee	6 employees	90	
Union Meeting House / Huntington Public Library	5 / seat * 25% of seats	280 seats	350	
Current Condition Total Wastewater Flows			**130,430**	
Scenario 1: Do Nothing				LV-WW-A
Existing Single Family Residences	420 / dwelling (on average)	244 dwellings	124,130	
Potential New Single Family Residences	420 / dwelling (on average)	145 dwellings	73,766	
Existing Multi-Family Homes / Apartments	140 / bedroom	5 properties, 20 bedrooms total	2,800	
Potential New Multi-Family Homes / Apartments	140 / bedroom	1 property, 4 bedrooms total	560	
Fuller House and Post Office	15 / employee	30 employees	450	
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 11: Representative Wastewater Flows, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Huntington Garage	420 / dwelling 15 / employee	1 dwelling 2 employees	450	
Liberty Head Post & Beam	15 / employee	6 employees	90	
Union Meeting House / Huntington Public Library	5 / seat * 25% of seats	280 seats	350	
Scenario 1 Total Wastewater Flows			**204,756**	
Scenario 2: Fix Existing Village Problems Only				
Properties within Shared Service Areas				
Huntington Acres cluster	420 / dwelling current 257 / dwelling shared	17 dwellings	7,140 current 4,369 shared	LV-WW-B.2a
Main Road / Bridge Street / East Road area cluster				LV-WW-B.2b, LV-WW-B.2c
Existing Single Family Residences	245 / dwelling shared	32 dwellings	7,840 shared	
Existing Multi-Family Homes / Apartments	140 / bedroom	1 @ 4 BR 1 @ 6 BR	1,400	
Fuller House and Post Office	15 / employee	30 employees	450	
Beaudry's Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Union Meeting House / Library	5 / seat * 25% of seats	280 seats	350	
TOTAL			10,800	
Bridge Street East / Hemlock Hill cluster	420 / dwelling current 245 / dwelling shared	21 dwellings	8,820 current 5,145 shared	LV-WW-B.2c, LV-WW-B.2d
Roberts Park Road / Riverbank cluster	420 / dwelling current 245 / dwelling shared	26 dwellings	10,080 current 6,370 shared	LV-WW-B.2e
Scenario 2 Total Shared Wastewater Flows			**26,684**	
Properties Outside Shared Service Areas				LV-WW-B.1
Existing Single Family Residences	420 / dwelling (on average)	148 dwellings	75,292	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 11: Representative Wastewater Flows, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Potential New Single Family Residences	420 / dwelling (on average)	123 dwellings	62,574	
Multi-Family Homes / Apartments	140 / bedroom	3 properties, 10 bedrooms total	1,400	
Potential New Multi-Family Homes / Apartments	140 / bedroom	1 property, 4 bedrooms total	560	
Huntington Garage	420 / dwelling 15 / employee	1 dwelling 2 employees	450	
Liberty Head Post & Beam	15 / employee	6 employees	90	
Scenario 2 Total Wastewater Flows			**167,050**	
Scenario 3: Provide for Village Centered Vitality				
Properties within Shared Service Areas				
Huntington Acres cluster (current flows only)	420 / dwelling current 257 / dwelling shared	17 dwellings	7,140 current 4,369 shared	LV-WW-C.2a
Main Road / Bridge Street / East Road area cluster				LV-WW-C.2b, LV-WW-C.2c
Existing Single Family Residences	245 / dwelling shared	32 dwellings	7,840	
Potential New Single Family Residences	245 / dwelling shared	20 dwellings	4,900	
Existing Multi-Family Homes / Apartments	140 / bedroom	2 properties, 10 bedrooms total	1,400	
Potential New Multi-Family Homes / Apartments	140 / bedroom	2 properties, 10 bedrooms total	1,400	
Fuller House and Post Office	15 / employee	30 employees	450	
Beaudry's Store, expanded use	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom 45 / seat, 3 meals/day	2 sets gas pumps 2 BR apartment 30 seats	2,430	
Jacques Country Store	500 / set gas pumps 300 / 2nd set pumps 140 / apt. bedroom	2 sets gas pumps 2 BR apartment	1,080	
Union Meeting House / Library	5 / seat * 25% of seats	280 seats	350	
Additional, un-allocated wastewater treatment capacity			1,750	
TOTAL			21,600	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 11: Representative Wastewater Flows, Lower Village

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Bridge Street East / Hemlock Hill cluster				LV-WW-C.2c, LV-WW-C.2d
Existing Single Family Residences	245 / dwelling shared	21 dwellings	5,145	
Potential New Single Family Residences	245 / dwelling shared	5 dwellings	1,225	
Additional, un-allocated wastewater treatment capacity			3,920	
TOTAL			10,290	
Roberts Park Road / Riverbank cluster (current flows only)	420 / dwelling current 245 / dwelling shared	26 dwellings	10,080 current 6,370 shared	LV-WW-C.2e
Scenario 3 Total Shared Wastewater Flows			**42,629**	
Properties Outside Shared Service Areas				LV-WW-C.1
Existing Single Family Residences	420 / dwelling (on average)	148 dwellings	75,292	
Potential New Single Family Residences	420 / dwelling (on average)	123 dwellings	62,574	
Existing Multi-Family Homes / Apartments	140 / bedroom	3 properties, 10 bedrooms total	1,400	
Potential New Multi-Family Homes / Apartments	140 / bedroom	1 property, 4 bedrooms total	560	
Huntington Garage	420 / dwelling 15 / employee	1 dwelling 2 employees	450	
Liberty Head Post & Beam	15 / employee	6 employees	90	
Scenario 3 Total Wastewater Flows			**182,995**	

Notes: *Residential flows range from 420 gpd for a single 3-bedroom residence, or by bedrooms up to 4 units, to as low as 245 gpd per residential unit for 20+ units.

**Commercial, multi-use, or institutional properties' design flows are estimated based on current permits or property use.

Source: VT EPRs, Chapter 1, eff. September 29, 2007.

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Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 12: Representative Wastewater Flows, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Current Condition				
Single Family Residences	420 / dwelling (on average)	59 dwellings	29,708	
Multi-Family Homes / Apartments	140 / bedroom	3 properties, 12 bedrooms total	1,680	
Church	15 / employee 5 / seat x 25% No suppers	1-2 employees 100 seats	155	
Town Hall	5 / seat	100 seats	500	
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720	
Town Offices	15 / employee	10 employees	150	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502	
Current Condition Total Wastewater Flows			**36,415**	
Scenario 1: Do Nothing				HC-WW-A
Existing Single Family Residences	420 / dwelling (on average)	59 dwellings	29,708	
Potential New Single Family Residences	420 / dwelling (on average)	108 dwellings	54,381	
Multi-Family Homes / Apartments	140 / bedroom	3 properties, 12 bedrooms total	1,680	
Potential New Multi-Family Homes / Apartments	140 / bedroom	1 property, 4 bedrooms total	560	
Church	15 / employee 5 / seat x 25% No suppers	1-2 employees 100 seats	155	
Town Hall	5 / seat	100 seats	500	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 12: Representative Wastewater Flows, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720	
Town Offices	15 / employee	10 employees	150	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502	
Scenario 1 Total Wastewater Flows			**91,356**	
Scenario 2: Fix Existing Village Problems Only				
Properties within Shared Wastewater Service Area				HC-WW-B.2a, HC-WW-B.2b
Existing Single Family Residences	420 / dwelling current 245 / dwelling shared	27 dwellings	11,970 current 6,615 shared	
Multi-Family Homes / Apartments	140 / bedroom	2 properties, 7 bedrooms total	980	
Church with suppers	15 / employee 5 / seat x 25% 8 / seat for suppers	1-2 employees 100 seats	955	
Town Hall at current design flow	5 / seat	100 seats	500	
Old Fire Station	15 / employee	3 employees	45	
Scenario 2 Total Shared Wastewater Flows			**9,095**	
Properties Outside Shared Wastewater Service Area				HC-WW-B.1
Existing Single Family Residences	420 / dwelling (on average)	32 dwellings	17,738	
Potential New Single Family Residences	420 / dwelling (on average)	95 dwellings	47,835	
Existing Multi-Family Homes / Apartments	140 / bedroom	2 properties, 5 bedrooms total	700	
Potential New Multi-Family Homes / Apartments	140 / bedroom	1 property, 4 bedrooms total	560	

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 12: Representative Wastewater Flows, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Town Garage / Fire Station	5 / person 15 / employee 575 un-allocated	20 persons 3 employees	720	
Town Offices	15 / employee	10 employees	150	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502	
Scenario 2 Total Wastewater Flows			**80,300**	
Scenario 3: Provide for Village Centered Vitality				
Properties within Shared Service Area				HC-WW-C.2a, HC-WW-C.2b
Existing Single Family Residences	420 / dwelling current 245 / dwelling shared	26 dwellings	13,200 current 6,370 shared	
Potential New Single Family Residences	245 / dwelling	26 dwellings	6,370	
Existing Multi-Family Homes / Apartments	140 / bedroom	2 properties, 7 bedrooms total	980	
Potential New Multi-Family Homes / Apartments	140 / bedroom	2 properties, 7 bedrooms total	980	
Church with suppers	15 / employee 5 / seat x 25% 8 / seat for suppers	1-2 employees 100 seats	955	
Town Hall with expanded use	5 / seat 8 / seat for suppers	100 seats	1,300	
Town Garage / Fire Station	5 / person 15 / employee	20 persons 3 employees	145	
Town Offices	15 / employee	10 employees	150	
Old Fire Station	15 / employee	3 employees	45	
Additional, un-allocated wastewater treatment capacity			895	
Scenario 3 Total Shared Wastewater Flows			**18,190**	
Developed Properties Outside Shared Service Area				HC-WW-C.1

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 12: Representative Wastewater Flows, Huntington Center

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Existing Single Family Residences	420 / dwelling (on average)	33 dwellings	13,688	
Potential New Single Family Residences	420 / dwelling (on average)	60 dwellings	25,200	
Multi-Family Homes / Apartments	140 / bedroom	1 property, 5 bedrooms total	700	
Brewster Pierce School	15 / person (approx)	217 students + staff total	3,502	
Scenario 3 Total Wastewater Flows			**61,280**	

Notes: *Residential flows range from 420 gpd for a single 3-bedroom residence, or by bedrooms up to 4 units, to as low as 245 gpd per residential unit for 20+ units.

**Commercial, multi-use, or institutional properties' design flows are estimated based on current permits or property use.

Source: VT EPRs, Chapter 1, eff. September 29, 2007.

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 13: Representative Wastewater Flows, Hanksville

Building Type	Flow Basis (gallons per unit, per day)	Estimated Units	Estimated Design Flows (gallons per day)	Related Alternatives
Current Condition				
Single Family Residences	420 / dwelling (on average)	46 dwellings	22,610	
Multi-Use Residential + Commercial	140 / bedroom	1 property	420	
Current Condition Total Wastewater Flows			**23,030**	
Scenario 1: Do Nothing				HV-WW-A
Existing Single Family Residences	420 / dwelling (on average)	46 dwellings	22,610	
Potential New Single Family Residences	420 / dwelling (on average)	55 dwellings	27,034	
Multi-Use Residential + Commercial	140 / bedroom	1 property	420	
Scenario 1 Total Wastewater Flows			**50,064**	
Scenario 2: Fix Existing Village Problems Only				
Properties within Shared Service Area				HV-WW-B.2
Single Family Residences	420 / dwelling current 257 / dwelling shared	16 dwellings	6,860 current 4,112 shared	
Properties Outside Shared Service Area				HV-WW-B.1
Existing Single Family Residences	420 / dwelling (on average)	30 dwellings	15,750	
Potential New Single Family Residences	420 / dwelling (on average)	50 dwellings	24,576	
Multi-Use Residential + Commercial	140 / bedroom	1 property	420	
Scenario 2 Total Wastewater Flows			**44,858**	

Notes: *Residential flows range from 420 gpd for a single 3-bedroom residence, or by bedrooms up to 4 units, to as low as 245 gpd per residential unit for 20+ units.

**Commercial, multi-use, or institutional properties' design flows are estimated based on current permits or property use.

Source: VT EPRs, Chapter 1, eff. September 29, 2007.

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-LV-1	Lynda Swannie, 680 Mayo Road, 387.0 AC & DWL	n/a	8,000 - 12,000	• 7 ac. suitable soils • No downgradient water supplies	• Privately owned • Watershed of receiving stream is very small (370 ac./0.58 mi^2) • Less suitable soils & steep slopes between stream & site may restrict capacity • Site at higher elevation than connections, pumping required • Ledge removal likely on portion of forcemain route
WW-LV-2	Nellie Jacques, Intersection of Pond, Mayo, Bridge. 57.63 AC & DWL (undeveloped portion)	n/a	11,000 - 16,500	• 4.7 ac. suitable soils • Huntington River likely receiving stream	• Privately owned • If blue-lines in wetland are receiving stream, capacity greatly reduced • 2-3 downgradient water supplies in current condition • Site at higher elevation than connections, pumping required
WW-LV-3	Peter & Carla Purinton, 190 Pond Road, 354 AC & DWL (undeveloped portion)	n/a	70,000 - 105,000	• 11.3 ac. suitable soils • Huntington River likely receiving stream	• Privately owned • 2-3 downgradient water supplies in current condition • Site at higher elevation than connections, pumping required
WW-LV-4	Katherine Barron, 400 Bridge St., 7.4 AC.	n/a	36,000 - 54,300	• 5.1 ac. suitable soils • Huntington River likely receiving stream	• Privately owned • May be slated for development • If stream to south is receiving stream, capacity may be reduced • 1-2 downgradient water supplies in current condition • Site at higher elevation than connections, pumping required

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-LV-5	Gail, Timothy, & Lisa Conley, Main Rd. at 201 Ledge View Dr., 11.23 AC (undeveloped portion)	n/a	8,000 - 12,000	• 2 ac. suitable soils • Huntington River is receiving stream • No downgradient water supplies • Site at slightly lower elevation than connections, gravity collection possible	• Privately owned • Site is adjacent to 100-year floodplain • Bedrock removal necessary if site is utilized for Huntington Acres needs area
WW-LV-6	Town of Huntington, Maplewood Cemetery, 12.5 AC	n/a	n/a - n/a	• Municipally owned • 4.4 ac. suitable soils	• Suitable soils occupied by burial sites
WW-LV-7	Judson J. Connor Trustee, 2160 Main Rd., 11.02 AC & DWL (undeveloped portion)	n/a	13,500 - 20,500	• 3.4 ac. suitable soils • Huntington River is receiving stream	• Privately owned • Many downgradient water supplies in current condition • Located in village core area • Site at higher elevation than connections, pumping required
WW-LV-8	Village Hill, Ltd., 3840 Main Rd., 44 AC	n/a	16,000 - 23,500	• 8.1 ac. suitable soils • Huntington River is receiving stream	• Privately owned • Many downgradient water supplies in current condition • Property is slated for subdivision and development • Site at higher elevation than connections, pumping required

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-LV-9	Kevin & Michelle Jenness, 700 East St., 53.5 AC & DWL (undeveloped portion)	n/a	8,000 - 12,000	• 2.1 ac. suitable soils • No downgradient water supplies	• Privately owned • Site is adjacent to 100-year floodplain • Watershed of receiving stream, Fargo Brook, is relatively small (1,360 ac./2.1 mi^2) • Site at higher elevation than connections, pumping required
WW-LV-10	Britt & Michelle Cummings, 2879 Main Rd., 17.97 AC & DWL (undeveloped portion)	n/a	12,000 - 18,000	• 4.5 ac. suitable soils • Huntington River is receiving stream • No downgradient water supplies • Gravity collection system possible depending on service area	• Privately owned • Portions may be steeply sloping • Construction access challenging • Site is adjacent to 100-year floodplain • River channel in this area is actively migrating
WW-LV-11	Nancy J. Bretschneider, 189 Cummings Dr., 10.2 AC & DWL (undeveloped portion)	n/a	30,000 - 50,000	• 3.6 ac. suitable soils • Huntington River may be receiving stream	• Privately owned • Property may already be subdivided and/or slated for development • Small tributary to Hollow Brook may be receiving stream • 6-12 downgradient water supplies in current condition • Site at higher elevation than connections, pumping required

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-LV-12	Lynne, Timothy, & Anthony Kiorpes, 164 Hinesburg Hollow Rd., 67.4 AC & DWL (undeveloped portion)	n/a	49,000 - 74,000	• 3.2 ac. suitable soils	• Privately owned • Portions of property may be too steep • Hollow Brook or a small tributary may be receiving stream • 2 downgradient water supplies in current condition • Site at similar or higher elevation than connections, pumping required
WW-HC-1	Bruce & Mary Taft, 4345 Main Rd., 117.98 AC & MH & BARNS (undeveloped portion)	n/a	5,400 - 8,100	• 5.8 ac. suitable soils • Huntington River may be receiving stream • Site at slightly lower elevation than connections, gravity collection possible	• Privately owned • Less suitable soils between stream & site may restrict capacity • Also identified as potential drinking water source site • Small tributary to Huntington River may be receiving stream • 1 downgradient water supply in current condition
WW-HC-2	Alan Campbell & Heidi Racht, 4501 Main Rd., 98.5 AC & DWL (undeveloped portion)	n/a	6,300 - 9,500	• 10.6 ac. suitable soils • Huntington River may be receiving stream • Site at slightly lower elevation than connections, gravity collection possible	• Privately owned • Less suitable soils between stream & site may restrict capacity • Small tributary to Huntington River may be receiving stream • 1 downgradient water supply in current condition

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-HC-3	William & Lisanne Hegman, 95 Camels Hump Rd., 10.1 AC & DWL	n/a	3,600 - 5,400	• 4.6 ac. suitable soils • Huntington River or Brush Brook are receiving streams • Site at similar elevation to connections, partial gravity collection possible	• Privately owned • Property has permit to subdivide • Less suitable soils between stream & site may restrict capacity • Site specific testing indicates ESHGW at 5 feet below ground • 2-3 downgradient water supplies in current condition • Likely site capacity less than 6,500 gpd
WW-HC-4	Foundation for Sustainable Future, c/o Melissa Hoffman, 410 Camels Hump Rd., 1296.1 AC DWLS & OUTBLDGS	n/a	8,000 - 12,000	• 10.6 ac. suitable soils north of road, 8.4 ac. south • Brush Brook is receiving stream	• Privately owned • Less suitable soils between stream & site may restrict capacity • 1 downgradient water supply in current condition • Site at similar or higher elevation than connections, pumping required
WW-HC-5	C. Sr. & Timothy Taft, W. + B. + C. Taft, & C. Place, 4905 Main Rd., 5.6 AC & DWL	n/a	3,600 - 5,400	• 3.4 ac. suitable soils • Huntington River or Brush Brook are receiving streams • Previous hydrogeologic study indicated gravel aquifer and surficial sand/gravel aquifer not hydraulically connected	• Privately owned • Less suitable soils between stream & site may restrict capacity • Site located in village core area • 10-12 downgradient water supplies in current condition • Site at similar or higher elevation than connections, pumping required • Likely site capacity less than 6,500 gpd

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-HC-6	Town of Huntington, School Street, 7.5 AC & BREWSTER PIERCE MEMORIAL SCHOOL	3,502	1,300 - 2,000	• Municipally owned • 1.2 ac. suitable soils • Huntington River is the likely receiving stream • Previous hydrogeologic study indicated gravel aquifer and surficial sand/gravel aquifer not hydraulically connected	• Less suitable soils between stream & site may restrict capacity • Site located in village core area • 8-12 downgradient water supplies in current condition • Site at similar or higher elevation than connections, pumping required • Likely site capacity less than 6,500 gpd
WW-HC-7	Town of Huntington, 4930-62 Main Rd., 7.9 AC & TOWN OFF & GAR & FIRE STATION	720	1,400 - 2,100	• Municipally owned • 2 ac. variably suitable soils • Huntington River is the likely receiving stream • No downgradient water supplies • Site at lower elevation than connections, gravity collection possible	• Less suitable soils between stream & site may further restrict capacity • Site is adjacent to 100-year floodplain • Design requires pre-treatment and filtrate leachfield to achieve noted capacity • Likely site capacity less than 6,500 gpd
WW-HC-8	Sowing the Future LLC, 5120 Main Rd., 236.3 AC & SHED (west of Main Rd.)	n/a	1,800 - 2,700	• 2.2 ac. suitable soils • Huntington River is the likely receiving stream • No downgradient water supplies	• Privately owned • Less suitable soils between stream & site may restrict capacity • Site is adjacent to wetland and 100-year floodplain • Site at higher elevation than connections, pumping required • Likely site capacity less than 6,500 gpd

Water and Wastewater Capacity Assessment
Town of Huntington, Vermont
TABLE 14: Summary of Potential Wastewater Dispersal Sites

Area Number	Description	Current Permitted Capacity, gpd	Estimated or Potential Available Capacity, gpd*	Advantages	Disadvantages
WW-HC-9	Florence, & John Miles, 315 Shaker Mtn. Rd., 76.3 AC & DWL & FARM BLDGS (both sides of Main Rd.)	n/a	27,000 - 40,500	• 4.1 ac. suitable soils north of road, 10 ac. south • Huntington River may be the receiving stream • No downgradient water supplies	• Privately owned • Portions may be steeply sloping • Less suitable soils between stream & site may restrict capacity • Carpenter Brook may be receiving stream • Portions of site adjacent to 100-year floodplain • Site at higher elevation than connections, pumping required
WW-HV-1	Joseph & Rosemary King, 7372 Main Rd., 167.6 AC & DWL & MH (southern undeveloped portion)	n/a	3,800 - 5,800	• 1.4 ac. suitable soils • Huntington River is the receiving stream • No downgradient water supplies • Site at lower elevation than connections, gravity collection possible	• Privately owned • Stream crossing necessary near northern end of collection system route • 2 downgradient water supplies in current condition • Likely site capacity less than 6,500 gpd • Ledge removal may be necessary along portions of route

Notes: gpd = gallons per day

STONE ENVIRONMENTAL, INC

Potential available capacity for undeveloped sites is based on Soil Survey soil texture and estimated system length parallel to topography.

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 1, eff. September 29, 2007, and Stone Environmental, Inc. 2012 calculations.

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Date/init: 2/2/2012, anm; rev 5/10/2012

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 15: Summary of Potential Water Supply Alternatives, Lower Village

Scenario	Alternative No.	Water Supply Sources	Water Treatment	Water Distribution Systems	Figure Reference
Current Condition • 252 developed properties • 146,480 gpd	n/a	Existing individual or shared shallow and drilled wells	Existing filters, water softeners, and disinfection systems chosen by property owners	Existing supply lines from wells to structures	Figure 8
Scenario 1: Do Nothing • 1-acre Village zoning remains • Up to 146 complying new residential lots created • 230,217 gpd (average day demand)	LV-W-A	Existing individual shallow wells and existing or new individual or small shared drilled wells	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Existing or new supply lines from wells to structures	Figure 15
Scenario 2: Fix Existing Village Problems Only • 1-acre Village zoning remains • Up to 123 complying new residential lots created outside shared capacity area • Shared water capacity provided only in situations where shared wastewater sites may impact existing water supplies • 217,629 gpd	LV-W-B.1 (Scenario 1 minus shared system lots)	Existing individual shallow wells and existing or new individual or small shared drilled wells	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Existing or new supply lines from wells to structures	---
	LV-W-B.2a	None necessary for Huntington Acres wastewater system.			---
	LV-W-B.2b (Main/Bridge/ East)	New drilled well to gravel aquifer at site W-LV-7	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site	Figure 18
	LV-W-b.2c (Main/Bridge/ East + Bridge/ Hemlock)	New drilled well to bedrock at site 02-061.000	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Shared distribution to all properties in service area from water storage at source site.	Figure 19
	LV-W-B.2d (Bridge/ Hemlock)	New drilled well to bedrock at site 02-061.000	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Shared distribution to all properties in service area from water storage at source site.	Figure 20
	LV-W-B-2e	None necessary for Roberts Park / Riverbank cluster system.			---

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 15: Summary of Potential Water Supply Alternatives, Lower Village

Scenario	Alternative No.	Water Supply Sources	Water Treatment	Water Distribution Systems	Figure Reference
Scenario 3: Provide for Village Centered Vitality • Zoning is modified to accomodate smaller min. lot sizes in core village areas • Shared capacity is provided for all uses to provide up to 200% of the current water demand capacity in wastewater service area • Shared capacity is provided for 100-150% current water demand within water service area but outside ww service area • 221,393 gpd	LV-W-C.1 (outside municipal svc area)	Existing individual shallow wells and existing or new individual or small shared drilled wells	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Existing or new supply lines from wells to structures	---
	LV-W-C.2a (all municipal svc areas)	New drilled well to gravel aquifer at site W-LV-7	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site	Figure 21
	LV-W-C.2b (all municipal svc areas)	New drilled well to gravel aquifer at site W-LV-8 - For Lower Village only	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site	Figure 22
	LV-W-C.2c (all municipal svc areas)	New drilled well to gravel aquifer at site W-LV-8 - FOR HUNTINGTON CENTER AND LOWER VILLAGE	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site.	Figure 23

Notes: gpd = gallons per day

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 21, eff. December 1, 2010, and Stone Environmental, Inc. 2012.

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Date/init: 2/15/2012, anm; rev 6/27/2012

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 16: Summary of Potential Water Supply Alternatives, Huntington Center

Scenario	Alternative No.	Water Supply Sources	Water Treatment	Water Distribution Systems	Figure Reference
Current Condition • 67 developed properties • 37,655 gpd (average day demand)	n/a	Existing individual or shared shallow and drilled wells	Existing filters, water softeners, and disinfection systems chosen by property owners	Existing supply lines from wells to structures	Figure 9
Scenario 1: Do Nothing • 1-acre Village zoning remains • Up to 109 complying new residential lots created • 94,686 gpd (average day demand)	HC-W-A	Existing individual shallow wells and existing or new individual or small shared drilled wells	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Existing or new supply lines from wells to structures	Figure 15
Scenario 2:Fix Existing Village Problems Only • 1-acre Village zoning remains • Up to 95 complying new residential lots created outside shared capacity area • No shared water capacity provided; any new lots connecting to shared wastewater system will need own or small shared water supply • 87,893 gpd (average day demand)	HC-W-B (also see HC-W-A above)	Wastewater sites were utilized that do not require the construction of community water systems for the shared wastewater system sites to be viable. Additionally, in Huntington Center, wastewater capacity appeared to be more of a limiting factor than water supply capacity.			---

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 16: Summary of Potential Water Supply Alternatives, Huntington Center

Scenario	Alternative No.	Water Supply Sources	Water Treatment	Water Distribution Systems	Figure Reference
Scenario 3: Provide For Village Centered Vitality • Zoning is modified to accomodate smaller min. lot sizes in core village areas • Shared capacity is provided for all uses to provide up to 200% current water supply capacity in core areas • Shared water supply systems support density resulting from added wastewater capacity • 78,660 gpd (average day demand)	HC-W-C.1 (outside municipal svc area)	Existing individual shallow wells and existing or new individual or small shared drilled wells	Existing or new filters, water softeners, and disinfection systems chosen by property owners	Existing or new supply lines from wells to structures	---
	HC-W-C.2a (shared system for core area)	New drilled well to gravel aquifer at site W-HC-6	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site.	Figure 24
	HC-W-C.2b (shared system for core area)	New drilled well to gravel aquifer at site W-LV-8 - For Huntington Center only	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site.	Figure 25
	HC-W-C.2c (shared system for core area)	New drilled well to gravel aquifer at site W-LV-8 - For Huntington Center AND LOWER VILLAGE	Shared filter, water softener, and standby disinfection system in control building	Shared distribution to all properties in service area from water storage at source site.	Figure 23

Notes: gpd = gallons per day

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 21, eff. December 1, 2010, and Stone Environmental, Inc. 2012.

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Date/init: 2/15/2012, anm; rev 6/27/2012

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 17: Summary of Potential Wastewater Treatment and Dispersal Alternatives, Lower Village

Scenario	Alternative No.	Treatment System	Collection System	Dispersal	Figure Reference
Current Condition • 252 developed properties • 130,430 gpd	n/a	Existing septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing leachfields	Figure 11
Scenario 1: Do Nothing • 1-acre Village zoning remains • Up to 146 complying new residential lots created • 204,756 gpd	LV-WW-A	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	Figure 14
Scenario 2: Fix Existing Village Problems Only • 1-acre Village zoning remains • Up to 123 complying new residential lots created outside shared capacity area • Shared capacity is provided for four concentrated areas of need at current design flows • Shared water supply systems used strategically to enable use of shared wastewater sites • 167,050 gpd	LV-WW-B.1 (Scenario 1 minus shared system lots)	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	---
	LV-WW-B.2a Huntington Acres	New individual septic tanks at each lot. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-5	Figure 26
	LV-WW-B.2b (Main/Bridge/ East)	New individual septic tanks at each lot. Grease traps at general stores or new food service businesses. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-8	Figure 27
	LV-WW-B.2c (Main/Bridge/ East + Bridge/ Hemlock)	New individual septic tanks at each lot. Grease traps as needed at general stores. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-3	Figure 28
	LV-WW-B.2d (Bridge/ Hemlock)	New individual septic tanks at each lot. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-4	Figure 29

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 17: Summary of Potential Wastewater Treatment and Dispersal Alternatives, Lower Village

Scenario	Alternative No.	Treatment System	Collection System	Dispersal	Figure Reference
	LV-WW-B.2e (Roberts/ Riverbank)	New individual septic tanks at each lot. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-9	Figure 30
Scenario 3: Provide for Village Centered Vitality • Zoning is modified to accomodate smaller min. lot sizes in core village areas • Shared capacity is provided for all uses to provide up to 200% current wastewater capacity in core areas • Shared water supply systems support added wastewater capacity and provide capacity for current needs (e.g., Huntington F.D. No 1) • 182,995 gpd	LV-WW-C.1 (outside service area)	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	---
	LV-WW-C.2a Huntington Acres	Same as LV-WW-B.2a above			Figure 26
	LV-WW-C.2b (Main/Bridge/ East)	New individual septic tanks at each lot. Grease traps as needed at general stores or new food service businesses. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-8	Figure 31
	LV-WW-C.2c (Main/Bridge/ East + Bridge/ Hemlock)	New individual septic tanks at each lot. Grease traps as needed at general stores or new food service businesses. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-3	Figure 32
	LV-WW-C.2d (Bridge/ Hemlock)	New individual septic tanks at each lot. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-LV-4	Figure 33
	LV-WW-C.2e (Roberts/ Riverbank)	Same as LV-WW-B.2e above			Figure 30

Notes: gpd = gallons per day

Potential available capacity for undeveloped sites is based on Soil Survey soil texture and potential land areas summarized in Table 14.

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 1, eff. September 29, 2007, and Stone Environmental, Inc. 2012.

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Date/init: 2/15/2012, anm; rev 6/27/2012

STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 18: Summary of Potential Wastewater Treatment and Dispersal Alternatives, Huntington Center

Scenario	Alternative No.	Treatment System	Collection System	Dispersal	Figure Reference
Current Condition • 67 developed properties • 36,415 gpd	n/a	Existing septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing leachfields	Figure 12
Scenario 1: Do Nothing • 1-acre Village zoning remains • Up to 109 complying new residential lots created • 91,356 gpd	HC-WW-A	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	Figure 16
Scenario 2: Fix Existing Village Problems Only • 1-acre Village zoning remains • Up to 95 complying new residential lots created outside shared capacity area • Shared capacity is provided for 27 residences along Main Road, plus two multi-family residences; Town Hall, Offices, Fire Dept., and Garage; and the Church with suppers • 80,300 gpd	HC-WW-B.1 (Scenario 1 minus shared system lots)	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	---
	HC-WW-B.2a (shared system for Main Rd limited lots)	New individual septic tanks at each lot; grease trap at Church. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-HC-3 and WW-HC-4 north	Figure 34
	HC-WW-B.2b (shared system for Main Rd limited lots)	New individual septic tanks at each lot; grease trap at Church. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-HC-2	Figure 35

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 18: Summary of Potential Wastewater Treatment and Dispersal Alternatives, Huntington Center

Scenario	Alternative No.	Treatment System	Collection System	Dispersal	Figure Reference
Scenario 3: Provide for Village Centered Vitality • Zoning is modified to accomodate smaller min. lot sizes in core village areas • Shared capacity is provided for all uses to provide up to 200% of current wastewater capacity in core areas • Shared water supply systems support added wastewater capacity • 61,280 gpd	HC-WW-C.1 (outside municipal svc area)	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	---
	HC-WW-C.2a (shared system for core area)	New individual septic tanks at each lot; grease trap at Church. Shared dosing tanks at dispersal sites.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-HC-3 and WW-HC-4 north	Figure 36
	HC-WW-C.2b (shared system for core area)	New individual septic tanks at each lot; grease trap at Church. Shared dosing tank at dispersal site.	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-HC-9 north and south	Figure 37

Notes: gpd = gallons per day

STONE ENVIRONMENTAL, INC

Potential available capacity for undeveloped sites is based on Soil Survey soil texture and potential land areas summarized in Table 14.

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 1, eff. September 29, 2007, and Stone Environmental, Inc. 2012.

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Date/init: 2/15/2012, anm; rev 6/27/2012

Water and Wastewater Capacity Assessments
Town of Huntington, Vermont
TABLE 19: Summary of Potential Wastewater Treatment and Dispersal Alternatives, Hanksville

Scenario	Alternative No.	Treatment System	Collection System	Dispersal	Figure Reference
Current Condition 47 developed properties 23,030 gpd	n/a	Existing septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing leachfields	Figure 13
Scenario 1: Do Nothing • 1-acre Village zoning remains • Up to 55 complying new residential lots created • 50,064 gpd	HV-WW-A	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	Figure 17
Scenario 2: Fix Existing Village Problems Only • 1-acre Village zoning remains • Up to 50 complying new residential lots created outside shared capacity area • Shared capacity is provided for 16 residences along Main Road • 44,858 gpd	HV-WW-B.1 (Scenario 1 minus capacity-limited lots on Main)	Existing or new septic tanks	Gravity or low-pressure pipe for septic tank effluent	Existing or new leachfields on individual properties to serve single family homes	---
	HV-WW-B.2 (shared system for Main Rd limited lots)	New individual septic tanks and shared dosing tank	Gravity or low-pressure pipe for septic tank effluent	New in-ground leachfield at Area WW-HV-1	Figure 38

Notes: gpd = gallons per day

Potential available capacity for undeveloped sites is based on Soil Survey soil texture and potential land areas summarized in Table 14.

No site confirmation testing or site-specific capacity analysis was performed during this study.

Source: VT EPRs, Chapter 1, eff. September 29, 2007, and Stone Environmental, Inc. 2012.

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STONE ENVIRONMENTAL, INC

Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 20: Preliminary Estimate of Total Water Project Costs, Lower Village

Description	Estimated gallons per day[1]	**Total Construction Costs (incl. 15% contingency)[2]**	Engineering, Permitting, and Legal Services[3]	Land Acquisition and Easements[5]	**Total Project Costs[6]**
Alternative LV-W-A	230,217	$2,675,000	$597,000	$0	$3,272,000
Alternative LV-W-B.1	198,549	$2,182,000	$510,000	$0	$2,692,000
Alternative LV-W-B.2a	n/a	n/a	n/a	n/a	n/a
Alternatives LV-W-B.2b & LV-W-B.2d	24,060	$1,777,586	$477,825	$90,000	$2,346,000
Alternative LV-W-B.2c	2,700	$349,213	$113,764	$30,000	$493,000
Alternative LV-W-B.2e	n/a	n/a	n/a	n/a	n/a
Alternative LV-W-C.1	104,053	$1,078,000	$219,000	$0	$1,297,000
Alternative LV-W-C.2a	117,340	$4,021,300	$1,228,890	$75,000	$5,325,000
Alternative LV-W-C.2b	117,340	$4,100,900	$1,230,270	$75,000	$5,407,000
Alternative LV-W-C.2c	149,430	$5,455,638	$1,659,191	$75,000	$7,190,000[7]

Notes: STONE ENVIRONMENTAL, INC

[1] Based on existing needs and conditions (see Table 8), and on projected development illustrated in no-action buildout scenario.
Each user in no-action scenario and for properties outside municipal service areas is assumed to have an average water demand of 450 gpd.
Municipal alternatives assume that full design capacity is connected at startup.

[2] Assumes 15% for unforeseen items/construction change orders, where applicable.

[3] For no-action areas, estimated at $1,500 per well. For municipal service areas, estimated as 30% of total construction cost before contingency applied.

[5] Allowance for land purchase or easement for water source and treatment/storage works, pumping stations, etc. where applicable.

[6] All total costs are rounded to the nearest thousand dollars.

[7] This option includes project costs for an alternative that also distributes community water to Huntington Center.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 21: Preliminary Estimate of Total Water Project Costs, Huntington Center

Description	Estimated gallons per day[1]	**Total Construction Costs (incl. 15% contingency)[2]**	Engineering, Permitting, and Legal Services[3]	Land Acquisition and Easements[5]	**Total Project Costs[6]**
Alternative HC-W-A	94,686	$974,000	$264,000	$0	$1,238,000
Alternative HC-W-B	87,893	$880,500	$244,500	$0	$1,125,000
Alternative HC-W-C.1	46,570	$391,000	$111,000	$0	$502,000
Alternative HC-W-C.2a	32,090	$1,451,338	$457,901	$75,000	$1,984,000
Alternative HC-W-C.2b	32,090	$2,045,600	$636,180	$75,000	$2,757,000
Alternative HC-W-C.2c	149,430	$5,455,638	$1,659,191	$75,000	$7,190,000[7]

Notes: STONE ENVIRONMENTAL, INC

[1] Based on existing needs and conditions (see Table 9), and on projected development illustrated in no-action buildout scenario.
Each user in no-action scenario and for properties outside municipal service areas is assumed to have an average water demand of 450 gpd.
Municipal alternatives assume that full design capacity is connected at startup.

[2] Assumes 15% for unforeseen items/construction change orders, where applicable.

[3] For no-action areas, estimated at $1,500 per well. For municipal service areas, estimated as 30% of total construction cost before contingency applied.

[5] Allowance for land purchase or easement for water source and treatment/storage works, pumping stations, etc. where applicable.

[6] All total project costs are rounded to the nearest thousand dollars.

[7] This option includes project costs for an alternative that also distributes community water to the Lower Village.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 22: Preliminary Estimate of Total Wastewater Project Costs, Lower Village

Description	Estimated gallons per day[1]	**Total Construction Costs (incl. 15% contingency)[2]**	Engineering, Permitting, and Legal Services[3]	Land Acquisition and Easements[5]	**Total Project Costs[6]**
Alternative LV-WW-A	204,756	$4,520,500	$848,500	$0	$5,369,000
Alternative LV-WW-B.1	140,366	$3,582,750	$673,750	$0	$4,257,000
Alternative LV-WW-B.2a	4,369	$954,470	$295,341	$30,000	$1,280,000
Alternatives LV-W-B.2b & LV-W-B.2d	15,945	$2,093,853	$691,156	$210,000	$2,995,000
Alternative LV-WW-B.2c	15,945	$2,137,377	$695,213	$180,000	$3,013,000
Alternative LV-WW-B.2e	6,370	$1,031,730	$327,519	$60,000	$1,419,000
Alternative LV-WW-C.1	123,146	$3,182,750	$593,750	$0	$3,777,000
Alternative LV-WW-C.2a	4,369	$954,470	$295,341	$30,000	$1,280,000
Alternatives LV-WW-C.2b & LV-WW-C.2d	31,890	$2,951,137	$1,011,341	$420,000	$4,383,000
Alternative LV-WW-C.2c	31,890	$2,667,976	$908,393	$360,000	$3,936,000
Alternative LV-WW-C.2e	6,370	$1,031,730	$327,519	$60,000	$1,419,000

Notes: STONE ENVIRONMENTAL, INC

[1] Based on existing needs and conditions (see Table 11), and on projected development illustrated in no-action buildout scenario.

Each user in no-action scenario and for properties outside municipal service areas is assumed to have an average deisgn flow of 420 gpd.

Municipal alternatives assume that full design capacity is connected at startup.

[2] Assumes 15% for unforeseen items/construction change orders, where applicable.

[3] For no-action areas, estimated at $2,000-$2,500 per system. For municipal service areas, estimated as 30% of total construction cost before contingency.

[5] Allowance for land purchase or easement for pump stations, treatment units, dispersal systems, etc. where applicable.

[6] All total project costs are rounded to the nearest thousand dollars.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 23: Preliminary Estimate of Total Wastewater Project Costs, Huntington Center

Description	Estimated gallons per day[1]	**Total Construction Costs (incl. 15% contingency)[2]**	Engineering, Permitting, and Legal Services[3]	Land Acquisition and Easements[5]	**Total Project Costs[6]**
Alternative HC-WW-A	91,356	$2,041,750	$376,750	$0	$2,419,000
Alternative HC-WW-B.1	71,205	$1,621,750	$292,750	$0	$1,915,000
Alternative HC-WW-B.2a	9,095	$1,132,074	$375,622	$120,000	$1,628,000
Alternative HC-WW-B.2b	9,095	$1,216,312	$400,893	$120,000	$1,737,000
Alternative HC-WW-C.1	43,090	$931,000	$165,000	$0	$1,096,000
Alternative HC-WW-C.2a	18,190	$2,049,846	$686,954	$240,000	$2,977,000
Alternative HC-WW-C.2b	18,190	$2,359,483	$779,845	$240,000	$3,379,000

Notes: STONE ENVIRONMENTAL, INC

[1] Based on existing needs and conditions (see Table 12), and on projected development illustrated in no-action buildout scenario.

Each user in no-action scenario and for properties outside municipal service areas is assumed to have an average design flow of 420 gpd.

Municipal alternatives assume that full design capacity is connected at startup.

[2] Assumes 15% for unforeseen items/construction change orders, where applicable.

[3] For no-action areas, estimated at $2,000-$2,500 per system. For municipal service areas, estimated as 30% of total construction cost before contingency.

[5] Allowance for land purchase or easement for pump stations, treatment units, dispersal systems, etc. where applicable.

[6] All total project costs are rounded to the nearest thousand dollars.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 24: Preliminary Estimate of Total Wastewater Project Costs, Hanksville

Description	Estimated gallons per day[1]	**Total Construction Costs (incl. 15% contingency)[2]**	Engineering, Permitting, and Legal Services[3]	Land Acquisition and Easements[5]	**Total Project Costs[6]**
Alternative HV-WW-A	50,064	$1,209,750	$180,750	$0	$1,391,000
Alternative HV-WW-B.1	40,746	$999,750	$180,750	$0	$1,181,000
Alternative HV-WW-B.2	4,112	$1,177,777	$371,333	$60,000	$1,609,000

Notes: STONE ENVIRONMENTAL, INC

[1] Based on existing needs and conditions (see Table 13), and on projected development illustrated in no-action buildout scenario.

Each user in no-action scenario and for properties outside municipal service areas is assumed to have an average design flow of 420 gpd.

Municipal alternatives assume that full design capacity is connected at startup.

[2] Assumes 15% for unforeseen items/construction change orders, where applicable.

[3] For no-action areas, estimated at $2,000-$2,500 per system. For municipal service areas, estimated as 30% of total construction cost before contingency.

[5] Allowance for land purchase or easement for pump stations, treatment units, dispersal systems, etc. where applicable.

[6] All total project costs are rounded to the nearest thousand dollars.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 25: Summary of Project Costs, Lower Village

	Water Project Costs (Table 20)		Wastewater Project Costs (Table 22)		
Description	**Outside service areas (B.1 and C.1 alternatives)**	**Inside municipal service areas**	**Outside service areas (B.1 and C.1 alternatives)**	**Inside municipal service areas**	**Total Project Costs**
Scenario 1: Do Nothing					
Alternative LV-A	$3,272,000	$0	$5,369,000	$0	$8,641,000
Scenario 2: Fix Existing Village Problems Only					
Alternatives LV-B.2a, 2b&d, 2e	$2,692,000	$2,346,000	$3,777,000	$5,694,000	$14,509,000
Alternatives LV-B.2a, 2c, 2e	$3,221,000	$493,000	$3,777,000	$5,712,000	$13,203,000
Alternatives LV-B.2b&d only	$2,692,000	$2,346,000	$4,257,000	$2,995,000	$12,290,000
Alternative LV-B-2c only	$3,221,000	$493,000	$4,257,000	$3,013,000	$10,984,000
Scenario 3: Provide for Village Centered Vitality (Water alternative LV-W-C.2a)					
Alternatives LV-WW-C.2a, 2b&d, 2e	$1,297,000	$5,325,000	$3,297,000	$7,082,000	$17,001,000
Alternatives LV-WW-C.2a, 2c, 2e	$1,297,000	$5,325,000	$3,297,000	$6,635,000	$16,554,000
Alternatives LV-WW-C.2b&d only	$1,297,000	$5,325,000	$3,777,000	$4,383,000	$14,782,000
Alternative LV-WW-C.2c only	$1,297,000	$5,325,000	$3,777,000	$3,936,000	$14,335,000
Scenario 3: Provide for Village Centered Vitality (Water alternative LV-W-C.2b)					
Alternatives LV-WW-C.2a, 2b&d, 2e	$1,297,000	$5,407,000	$3,297,000	$7,082,000	$17,083,000
Alternatives LV-WW-C.2a, 2c, 2e	$1,297,000	$5,407,000	$3,297,000	$6,635,000	$16,636,000
Alternatives LV-WW-C.2b&d only	$1,297,000	$5,407,000	$3,777,000	$4,383,000	$14,864,000
Alternative LV-WW-C.2c only	$1,297,000	$5,407,000	$3,777,000	$3,936,000	$14,417,000
Scenario 3: Provide for Village Centered Vitality (Water alternative LV-W-C.2c)*					
Alternatives LV-WW-C.2a, 2b&d, 2e	$1,297,000	$7,190,0007	$3,297,000	$7,082,000	$11,676,000
Alternatives LV-WW-C.2a, 2c, 2e	$1,297,000	$7,190,0007	$3,297,000	$6,635,000	$11,229,000
Alternatives LV-WW-C.2b&d only	$1,297,000	$7,190,0007	$3,777,000	$4,383,000	$9,457,000
Alternative LV-WW-C.2c only	$1,297,000	$7,190,0007	$3,777,000	$3,936,000	$9,010,000

Notes:

STONE ENVIRONMENTAL, INC

Total project costs in this table are drawn from Tables 20 and 22, and are only summarized here.

"Outside service areas" means that these costs are associated with construction or replacement of privately owned systems on individual properties.

"Inside service areas" means that these costs are associated with municipally owned, shared systems.

* This water alternative provides community water to both the Lower Village and Huntington Center.

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Water and Wastewater Capacity Assessment for Huntington's Villages
Town of Huntington, Vermont
TABLE 26: Summary of Project Costs, Huntington Center

	Water Project Costs (Table 21)		Wastewater Project Costs (Table 23)		
Description	**Outside service areas (B.1 and C.1 alternatives)**	**Inside service areas**	**Outside service areas (B.1 and C.1 alternatives)**	**Inside service areas**	**Total Project Costs**
Scenario 1: Do Nothing					
Alternative HC-A	$1,238,000	$0	$2,419,000	$0	$3,657,000
Scenario 2: Fix Existing Village Problems Only					
Alternative HC-WW-B.2a	$1,125,000	$0	$1,915,000	$1,628,000	$4,668,000
Alternative HC-WW-B.2b	$1,125,000	$0	$1,915,000	$1,737,000	$4,777,000
Scenario 3: Provide for Village Centered Vitality (Water alternative HC-W-C.2a)					
Alternative HC-WW-C.2a	$502,000	$1,984,000	$1,096,000	$2,977,000	$6,559,000
Alternative HC-WW-C.2b	$502,000	$1,984,000	$1,096,000	$3,379,000	$6,961,000
Scenario 3: Provide for Village Centered Vitality (Water alternative HC-W-C.2b)					
Alternative HC-WW-C.2a	$502,000	$2,757,000	$1,096,000	$2,977,000	$7,332,000
Alternative HC-WW-C.2b	$502,000	$2,757,000	$1,096,000	$3,379,000	$7,734,000
Scenario 3: Provide for Village Centered Vitality (Water alternative HC-W-C.2c)*					
Alternative HC-WW-C.2a	$502,000	$7,190,000	$1,096,000	$2,977,000	$11,765,000
Alternative HC-WW-C.2b	$502,000	$7,190,000	$1,096,000	$3,379,000	$12,167,000

Notes:

STONE ENVIRONMENTAL, INC

Total project costs in this table are drawn from Tables 21 and 23, and are only summarized here.

* This water alternative provides community water to both the Lower Village and Huntington Center.

"Outside service areas" means that these costs are associated with construction or replacement of privately owned systems on individual properties.

"Inside service areas" means that these costs are associated with municipally owned, shared systems.

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Water and Wastewater Capacity Evaluation
Town of Huntington, Vermont
TABLE 27: Evaluation of Alternatives, Lower Village

Criteria	No Action Scenario	"Fix Problems" Build-Out Scenario			"Village Vitality" Build-Out Scenario		
		Village Core, Huntington River Crossing	Village Core, No River Crossing	Village Core Plus Other Needs Areas	Village Core, Huntington River Crossing	Village Core, No River Crossing	Village Core Plus Other Needs Areas
Construction Costs/Funding	• Moderate cost alternative • Individual owners solely responsible for costs / financing	• Lower cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Higher cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Higher cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Lower cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Higher cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Highest cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered
Operation/ Maintenance Costs	• Variable, depending on individual owners' systems and preferences	• Lower for small shared water system • Higher for wastewater (operating contract, system and down-gradient water quality monitoring, annual engineering inspection, electric use for pumps, septic tank pump-outs)	• Higher for water system (part-time operator, water testing, reporting) • Lower for wastewater (annual pump check and engineering inspection, electric use for pumps, septic tank pump-outs)	• Lower for small shared water system • Higher for wastewater (operating contract etc. for village core; annual engineering inspection, electric use for pumps, septic tank pump-outs for smaller outlying systems)	• Higher for water system (part-time operator, water testing, reporting) • High for wastewater (operating contract, system and down-gradient water quality monitoring, annual engineering inspection, electric use for pumps, septic tank pump-outs)	• Higher for water system (part-time operator, water testing, reporting) • High for wastewater (operating contract, system and down-gradient water quality monitoring, annual engineering inspection, electric use for pumps, septic tank pump-outs)	• Higher for water system (part-time operator, water testing, reporting) • Highest for wastewater (operating contract etc. for village core; annual engineering inspection, electric use for pumps, septic tank pump-outs for smaller outlying systems)
Implementation/ Feasibility	• Simple project implementation – continues current practice	• Requires negotiation with private property owners for single water source and wastewater dispersal sites	• Requires negotiation with private property owners for multiple water source and wastewater sites	• Requires negotiation with private property owners for one water source and several wastewater sites	• Requires negotiation with private property owners for single water source and wastewater dispersal sites	• Requires negotiation with private property owners for water source and two wastewater sites	• Requires negotiation with private property owners for one water source and 3-4 wastewater sites
Administrative Issues	• State and/or local permits required	• Site specific Indirect Discharge permit required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System permit required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Site specific Indirect Discharge permit required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal
Public Acceptability	• Generally acceptable • Continues current practice	• Municipally funded solution for only core properties may meet resistance	• Municipally funded solution for only core properties may meet resistance	• Generally acceptable	• Generally acceptable	• Generally acceptable	• Generally acceptable
Complexity	• Low complexity	• Simple water system • Moderately complex wastewater system (pressure collection and multiple pumps)	• Moderately complex water and wastewater systems	• Simple water system • Moderately complex wastewater system (pressure collection and multiple pumps)	• Moderately complex water and wastewater systems	• Moderately complex water and wastewater systems	• Moderately complex water and wastewater systems
Adaptability to future growth	• Capacity for growth entirely outside village core	• Focus on existing flows with little growth potential in core	• Focus on existing flows with little growth potential in core	• Focus on existing flows with little growth potential in core	• Fosters and focuses future growth within core	• Fosters and focuses future growth within core	• Fosters and focuses future growth within core
Effects on environmentally sensitive areas	• Project area/ impact limited to individual replacements	• Smaller project area/ impact	• Smaller project area/ impact • No River crossing increases flood resilience	• Larger project area/ impact	• Larger project area/ impact	• Larger project area/ impact • No River crossing increases flood resilience	• Largest project area/ impact
Reliability, redundancy	• Proven water supply and wastewater systems • Pumps require maintenance	• Proven technologies • Passive wastewater treatment • Pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure
Evaluation Results (within each scenario)	**Less Favorable**	**More Favorable**	**Less Favorable**	**Less Favorable**	**More Favorable**	**Less Favorable**	**Less Favorable**

Source: Stone Environmental, May 2012.
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Date/Init: 5/9/2012, anm; rev 6/28/2012

Water and Wastewater Capacity Evaluation
Town of Huntington, Vermont
TABLE 28: Evaluation of Alternatives, Huntington Center

		"Fix Problems" Build-Out Scenario		**"Village Vitality" Build-Out Scenario**		**"Village Vitality" Build-Out Scenario**
Criteria	**No Action Scenario**	**HC-WW-B.2a**	**HC-WW-B.2b**	**HC-W-C.2a + HC-WW-C.2a**	**HC-W-C.2b + HC-WW-C.2b**	**Combined Water System for Both Villages and Village-Specific Wastewater**
Construction Costs/Funding	• Moderate cost alternative • Individual owners solely responsible for costs / financing	• Lower cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Higher cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Lower cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Higher cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered	• Highest cost alternative • Potential to fund with VT DEC SRF or USDA-RD loan • Potential for VT DEC grant if failing septic systems discovered
Operation/ Maintenance Costs	• Variable, depending on individual owners' systems and preferences	• Lower (annual pump check and engineering inspection, electric use for pumps, septic tank pump-outs)	• Lower (annual pump check and engineering inspection, electric use for pumps, septic tank pump-outs)	• Low for small shared water system • High for wastewater (operating contract, system and down-gradient water quality monitoring, annual engineering inspection, electric use for pumps, septic tank pump-outs)	• High for water system (part-time operator, water testing, reporting) • Lower for wastewater (annual pump check and engineering inspection, electric use for pumps, septic tank pump-outs)	• Higher for water system (part-time operator, water testing, reporting) • Highest for wastewater (operating contract etc. for village core; annual engineering inspection, electric use for pumps, septic tank pump-outs for smaller outlying systems)
Implementation/ Feasibility	• Simple project implementation – continues current practice	• Requires negotiation with private property owners for wastewater dispersal sites	• Requires negotiation with private property owners for wastewater dispersal sites	• Requires negotiation with private property owners for water source and wastewater dispersal sites	• Requires negotiation with private property owners for water source and wastewater sites	• Requires negotiation with private property owners for one water source and 3-4 wastewater sites
Administrative Issues	• State and/or local permits required	• General Indirect Discharge permit required • Requires management district • Access easement or property purchase required for access to septic tanks, wastewater dispersal	• General Indirect Discharge permit required • Requires management district • Access easement or property purchase required for access to septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal	• Public Community Water System and Site specific Indirect Discharge permits required • Requires management district • Access easement or property purchase required for access to water source, septic tanks, wastewater dispersal
Public Acceptability	• Generally acceptable • Continues current practice	• Municipally funded solution for selected core properties may meet resistance	• Municipally funded solution for selected core properties may meet resistance	• Generally acceptable	• Generally acceptable	• Generally acceptable
Complexity	• Low complexity	• No community water system • Moderately complex wastewater system (pressure collection and multiple pumps)	• No community water system • Moderately complex wastewater system (pressure collection and multiple pumps)	• Moderately complex water and wastewater systems	• Moderately complex water and wastewater systems	• Moderately complex water and wastewater systems
Adaptability to future growth	• Capacity for growth entirely outside village core	• Focus on existing flows with little growth potential in core	• Focus on existing flows with little growth potential in core	• Fosters and focuses future growth within core	• Fosters and focuses future growth within core	• Fosters and focuses future growth within both Village core areas
Effects on environmentally sensitive areas	• Project area/ impact limited to individual replacements	• Smaller project area/ impact	• Smaller project area/ impact	• Larger project area/ impact, esp. for water system	• Larger project area/ impact, esp. for water system	• Largest project area/ impact
Reliability, redundancy	• Proven water supply and wastewater systems • Pumps require maintenance	• Proven technologies • Passive wastewater treatment • Pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure	• Proven technologies • Passive wastewater treatment • Water treatment systems, pumps, etc. require monitoring and maintenance • Requires management to maintain public infrastructure
Evaluation Results (within each scenario)	**Less Favorable**	**More Favorable**	**Less Favorable**	**More Favorable**	**Less Favorable**	**More Favorable**

Source: Stone Environmental, May 2012.
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