

Draft 1- ENERGY

Enhanced Energy Plan

The intent of this section is to meet the municipal determination standards for enhanced energy planning enabled in 24 V.S.A. 4352. The purpose of enhanced energy planning is to further local, regional, and state energy goals, including the goal of having 90% of energy used in Vermont come from renewable sources by 2050 (90 x 50 goal), and the following:

- A. *Vermont's greenhouse gas reduction goals under 10 V.S.A. § 578(a);*
- B. *Vermont's 25 by 25 goal for renewable energy under 10 V.S.A. § 580;*
- C. *Vermont's building efficiency goals under 10 V.S.A. § 581;*
- D. *State energy policy under 30 V.S.A. § 202a and the recommendations for regional and municipal energy planning pertaining to the efficient use of energy and the siting and development of renewable energy resources contained in the State energy plans adopted pursuant to 30 V.S.A. §§ 202 and 202b (State energy plans); and*
- E. *The distributed renewable generation and energy transformation categories of resources to meet the requirements of the Renewable Energy Standard under 30 V.S.A. §§ 8004 and 8005.*

A positive determination of compliance with the requirements of enhanced energy planning, as provided by the Regional Planning Commission, will enable South Hero to achieve “substantial deference” instead of “due consideration” in Certificate of Public Good (CPG) proceedings for energy generation facilities (ex. wind facilities, solar facilities, hydro facilities, etc.) under Criteria (b)(1)-Orderly Development. In short, this means that South Hero will have a greater “say” in CPG proceedings before the Vermont Public Utility Commission about where these facilities should or should not be located in the community.

To receive a positive determination of energy compliance, an enhanced energy plan must be duly adopted, regionally approved, and contain the following information:

- A. An analysis of current energy resources, needs, scarcities, costs, and problems.
- B. Targets for future energy use and generation.
- C. “Pathways,” or implementation actions, to help the municipality achieve the established targets.
- D. Mapping to help guide the conversation about the siting of renewables.

Energy Resources, Needs, Scarcities, Costs and Problems

The following subsection reviews each sector of energy use (thermal, transportation, electricity) and electricity generation in South Hero. Several different units of measurement are used in this section. Please refer to Table 7.13 for more information about unit conversions.

Thermal Energy

Table 7.1 shows an estimate of current residential thermal energy demand in South Hero, based on data from the American Community Survey (ACS 2016-2021). The data shows that 43% of households in South Hero depend on fuel oil as their primary source for home heating. This is followed by propane (29.1%) and wood (16.8%). Wood includes both cord wood and wood pellets. The nearest natural gas pipeline is located in Milton and is not likely to be extended to South Hero in the future. The ACS data showing households in South Hero using natural gas for heating is an error. Data from Efficiency Vermont shows that South Hero residents are adopting heat pumps at a higher than average rate,

despite consisting of only 3% of the population of Grand Isle and Franklin Counties nearly 7% of reported heat pump installations in the region occurred in South Hero.

Fuel Source	South Hero Households (ACS 2016-2021)	South Hero % of Households	South Hero - Households Square Footage Heated	Municipal Thermal Energy Use in British Thermal Units (BTUs) BTU (in Billions)
Natural Gas	3	0.5%	6,480	0
Propane	161	29.1%	33,2080	20
Electricity	22	4.0%	33,800	2
Fuel Oil	238	43.0%	469,000	28
Coal	0	0.0%	0	0
Wood	93	16.8%	193,040	12
Solar	2	0.4%	4,320	0
Other	31	5.6%	66,960	4
No Fuel	3	0.5%	6,480	0
Total	553	100.0%	1,112,160	67

Estimates for commercial and industrial thermal energy use are more difficult to calculate due to the lack of accurate information available. Table 7.2 provides an estimate of total commercial energy use (thermal and electricity). The estimate is based on data from the Vermont Department of Labor (VT DOL) and the Vermont Department of Public Service (VT DPS). According to NRPC, it is assumed that the majority of this energy use, 50 billion BTUs per year, is used as thermal energy for commercial uses.

	Commercial Establishments in South Hero (VT DOL)	Estimated Thermal Energy BTUs per Commercial Establishment/year (in Billions) (VT DPS)	Estimated Thermal Energy BTUs by Commercial Establishments in South Hero/year (in Billions)
Municipal Commercial Energy Use	73	0.725	50

Electricity Use

Table 7.3 shows 2021 electricity use in South Hero per date available from Efficiency Vermont. South Hero’s total electricity use has increased since 2015 from 10.5 million kWh in 2015 to about 11.6 million kWh per year in 2021. According to Efficiency Vermont, the average residential usage per household has increased from 6,450 kWh per year to 7,309 kWh per year between 2015 and 2021. During the same period, overall commercial and industrial electricity usage decreased from 3.8 million kWh to 3.5 million kWh. South Hero’s average residential usage in 2021 was about 300 kWh lower than the average residential kWh use in the region (but this may be due in part to the high number of seasonal homes in

South Hero). Increases in electrical energy usage may be partially related to increases in use of electricity for heating and transportation, as data from Efficiency Vermont shows that more South Hero residents are adopting electric vehicles and heat pumps.

South Hero is served by one electric utility: Vermont Electric Cooperative.

Use Sector	Current Electricity Use in South Hero – 2021 (Efficiency Vermont) (kWh)	Current Electricity Use (in Billion BTUs)
Residential	8,090,868	27.6
Commercial and Industrial	3,532,267	12.1
Total	11,623,135	39.7

Transportation Data	Municipal Data
Total # of Passenger Vehicles (ACS 2016-2021)	1,098
Average Miles per Vehicle (VTrans- 2019)	11,772
Total Miles Traveled	12,925,656
Realized MPG (2013 - VTrans 2015 Energy Profile)	23.4
Total Gallons Use per Year	552,378
Transportation BTUs (Billion)	67
Average Cost per Gallon of Gasoline in 2021 (NRPC)	3.50
Gasoline Cost per Year	1,933,324

Transportation

Table 7.4 contains an estimate of transportation energy use in South Hero. NRPC estimates that South Hero residents drive personal vehicles approximately 12.925 million miles per year and spend about \$2 million on transportation fuel expenses per year. This calculation does not include expenses for commercially owned and operated vehicles.

As of 2021, there were 37 electric and hybrid vehicle registrations in South Hero according to the Vermont Department of Motor Vehicles.

Electricity Generation

There is currently .4 MW of electricity generation capacity from renewable generation facilities located in South Hero. This capacity results in approximately 812.39 MWh of electricity generation per year. All of this generation is from net-metering solar facilities located in South Hero. The amount of electricity generation in South Hero is roughly equal to the annual

electricity use of about 121 households in Vermont based on information available from the U.S. Energy Information Administration (6696 kWh per VT household per year).

Table 7.5 organizes information about existing generation in South Hero by type of facility. Map 7.4 shows the location of all electricity generators in South Hero with a capacity greater than 15 kW. A full list of electricity generators in South Hero can be found at the end of this section (Table 7.12).

South Hero has good access to electric transmission and three-phase distribution lines. These types of lines are used to transmit large quantities of electricity and are needed to serve large industrial users and commercial centers. The ease of access to this type of infrastructure in South Hero may make development of renewable energy facilities easier and more cost-effective than in other surrounding

communities with more existing grid infrastructure.

Map 7.2 shows the electricity transmission and three-phase distribution infrastructure in South Hero. The map shows a three-phase distribution line in the town along VT Route 314, US Route 2, and South Road. There is also a transmission line that carries electric from New York State to Milton, VT via South Hero. Access to renewable generation resources, such as solar and wind, will be addressed below in the mapping section.

Table 7.5 – Existing Renewable Electricity Generation		
Generation Type	MW	MWh
Solar	0.65	797.17
Wind	0.01	15.33
Hydro	0.00	0.00
Biomass	0.00	0.00
Other	0.00	0.00
Total Existing Generation	0.40	812.49

While not included in the targets for energy use and generation, another potential source of energy in South Hero are anaerobic biodigesters. Biodigesters capture methane from manure or food waste and convert it into a renewable gas which either can be used in natural gas pipelines or transformed into electrical energy on-site through use of a generator. Anaerobic biodigesters can have beneficial climate impacts as they reduce methane emissions and can offset use of traditional natural gas. Biodigesters can also provide an important source of income for farmers. A major barrier to the expansion of biodigesters is that many small farms do not generate enough manure to make the biodigester profitable.

Equity And Affordability

Reaching South Hero’s energy goals will bring both environmental and economic costs and benefits. The equity issues related to who will bear those costs is of continuing concern to South Hero. A just energy transition requires that all residents have equitable access to the benefits and costs of the energy transition. The efficiency of green technologies offers savings for consumers as seen with electric vehicles, electric heat pumps, newer appliances, residential solar, etc. These technologies often require upfront investment, making them more difficult to access for residents with lower income. Low-income workers in Vermont also tend to work in industries that are more susceptible to the effects of climate change such as tourism and agriculture and are often disproportionately impacted by natural disasters like flooding. Equity for all residents will be considered in every decision about energy.

Targets for Use and Generation

The second required element of an enhanced energy plan is creation of targets for future energy use. Northwest Regional Planning Commission worked with the Vermont Energy Investment Corporation (VEIC) and the Vermont Department of Public Service in 2016 to develop regional targets for future energy use and renewable electricity generation to meet the State of Vermont’s 90 x 50 goal. The targets represent only one scenario that would meet this goal. There may be many different ways that would also enable Vermont to achieve the 90 x 50 goal. For more information about the regional targets, please see the Northwest Regional Energy Plan (www.nrpcvt.com).

Regional targets for energy use and renewable electricity generation were disaggregated to create municipal targets. These municipal targets were also designed to ensure compliance with the Department of Public Service’s Municipal Determination Standards. Tables 7.6, 7.7 and 7.8 show the targets for future energy use for South Hero by sector (totals are cumulative).

One thermal target for South Hero in 2050 is to have 85.3% of structures be heated by renewable energy sources. Much of this transition is likely to come from conversion to electric heat pumps as the primary heating source for single family homes as the technology becomes more readily available and affordable. Regionally, the target also relies on wood heating being a continued source of residential heating. However, South Hero has a low a target for new efficient wood heat systems (5 by 2050). This is due primarily to the high proportion of existing households in South Hero that already use wood heating systems. Although there is only a low target for converting other types of heating to efficient wood heating, South Hero strongly encourages residents’ conversion of existing wood heating systems to more advanced wood heating systems. Newer wood heating systems are more efficient and have less greenhouse gas emissions than older wood heating systems. Table 7.6 also includes targets for the weatherization of residential households and commercial structures (78% and 73% respectively in 2050).

Table 7.6 - Thermal Targets			
Thermal Targets	2025	2035	2050
Percent of Total Heating Energy From Renewable Sources - Heating (BTUs)	44.5%	57.6%	85.3%
New Efficient Wood Heat Systems (in units)	0	0	5
New Heat Pumps (in units)	84	191	358
Percentage of municipal households to be weatherized	5%	16%	78%
Percentage of commercial establishments to be weatherized	25%	25%	73%

The transportation energy targets for South Hero are similarly ambitious. By 2050, almost 91.2% of transportation energy will need to come from renewable sources in order to meet the 90 x 50 goal. This will primarily be done through the conversion light-duty passenger vehicles from fossil fuels energy sources to electric energy. However, it will also mean conversion of heavy-duty vehicles from diesel to biodiesel sources. Biodiesel technology and infrastructure will certainly need to advance tremendously in coming years to meet this ambitious target.

Table 7.7 - Transportation Targets			
Transportation Targets	2025	2035	2050
Percent of Total Transportation Energy from Renewable Sources - Transportation (BTUs)	11.2%	34.0%	91.2%
Electric Vehicles	125	937	2229
Biodiesel Vehicles	285	569	1100

Targets for electricity use are complex to interpret. Electricity use in South Hero is targeted to double by 2050 (Table 7.8). This increase in use will likely be driven by conversions to electric heat pumps and electric vehicles. These consumer changes will cause electricity use to grow. At the same time, total energy use (energy, not electricity) will become more efficient. This is because electric cars and electric heating sources are more efficient than using other energy sources, such as fossil fuels.¹

¹ Vermont Comprehensive Energy Plan - 2016, page 44.

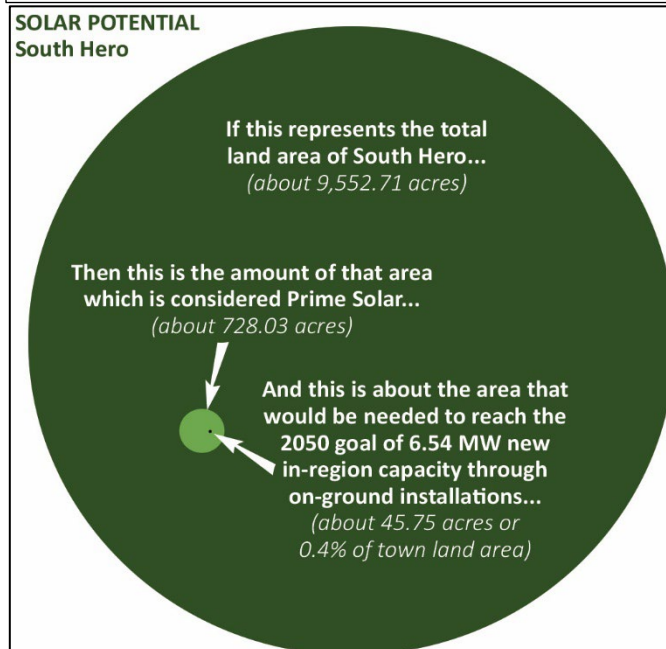
Table 7.8 - Electricity Targets			
Electricity Targets	2025	2035	2050
Increased Efficiency and Conservation (BTUs)	25.2%	48.3%	100.7%

Table 7.9 shows the electricity generation targets for new electricity generation in South Hero in 2025, 2035, and 2050. All new wind, solar, hydro, and biomass electricity generation sites will further progress towards achieving the generation targets (in MWh). Given the difficulty of developing additional hydro generation, and the constraints upon wind development, it is likely that solar generation will need to be a substantial component of meeting these generation targets. Meeting the generation targets will take considerable effort over the next 30 to 35 years. The 2050 generation target (10,927.45 MWh) is about 22 times more than the current generation capacity (493.63 MWh) within the Town of South Hero.

Table 7.9 – Renewable Electricity Generation Targets			
Renewable Generation Targets	2025	2035	2050
Total Renewable Generation Target (in MWh)	3,606.06	7,212.12	10,927.45

Table 7.10 - Renewable Electricity Generation Potential		
Resource	MW	MWh
Rooftop Solar	1	1,149
Ground-mounted Solar	515	631,111
Wind	1,285	3,939,726
Hydro	0	0
Biomass and Methane	0	0
Other	0	0
Total Renewable Generation Potential	1,801	4,571,986

Figure 7.2 – Ground Mounted Solar Potential



Based on mapping and calculations completed by NRPC, South Hero has sufficient land to meet the above electricity generation targets. South Hero has access to the renewable electricity generation capacity outlined in Table 7.10. This estimate shows that South Hero has considerably more potential for renewable electricity generation than what is needed to meet the renewable electricity generation targets in Table 7.9. This generation capacity was calculated using the “base” layers for solar and wind. For an explanation of what constitutes a “base” layer, please see the mapping subsection below.

South Hero supports NRPC’s position regarding “commercial” and “industrial” wind facilities. The NRPC Regional Plan finds that the construction of new “industrial” or

“commercial” wind facilities within the region does not conform to the Regional Plan (NRPC considers any wind facility with a tower height (excluding blades) in excess of 100 feet tall to be considered an “industrial” or “commercial” wind facility).

Energy potential from biomass and methane sources is not estimated. This is due to a variety of factors including insufficient information on which to create estimates. South Hero encourages the use of these sources for electricity and thermal energy generation, especially on farms.

Mapping Energy Resources and Constraints

The third required element of an enhanced energy plan is the inclusion of maps that will provide guidance to the community and developers regarding the location of new renewable generation facilities. South Hero has incorporated maps provided by NRPC. These maps show data as required by the Department of Public Service Municipal Determination Standards, including access to energy resources and constraints to renewable development. All maps may be found at the end of this section.

The intent of the maps is to generally show those areas that may be good locations, or may be inappropriate locations, for future renewable electricity generation facilities. However, it is important to note that the maps are a planning tool and do not precisely indicate locations where siting a facility is necessarily acceptable. When an electricity generation facility is proposed, the presence of all natural resources constraints on site shall be verified as a part of the application.

Mapping Methodology

Spatial data showing the location of energy resources formed the basis of the maps developed by NRPC. This is the data that shows where there is solar, wind, hydro, and biomass “potential” in South Hero based on information provided by the Vermont Sustainable Jobs Fund. “Known” and “possible” constraints were subsequently identified on the maps. Known constraints are conservation resources

that shall be protected from all future development of renewable electricity generation facilities. Possible constraints are conservation resources that shall be protected, to some extent, from the development of renewable generation facilities. The presence of possible constraints on land does not necessarily impede the siting of renewable generation facilities on a site. Siting in these locations could occur if impacts to the affected possible constraints are mitigated, preferably on-site.

A full list of known and possible constraints included on the maps is located in Table 7.11. The known constraints and possible constraints used to create the maps include constraints that are required per the Municipal Determination Standards from the Department of Public Service and regional constraints selected by NRPC.

Solar and Wind

The solar and wind maps show both “base” and “prime” areas. Base areas are areas with electricity generation potential, yet may contain possible constraints. Prime areas are areas that have electricity generation potential that do not contain known or possible constraints. Areas that do not contain electricity generation potential, and areas that contain a known constraint, are shown as white space on the map.

The solar map indicates a general abundance of base and prime solar areas in South Hero, including many areas located within ½ mile of transmission and three-phase distribution lines. The following preferred locations for solar generation facilities by the Town of South Hero: rooftops, parking lots, and landfills. Brownfield sites located outside of the village areas of South Hero and Keeler Bay are also considered preferred locations.

South Hero has a strong preference for solar facilities that have less than 5 MW in generation capacity. This preference is a reflection of the community’s dedication to preserving the aesthetic and rural qualities of South Hero by restricting the geographic size of solar facilities. In addition, South Hero prefers that solar facilities greater than 149 kW in generation capacity to be sufficiently separated from other similarly sized solar facilities to “break up” the visual impact of two or more solar facilities located next to each other and to preserve South Hero’s rural character.

All solar facilities to be sited in South Hero shall include proper screening. The Town of South Hero hopes to adopt a municipal solar screening ordinance in the future.

South Hero has relatively good access to base and prime wind resources. These areas are generally concentrated near the lakeshore, particularly in the western part of town.

Hydro and Biomass

The biomass map is somewhat similar to the solar and wind maps. The biomass map also displays “base” and “prime” areas. However, these categories are not necessarily indicative of electricity generation potential. They instead indicate areas of contiguous forest that may be used for the harvesting of woody biomass for use in either thermal or electric generation.

The hydro map is unique from the other types of generation maps. It shows existing dam sites used for electricity generation. It also shows existing dam sites that are not used for electricity generation, but could be retrofitted to provide electricity generation capacity. Data about these dams comes from a study commissioned by the Vermont Agency of Natural Resources. The hydro map also shows some

known and possible constraints that could impact the redevelopment of some dam sites. South Hero has no existing dam sites and the development of new dam sites is extremely unlikely due to South Hero's island location and the extensive regulatory process involved in developing new dams.

Conclusion

Achieving the 90 x 50 goal, and the other energy goals in state statute, will be difficult. South Hero is committed to playing its part in working towards accomplishing these goals and in creating a more sustainable, affordable, and secure energy future.

GOALS:

1. Plan for increased electric demand with the support of local electric utilities and Efficiency Vermont.
2. Reduce annual fuel needs and fuel costs for heating structures, to foster the transition from non-renewable fuel sources to renewable fuel sources, and to maximize the weatherization of residential households and commercial establishments.
3. Hold vehicle miles traveled per capita to 2011 levels through reducing the amount of single occupancy vehicle (SOV) commute trips and developing public transit ridership.
4. Focus growth within and adjacent to the villages.

POLICIES

1. South Hero supports energy conservation efforts and the efficient use of energy across all sectors.
2. South Hero supports the reduction of transportation energy demand, reduction of single-occupancy vehicle use, and the transition to renewable and lower-emission energy sources for transportation.
3. South Hero supports patterns and densities of concentrated development that result in the conservation of energy. This includes support of public transit connections from South Hero to other parts of the region.
4. South Hero supports the development and siting of renewable electricity generation resources in the Town that are in conformance with the goals, strategies, and mapping outlined in this plan. Development of electricity generation in identified preferred locations shall be favored over the development of other sites.
5. South Hero supports the conversion of fossil fuel heating to advanced wood heating systems or electric heat pumps.
6. Support local farms and the local food system.

IMPLEMENTATION ACTIONS:

1. Coordinate annually with Efficiency Vermont and state low-income weatherization programs to encourage residents to participate in weatherization programs available to South Hero residents.

2. Promote the use of the residential and commercial building energy standards by distributing code information to permit applicants.
3. Determine if there is a need to create a municipal Energy Committee, appoint an Energy Coordinator, or provide greater funding and support to existing municipal boards to coordinate energy-related planning in South Hero and to educate residents about the goals of this plan.
4. Investigate a revision to the zoning bylaw that would incentivize compliance with the state’s stretch code, or similarly high environmental standard, through the issuance of a bonus density.
5. Conduct an energy audit of municipal and other public buildings to identify weatherization retrofits and incorporate the recommendations into the municipal capital budget.
6. Promote and provide information about the GoVermont website (<https://www.connectingcommuters.org/>) which provides information citizens about ride share, vanpool, and park-and-ride options.
7. Identify areas that may be appropriate for a wood-fired district heating facility.
8. Study the expansion of public transit routes in South Hero.
9. Plan for and install electric vehicle charging infrastructure on municipal property.
10. Review municipal road standards to ensure that they reflect the “complete streets” principles as outlined by Vermont Agency of Transportation and Vermont Department of Health (http://www.healthvermont.gov/sites/default/files/documents/2016/11/HPDP_PA&N%20Complete_streets_guide_for_VT_communities.pdf).
11. Review local policies and ordinances to limit water and sewer services to those areas of town where additional development will not contribute to sprawl.
12. Investigate the installation of a municipal solar and/or wind net-metering facilities to off-set municipal electric use.
13. Investigate installation of a community-based renewable energy project.
14. Provide firefighters with training in fighting fires on structures that have solar installed.
15. Develop and adopt a municipal solar screening ordinance.
16. Investigate the need for an additional municipal park and ride facility.

Table 7.11 – Mapping Constraints		
Solar, Wind and Biomass Maps - Known Constraints		
Constraint	Description	Source

Confirmed and unconfirmed vernal pools	There is a 600-foot buffer around confirmed or unconfirmed vernal pools.	ANR
State Significant Natural Communities and Rare, Threatened, and Endangered Species	Rankings S1 through S3 were used as constraints. These include all of the rare and uncommon rankings within the file. For more information on the specific rankings, explore the methodology for the shapefile.	VCGI
River corridors	Only mapped River Corridors were mapped. Does not include 50 foot buffer for streams with a drainage area less than 2 square miles.	VCGI
National wilderness areas		VCGI
FEMA Floodways		VCGI/NRPC
Class 1 and Class 2 Wetlands		VCGI
Designated Downtowns, Designated Growth Centers, and Designated Village Centers	These areas are the center of dense, traditional development in the region. This constraint does not apply to roof-mounted solar within such designated areas. The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan.	NRPC
FEMA Flood Insurance Rate Map (FIRM) special flood hazard areas	Special flood hazard areas as digitized by the NRPC were used (just the 100-year flood plain - 500-year floodplain not mapped). The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan.	NRPC
Ground and surface waters drinking protection areas	Buffered Source Protection Areas (SPAs) are designated by the Vermont Department of Environmental Conservation (DEC). SPA boundaries are approximate but are conservative enough to capture the areas most susceptible to contamination. The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan.	ANR
Vermont Conservation Design Highest Priority Forest Blocks	The lands and waters identified here are the areas of the state that are of highest priority for maintaining ecological integrity. Together, these lands comprise a connected landscape of large and intact forested habitat, healthy aquatic and riparian systems, and a full range of physical features (bedrock, soils, elevation, slope, and aspect) on which plant and animal natural communities depend. The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan. (Source: ANR)	ANR

Public water sources	A 200-foot buffer is used around public drinking water wellheads. The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan.	ANR
Municipal Conservation Land Use Areas	Conservation Land Use Districts, as designated in municipal plans, that include strict language that strongly deters or prohibits development have been included as a regional known constraint. The inclusion of this resource as a regional constraint is consistent with the goals and policies of the Northwest Regional Plan. Specific municipal land use districts included are outlined in Section D of the Regional Energy Plan. There are no areas identified in the South Hero Town Plan were included in this category.	NRPC
Solar, Wind and Biomass Maps - Possible Constraints		
Constraint	Description	Source
Protected lands	This constraint includes public lands held by agencies with conservation or natural resource oriented missions, municipal natural resource holdings (ex. Town forests), public boating and fishing access areas, public and private educational institution holdings with natural resource uses and protections, publicly owned rights on private lands, parcels owned in fee by non-profit organizations dedicated to conserving land or resources, and private parcels with conservation easements held by non-profit organizations.	VCGI
Deer wintering areas	Deer wintering habitat as identified by the Vermont Agency of Natural Resources.	ANR
Hydric soils	Hydric soils as identified by the US Department of Agriculture.	VCGI
Agricultural soils	Local, statewide, and prime agricultural soils are considered.	VCGI
Act 250 Agricultural Soil Mitigation Areas	Sites conserved as a condition of an Act 250 permit.	VCGI
Class 3 wetlands	Class 3 wetlands in the region have been included as a Regional Possible Constraint. The inclusion of this resource as a regional constraint is consistent with goals and policies of the Northwest Regional Plan.	ANR

Municipal Conservation Land Use Areas	Conservation Land Use Districts, as designated in municipal plans, that include strict language that deters, but does not prohibit development, have been included as a regional possible constraint. Specific municipal land use districts included are outlined in Section D of the Regional Energy Plan. No areas identified in the South Hero Town Plan were included in this category.	NRPC
Hydro Map - Known Constraints		
Constraint	Description	Source
None		
Hydro Map - Possible Constraints		
Constraint	Description	Source
"303d" list of stressed waters		ANR
Impaired waters		ANR
State Significant Natural Communities and Rare, Threatened, and Endangered Species	Rankings S1 through S3 were used as constraints. These include all of the rare and uncommon rankings within the file. For more information on the specific rankings, explore the methodology for the shapefile.	VCGI

The data in Table 7.12 displays facilities that have a Certificate of Public Good from the Vermont Utilities Commission to generate electricity. The Town of South Hero recognizes that some of the data in the table may be out of date or incorrect. The Town of South Hero also recognizes that some identified facilities may no longer generate electricity.

Category	Sub Category	Address	CPG Number	Electricity Type	Utility	Capacity kW
Solar	Ground-mounted PV	565 West Shore Road	2960	Net Metered	Vermont Electric Coop	20
Solar	Ground-mounted PV	89 East Shore Road	17-3418	Net Metered	Vermont Electric Coop	15
Solar	Ground-mounted PV: Tracker	76 Lakeview Road	414	Net Metered	Vermont Electric Coop	11.59
Solar	Ground-mounted PV: Tracker	316 South Street	18-2204	Group Net Metered	Vermont Electric Coop	11.4
Solar	Ground-mounted PV: Tracker	135 Kibbie Point Rd	5078	Net Metered	Vermont Electric Coop	11
Solar	Ground-	142 Ferry Rd	3986	Net Metered	Vermont	10.8

	mounted PV: Tracker				Electric Coop Vermont Electric Coop Vermont Electric Coop Vermont Electric Coop	
Solar	Ground- mounted PV	561 West Shore Road	2977	Net Metered	Electric Coop Vermont Electric Coop Vermont Electric Coop	8.89
Solar	Ground- mounted PV	72 South St	17-2858	Net Metered	Electric Coop Vermont Electric Coop	7.6
Solar	Ground- mounted PV	549 Rt 2	2345	Net Metered	Electric Coop Vermont Electric Coop	6.41
Solar	Ground- mounted PV	74 Whipple Rd	17-4328	Net Metered	Electric Coop Vermont Electric Coop	6
Solar	Ground- mounted PV	16 Hall Road	3063	Net Metered	Electric Coop Vermont Electric Coop	4.03
Solar	Ground- mounted PV: Tracker	134 East Shore Road	6264	Net Metered	Electric Coop Vermont Electric Coop	4
Solar	Ground- mounted PV	14 Whipple Rd	1740	Net Metered	Electric Coop Vermont Electric Coop	2.74
Solar	Ground- mounted PV	14 Narrows Road	506	Net Metered	Electric Coop Vermont Electric Coop	2.17
Solar	Roof-Mounted PV	479 West Shore Rd	1861	Net Metered	Electric Coop Vermont Electric Coop	26.93
Solar	Roof-Mounted PV	505 W Shore Rd	19-0628	Net Metered	Electric Coop Vermont Electric Coop	22.8
Solar	Roof-Mounted PV	159 Landon Road	17-4672	Net Metered	Electric Coop Vermont Electric Coop	13.6
Solar	Roof-Mounted PV	320 South St	2726	Net Metered	Electric Coop Vermont Electric Coop	12.08
Solar	Roof-Mounted PV	316 South Street	7288	Group Net Metered	Electric Coop Vermont Electric Coop	12
Solar	Roof-Mounted PV	30 Wally's Point Rd	3935	Net Metered	Electric Coop Vermont Electric Coop	11
Solar	Roof-Mounted PV	51 Martin Road	17-4574	Net Metered	Electric Coop Vermont Electric Coop	10.4

Solar	Roof-Mounted PV	25 Martin Road	17-3741	Net Metered	Vermont Electric Coop	10.4
Solar	Roof-Mounted PV	153 West Shore Road	3801	Net Metered	Vermont Electric Coop	10
Solar	Roof-Mounted PV	15 Lakeview Rd	18-3630	Net Metered	Vermont Electric Coop	10
Solar	Roof-Mounted PV	14 Featherbed Lane	18-1230	Net Metered	Vermont Electric Coop	10
Solar	Roof-Mounted PV	14 Melcher Place	6932	Net Metered	Vermont Electric Coop	10
Solar	Roof-Mounted PV	113 East Shore Rd	6673	Net Metered	Vermont Electric Coop	10
Solar	Roof-Mounted PV	29 Kibbe Farm Rd	2796	Net Metered	Vermont Electric Coop	9.83
Solar	Roof-Mounted PV	30 Whipple Rd	3756	Group Net Metered	Vermont Electric Coop	9.5
Solar	Roof-Mounted PV	75 South Street	1268	Net Metered	Vermont Electric Coop	9.19
Solar	Roof-Mounted PV	25 Haycorn Hollow	3126, 18-0631	Net Metered	Vermont Electric Coop	8.9
Solar	Roof-Mounted PV	122 Station St	4007	Net Metered	Vermont Electric Coop	8.25
Solar	Roof-Mounted PV	7 Hochelaga Road	2639	Net Metered	Vermont Electric Coop	8.08
Solar	Roof-Mounted PV	30 Ferry Rd	1716	Net Metered	Vermont Electric Coop	7.87
Solar	Roof-Mounted PV	39 Eagle Camp Road	18-2771	Net Metered	Vermont Electric Coop	7.6
Solar	Roof-Mounted PV	31 Featherbed Lane	19-0576	Net Metered	Vermont Electric Coop	7.6
Solar	Roof-Mounted PV	10 Keeler Bay Rd	18-4181	Net Metered	Vermont Electric	7.6

Solar	Roof-Mounted PV	245 South St	18-4017	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	17 Turtle Bay Lane	18-3281	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	467 West Shore Road	17-4795	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	17 Tourville Drive	17-3596	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	33 Colony Way	7263	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	33 Crescent Bay Road	3881	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	135 Ferry Rd	19-3600	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	139 East Shore Rd	19-3898	Net Metered	Coop Vermont Electric	7.6
Solar	Roof-Mounted PV	77 Landon Rd	5437	Net Metered	Coop Vermont Electric	7
Solar	Roof-Mounted PV	328 U.S. Route 2	1135	Net Metered	Coop Vermont Electric	6.65
Solar	Roof-Mounted PV	85 Whipple	18-0416	Net Metered	Coop Vermont Electric	6.6
Solar	Roof-Mounted PV	88 Kibbe Point Road	2722	Net Metered	Coop Vermont Electric	6.42
Solar	Roof-Mounted PV	117 Lakeview Rd	2692	Net Metered	Coop Vermont Electric	6.38
Solar	Roof-Mounted PV	25 Sweeney Farm Rd	18-1991	Net Metered	Coop Vermont Electric	6
Solar	Roof-Mounted PV	349 West Shore Road	17-4329	Net Metered	Coop Vermont Electric	6
Solar	Roof-Mounted PV	357 South St	17-2600	Net Metered	Coop Vermont Electric	6

	PV				Electric Coop Vermont Electric Coop	
Solar	Roof-Mounted PV	1 Mott Lane	17-3269	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	91 West Shore Road	17-2750	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	4 Chase Ln	17-2780	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	146 East Shore Road	17-2737	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	64 Featherbed Lane	5642	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	42 Sweeney Rd	5370	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	19 Ferry Rd	3894	Net Metered	Vermont Electric Coop	6
Solar	Roof-Mounted PV	45 Heron Ridge Rd	2732	Net Metered	Vermont Electric Coop	5.93
Solar	Roof-Mounted PV	15 Fox Crossing Rd	2652	Net Metered	Vermont Electric Coop	5.9
Solar	Roof-Mounted PV	21 Contentmen t Lane	2875	Net Metered	Vermont Electric Coop	5.59
Solar	Roof-Mounted PV	44 RichaRds Rd	No number	Net Metered	Vermont Electric Coop	5.46
Solar	Roof-Mounted PV	321 Rt 2	2877	Net Metered	Vermont Electric Coop	5.24
Solar	Roof-Mounted PV	161 Landon Rd	17-3362	Net Metered	Vermont Electric Coop	5.2
Solar	Roof-Mounted PV	9 Meadow Lane	2173	Net Metered	Vermont Electric Coop	5.1
Solar	Roof-Mounted PV	308 South Street	18-3182	Net Metered	Vermont Electric Coop	5

Solar	Roof-Mounted PV	86 Featherbed Lane	18-1748	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	5 Sandbar Heights Drive	17-0233	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	45 South Street	18-0496	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	14 South St	17-2641	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	69 Sunset Beach Road	7277	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	30 Haycorn Hollow	5563	Net Metered	Vermont Electric Coop	5
Solar	Roof-Mounted PV	8 Whipple Rd	3099	Net Metered	Vermont Electric Coop	4.26
Solar	Roof-Mounted PV	550 West Shore Rd	18-4262	Net Metered	Vermont Electric Coop	3.8
Solar	Roof-Mounted PV	6 Sandbar Heights	17-4611	Net Metered	Vermont Electric Coop	3.8
Solar	Roof-Mounted PV	9 Old Farm Rd	17-0213	Net Metered	Vermont Electric Coop	3.8
Solar	Roof-Mounted PV	86 LombaRd Lane	7222	Net Metered	Vermont Electric Coop	3.8
Solar	Roof-Mounted PV	104 Kibbe Point Road	2302	Net Metered	Vermont Electric Coop	3.73
Solar	Roof-Mounted PV	10 Windridge Road	17-3398	Net Metered	Vermont Electric Coop	3.6
Solar	Roof-Mounted PV	58 West Shore Road	2851	Net Metered	Vermont Electric Coop	3.21
Solar	Roof-Mounted PV	50 Whipple Rd	1838	Net Metered	Vermont Electric Coop	3.19
Solar	Roof-Mounted PV	380 South Street	1026	Net Metered	Vermont Electric	3.19

Solar	Roof-Mounted PV	22 South Street	18-0270	Net Metered	Coop Vermont Electric Coop	3
Solar	Roof-Mounted PV	15 Allen Point Road	7257	Net Metered	Coop Vermont Electric Coop	3
Solar	Roof-Mounted PV	47 Colodny Way	3929	Net Metered	Coop Vermont Electric Coop	3
Wind	Small Wind	134 East Shore Road	398	Net Metered	Coop Vermont Electric Coop	2.5
Wind	Small Wind	76 Lakeview Road	414	Net Metered	Coop Vermont Electric Coop	2.5

Table 7.13 Standard Conversions - BTU to Unit		
Unit	Unit Type	British Thermal Units
Kilowatt	Kilowatt	3,412
Gasoline	Gallon	120,404
Ethanol	Gallon	84,714
Diesel Fuel	Gallon	137,571
Heating Oil	Gallon	137,571
Residual Fuel Oil	Gallon	149,690
LPG	Gallon	84,738
Kerosene	Gallon	135,000
Biodiesel	Gallon	127,595
Wood Pellets	Ton	16,500,000
Cord Wood	Cord	20,000,000
Wood	Pounds	8,000
Natural Gas	Cubic Feet	103,200
Compressed Natural Gas	Pounds	20,160
Coal	Short Ton	19,490,000

Utility Service Areas

South Hero, Vermont Act 174 The Energy Development Improvement Act of 2016

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Legend

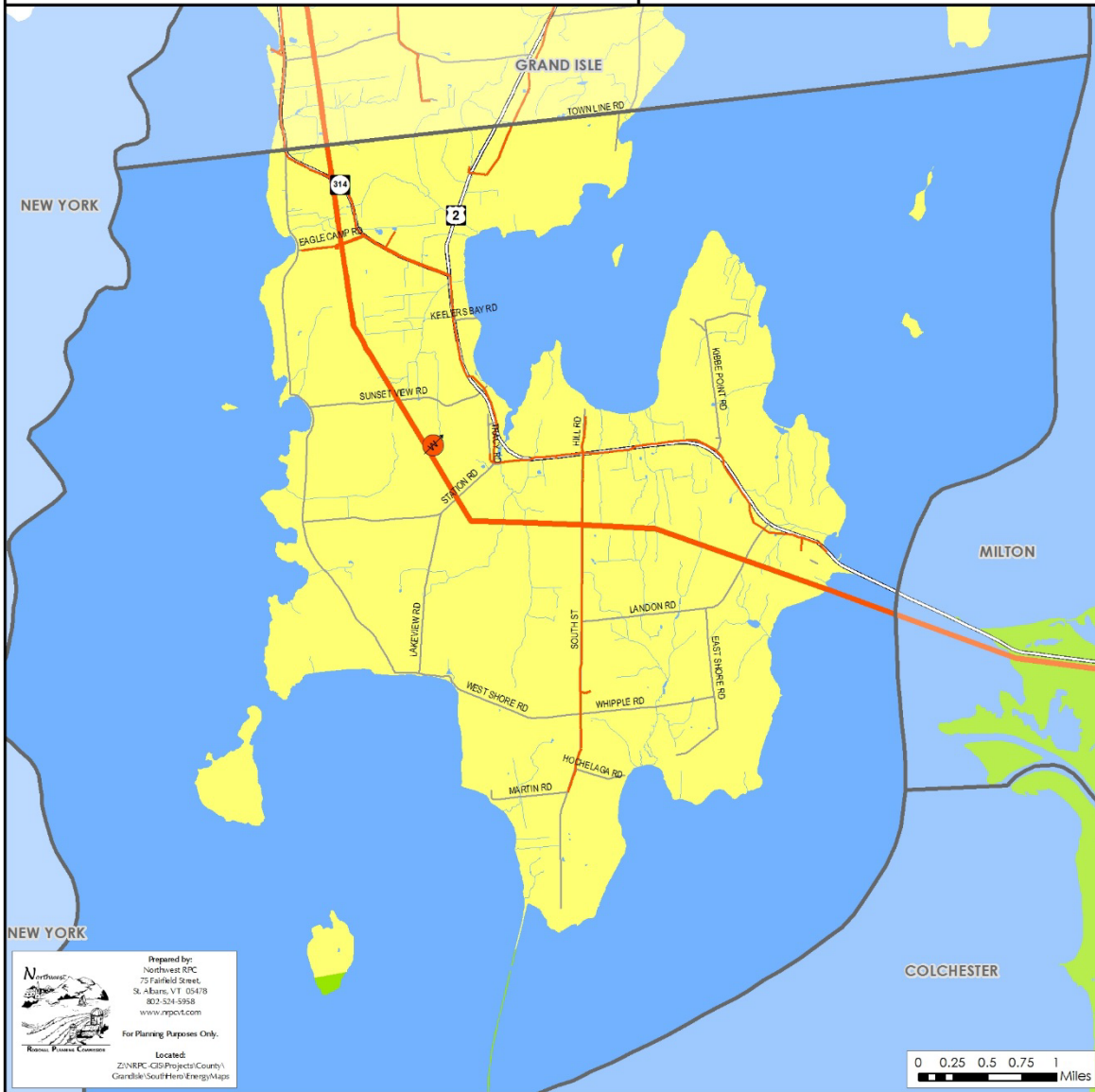
Utility Service Area Features

- Green Mountain Power
- Swanton Village Electric
- Vermont Electric Co-op
- Enosburg Falls Electric
- Substation
- 3 Phase Power Line
- Transmission Line

Map E.1

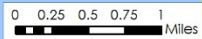
Sources: VCGI

Disclaimer: The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Northwest RPC is not responsible for these. Questions of on-the-ground location can be resolved by site inspections and/or surveys by a registered surveyor. This map is not sufficient for delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.



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Transmission & 3 Phase Power Infrastructure

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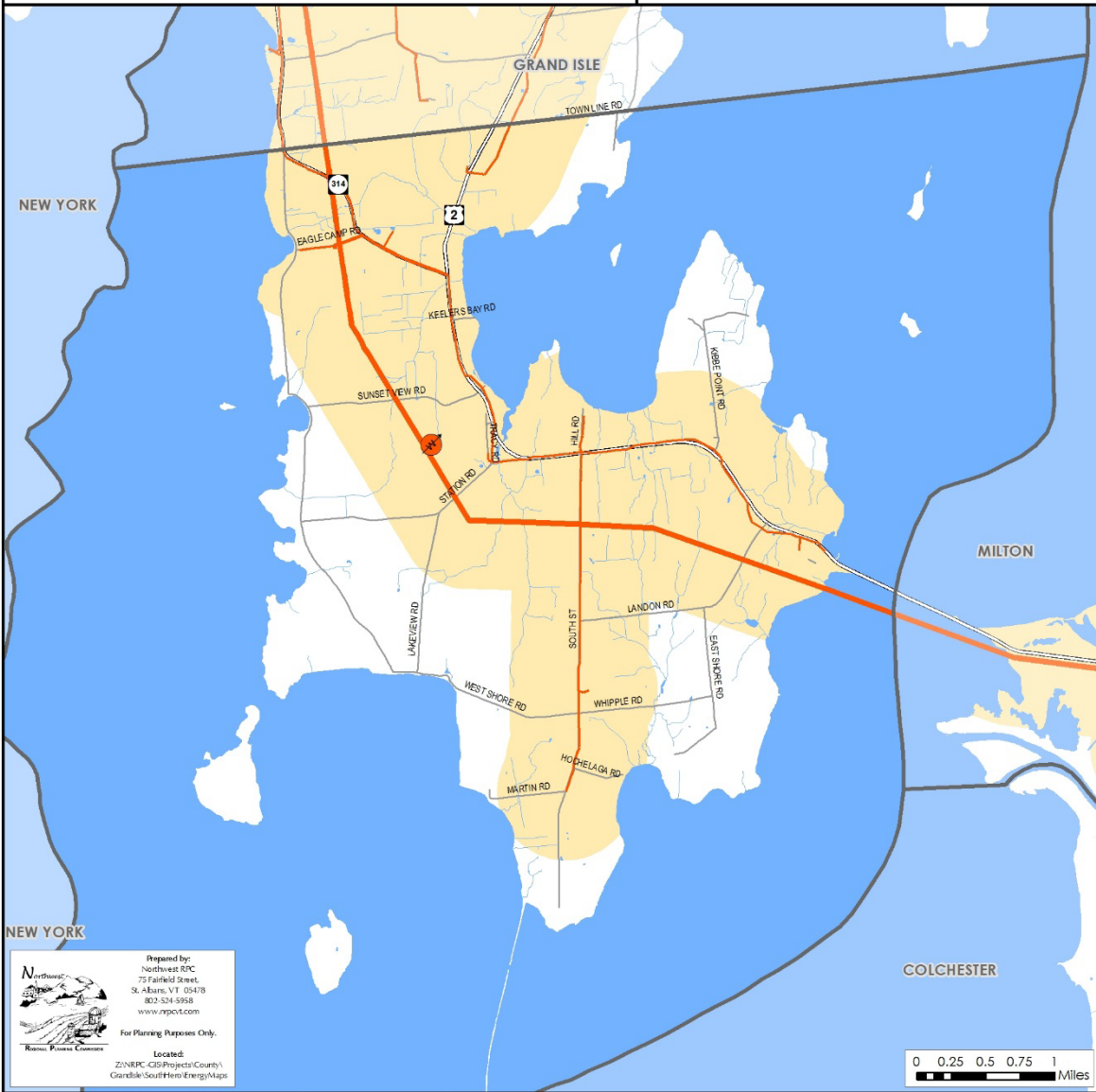


Legend

-  Substation
-  3 Phase Power Line
-  Transmission Line
-  1/2 Mile Buffer (3 Phase Power Line & Transmission Line)

Map E.2

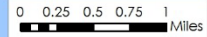
Sources: VCGI
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Existing Generation Facilities

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Legend

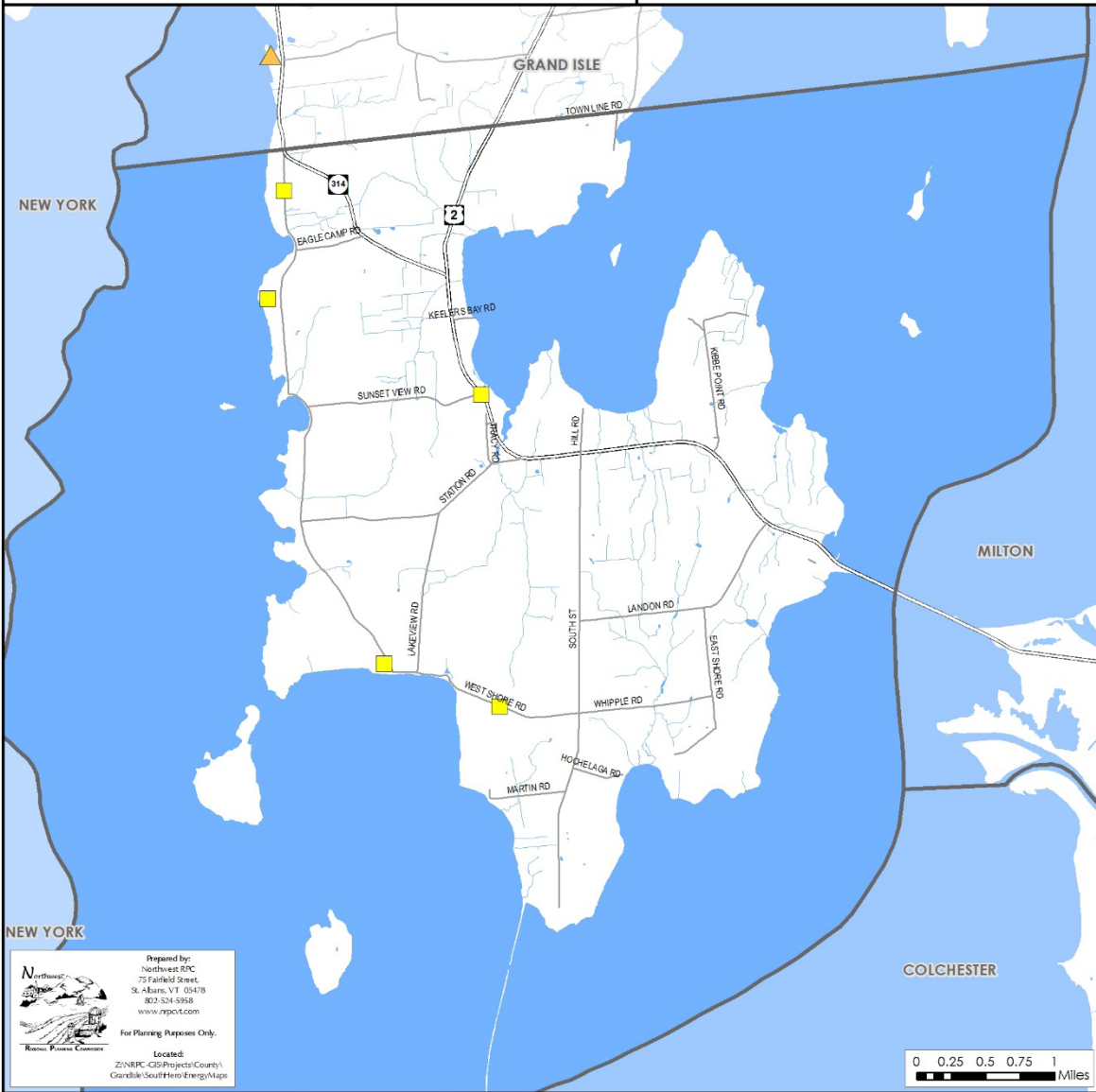
- ★ Biomass Facility
- Hydro Facility
- Solar Facility
- ▲ Wind Facility

Map E.3

Note: Only generators 15kW are shown on the map. A full list of all generators is available.

Sources: VCGI

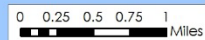
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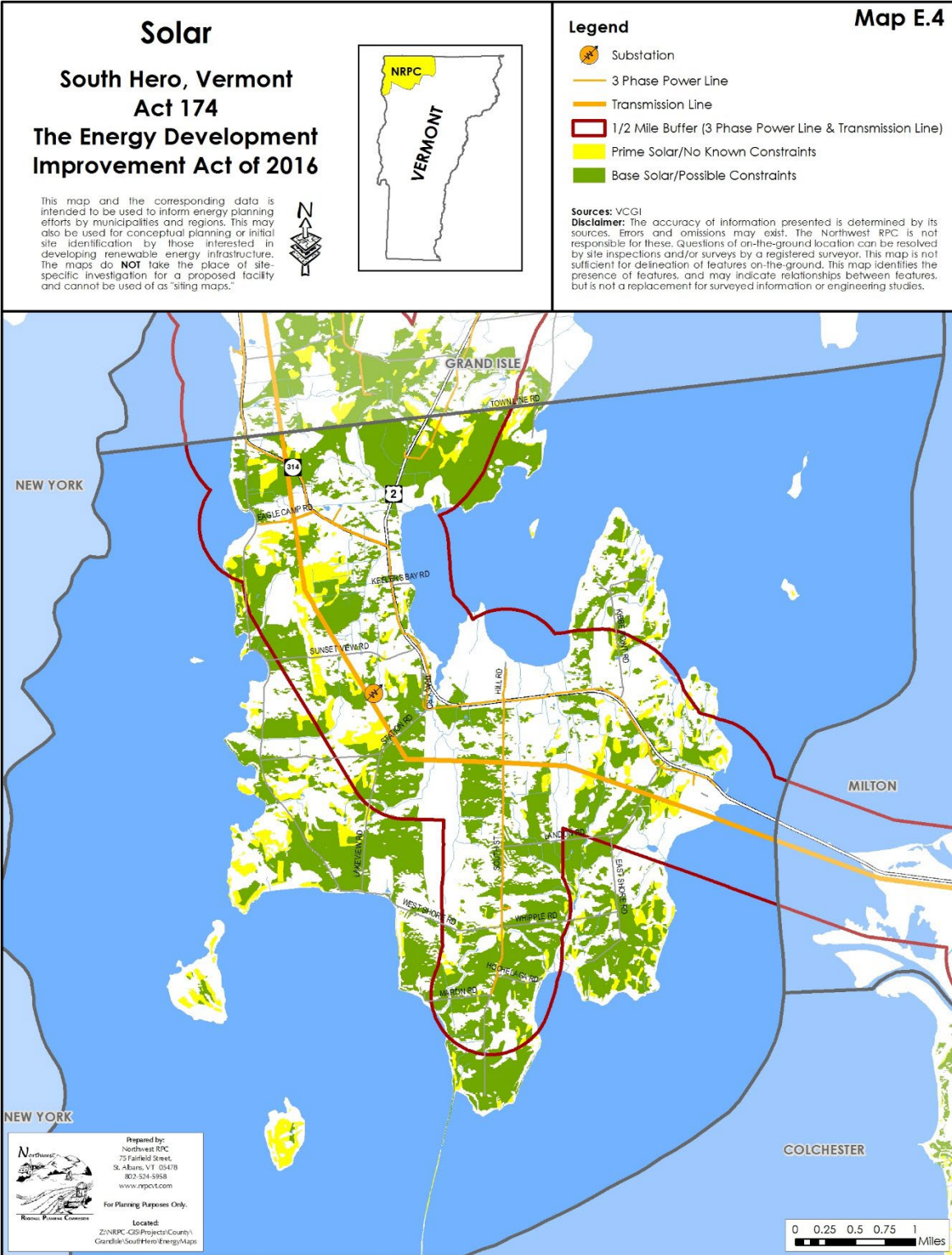




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Wind

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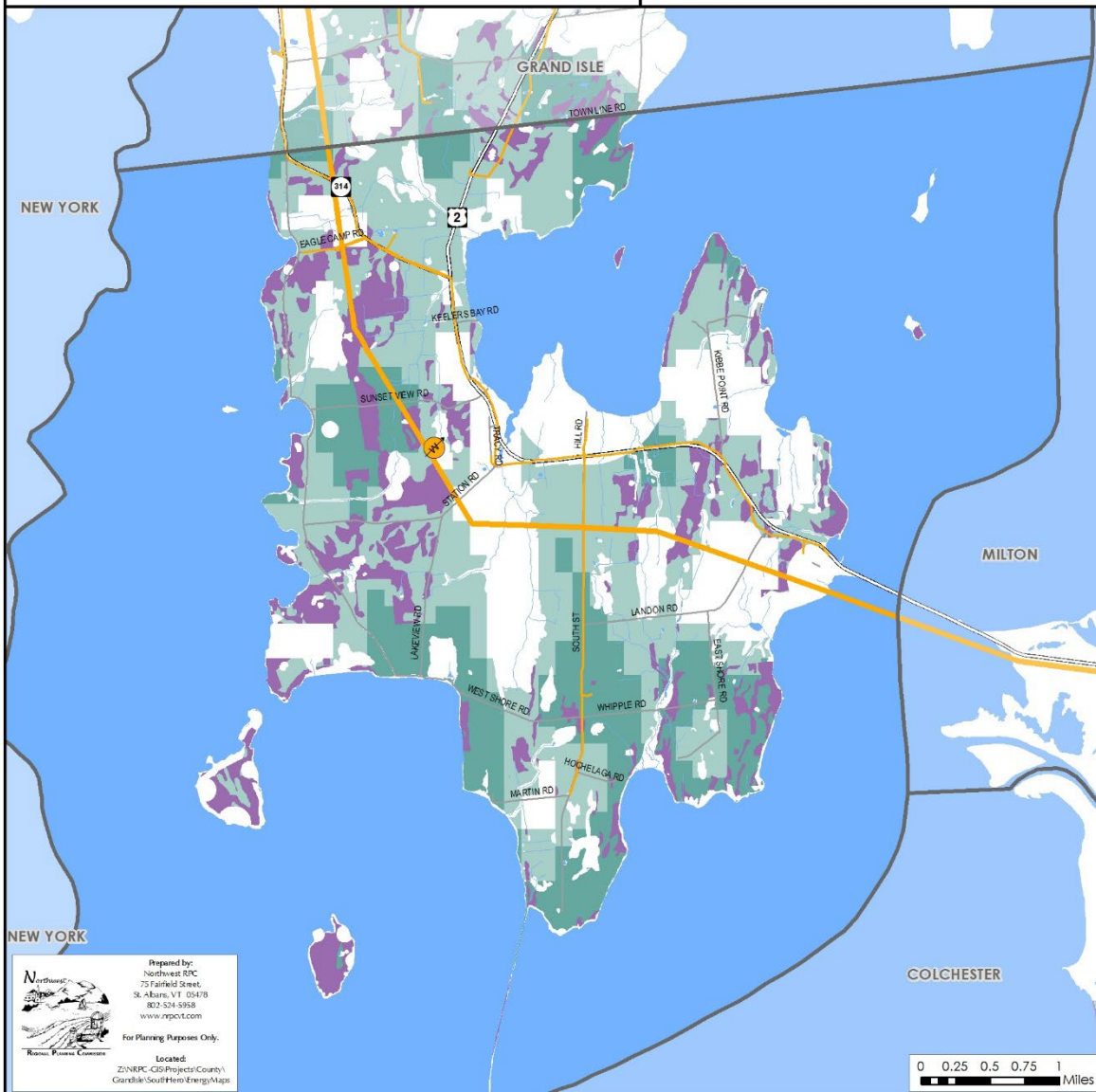


Legend

- Substation
- 3 Phase Power Line
- Transmission Line
- Prime Wind**
Areas of high wind potential and no known constraints. Darker areas have higher wind speeds.
- Base Wind**
Areas of high wind potential and a presence of possible constraints. Darker areas have higher wind speeds.

Map E.5

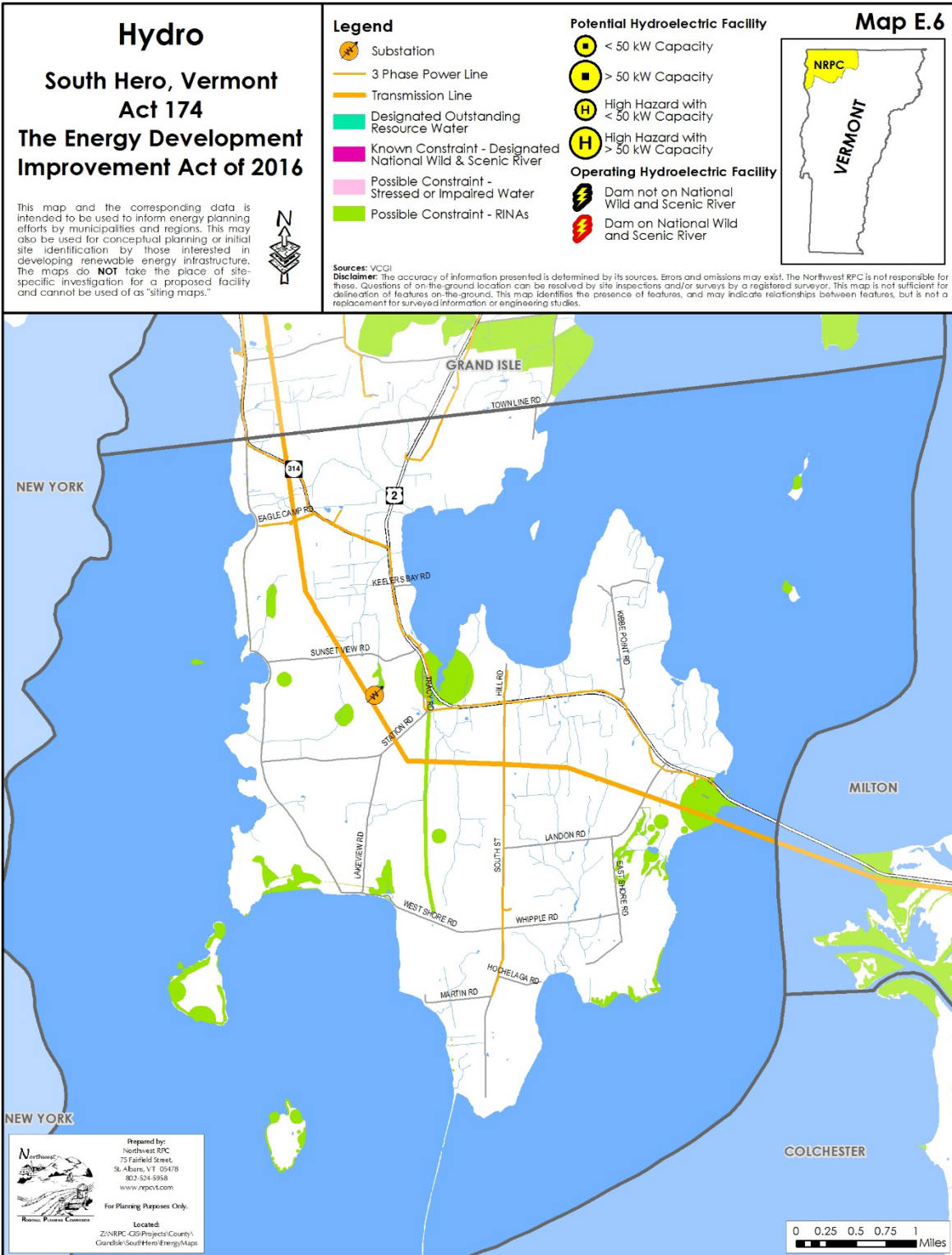
Sources: VCGI
Disclaimer: The accuracy of information presented is determined by its sources. Errors and omissions may exist. The Northwest RPC is not responsible for these. Questions of on-the-ground location can be resolved by site inspections and/or surveys by a registered surveyor. This map is not sufficient for delineation of features on-the-ground. This map identifies the presence of features, and may indicate relationships between features, but is not a replacement for surveyed information or engineering studies.



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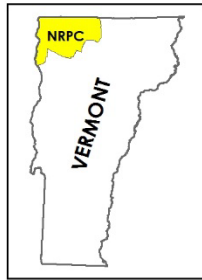
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Woody Biomass

South Hero, Vermont Act 174 The Energy Development Improvement Act of 2016

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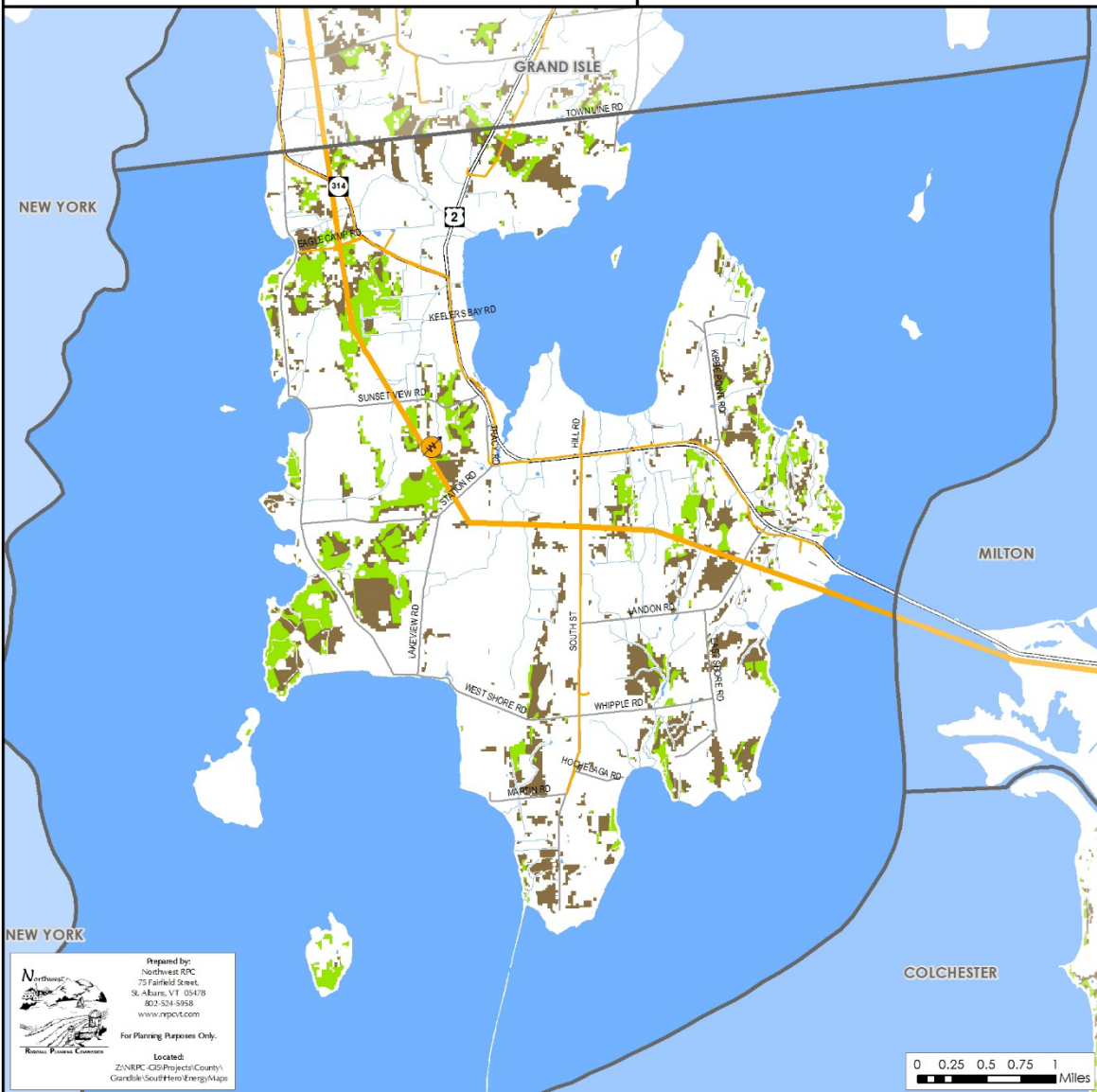
Legend

- Biomass System
- Cow Power
- Substation
- 3 Phase Power Line
- Transmission Line
- Prime Woody Biomass/No Known Constraints
- Base Woody Biomass/Possible Constraints

Map E.7

Sources: VCGI

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