DOE/EA-1631

FINAL

ENVIRONMENTAL

ASSESSMENT

Environmental Assessment for DEPARTMENT OF ENERGY LOAN GUARANTEE FOR BEACON POWER CORPORATION FREQUENCY REGULATION FACILITY IN STEPHENTOWN, N.Y.

U.S. Department of Energy
Loan Guarantee Program Office
Washington, DC 20585

February 2009

Environmental Assessment for Department of Energy Loan Guarantee for Beacon Power Corporation Frequency Regulation Facility in Stephentown, N.Y.
DOE/EA-1631

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ACRONYMS

ACOE	U.S. Army Corps of Engineers
Beacon	Beacon Power Corporation
CO_2	Carbon Dioxide
dB(A)	A-weighted decibel scale
DOE	U.S. Department of Energy
EIA	Energy Information Administration
EPA	U.S. Environmental Protection Agency
EPAct 05	Energy Policy Act of 2005
ISO	Independent System Operator
L_{dn}	day-night noise level
MW	megawatt
MWh	megawatt-hour
NO_x	nitrogen oxides
NYSDEC	New York State Department of Environmental Conservation
NYISO	New York Independent System Operator
OSHA	Occupational Safety and Health Administration
ppm	parts per million
PVC	polyvinyl chloride
SEQR	State Environmental Quality Review
SO_2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plans
USC	United States Code

1.0 PURPOSE AND NEED

1.1 Introduction

The U.S. Department of Energy (DOE) has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) (42 USC 4321, et. seq.) Council on Environmental Quality regulations for implementing NEPA (40 CFR Parts 1500-1508) and DOE NEPA regulations (10 CFR Part 1021). The EA examines the potential environmental impacts associated with issuing a Federal loan guarantee to Beacon Power Corporation for construction and operation of a flywheel-based frequency regulation facility at an undeveloped seven acre site in Stephentown, New York[1]. A frequency regulation facility is needed to help maintain balance in the electric power grid due to the constant fluctuation of electricity demand and supply. A frequency regulation facility assists in maintaining the grid's equilibrium by storing energy when supply exceeds demand and releasing energy back onto the grid when demand exceeds supply. The proposed facility would be sited adjacent to an existing electric substation along the high voltage transmission lines of National Grid, a company that transmits and distributes electricity and natural gas to customers in New York, New Hampshire, Massachusetts, and Rhode Island. The facility would be interconnected with the high voltage transmission lines of the existing electric power grid.

1.2 Purpose and Need for Agency Action

DOE's proposed action is to issue a loan guarantee to Beacon Power Corporation for construction of a flywheel-based frequency regulation facility in Stephentown, New York. The purpose of this action is to expedite the deployment of a new energy technology into commercial use in the U.S. and to reduce emissions of greenhouse gases and other air pollutants pursuant to Title XVII of the Energy Policy Act of 2005 (EPAct 05).

EPAct 05 authorized DOE to make loan guarantees for projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the issuance is guaranteed." Title XVII identified ten categories of technologies and projects that are potentially eligible for loan guarantees, including those for efficient electric generation, transmission, and distribution. The two principal goals of the Title XVII loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits.

In August 2006, DOE issued its first solicitation for pre-applications inviting interested parties to submit proposals that meet the goals of EPAct 05 and the President's Advanced Energy Initiative. The Advanced Energy Initiative, issued in February 2006, aims to reduce U.S. reliance on foreign sources of energy by changing the way Americans fuel their vehicles and power their homes and businesses. DOE received 143 pre-applications in December 2006. From April to August 2007, DOE's Loan Guarantee Program Office (LGPO), with assistance from DOE program offices, conducted technical and financial reviews of the pre-applications.

[1] The amount requested for the loan guarantee is not being disclosed at this time because it is business sensitive. Moreover, should DOE approve a loan guarantee, the amount may differ from the original request.

On October 4, 2007, DOE invited 16 of the 143 pre-applicants to submit applications for loan guarantees. These 16 were selected on the basis of the completeness of their application and the overall merit of their technologies. On October 7, 2007, Beacon Power Corporation accepted DOE's invitation to submit an application for a loan guarantee for construction of a flywheel-based frequency regulation facility in Stephentown, New York. DOE is performing a disciplined and rigorous review of Beacon's submittal documentation, including this environmental assessment, to take proper account of the potential risks of the project.

The rates of demand and generation for electricity are both constantly fluctuating. As a consequence, frequency regulation is necessary to help maintain balance in the electricity grid. Across the United States, a small percentage of generators provide this balance by increasing or decreasing their power output around a predetermined set point, as required. Currently, these generators may be fueled by natural gas, coal, or pumped storage hydro systems[1]. In contrast, Beacon's proposed flywheel-based frequency regulation facility would provide frequency regulation on the grid by absorbing energy when it is abundant (i.e., when supply exceeds demand) and then discharging energy as necessary (i.e., when demand exceeds supply) to maintain the electricity grid frequency within a desired range. It is estimated that across the U.S., regulating electricity grid frequency using traditional sources (natural gas, coal, or pumped storage hydro systems) result in increased fuel consumption on the order of 0.5 to 1.5% because of the inefficiency of starting up and shutting down these sources.[2] This is much like the inefficiency experienced by accelerating and decelerating an automobile as opposed to running it at a constant speed.

In the case of the Beacon facility, the flywheel energy storage system draws power from the electricity grid. This electricity is used by a motor/generator in the flywheel system that spins the rotor, which is a large composite cylinder. Once the rotor is spinning, the stored energy is instantly available when needed. When electric power is required, the motor/generator acts as a generator by supplying power back to the utility grid. Therefore, a flywheel system acts as a kinetic or mechanical battery, spinning at very high speeds to store energy that is instantly available when needed.

Because flywheel-based frequency regulation facilities do not emit air pollutants, the proposed facility would regulate electricity grid frequency without direct emissions of greenhouse gasses or other anthropogenic air pollutants. Therefore, use of flywheel frequency regulation would reduce carbon dioxide (CO_2) emissions in all regions of the U.S. where it is deployed.

[1] Pumped storage hydro systems are used for frequency power regulation in the following manner: at times of low electrical demand, excess generation capacity is used to pump water into a higher reservoir. When there is higher demand, water is released back into a lower reservoir through a turbine. Pumped hydropower, like a flywheel-based system, stores energy rather than generating it; however, the round trip efficiency of pumped hydropower is approximately 10% lower than flywheel systems because of the inefficiencies of the bi-directional pumps.

[2] Emissions Comparison for a 20 MW Flywheel-based Frequency Regulation Power Plant, May 18, 2007, KEMA, p. 4, 10, 19.

2.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVE

DOE proposes to issue a Federal loan guarantee to Beacon Power Corporation (est. 1997), a publically owned energy storage technology company, for the construction and operation of a frequency regulation facility in Stephentown, New York.

2.1 Location

Beacon Power Corporation proposes to construct and operate a 20 MW flywheel-based frequency regulation facility at an undeveloped seven acre site on Grange Hall Road in Stephentown, New York. Stephentown is a largely rural community that is about 26 miles from Albany, New York, to the north; about 17 miles to Troy, New York, to the west; and about 13 miles to Pittsfield, Massachusetts, to the east. The town has an area of 58 square miles. There are rocky hills on the east and west sides of the town that frame a narrow valley running from north to south through the center of town. Kinderhook Creek flows to the south through this central valley (Figures 2 and 3).

The undeveloped site is adjacent to an existing electric substation along the high voltage transmission lines of National Grid. The facility is planned to be interconnected with the high voltage transmission lines of the existing electric power grid and would make use of flywheel technology to temporarily absorb and discharge energy to help balance supply and demand on the NYISO electricity grid. The frequency regulation facility must be located at a point where an interconnection into the electric power grid is feasible. The existing high voltage transmission line at Grange Hall Road in Stephentown is a location where this interconnection can be made. The seven acre undeveloped site provides sufficient space for the proposed facility along with buffer space from surrounding land uses.

2.2 Proposed Action

2.2.1 Flywheel

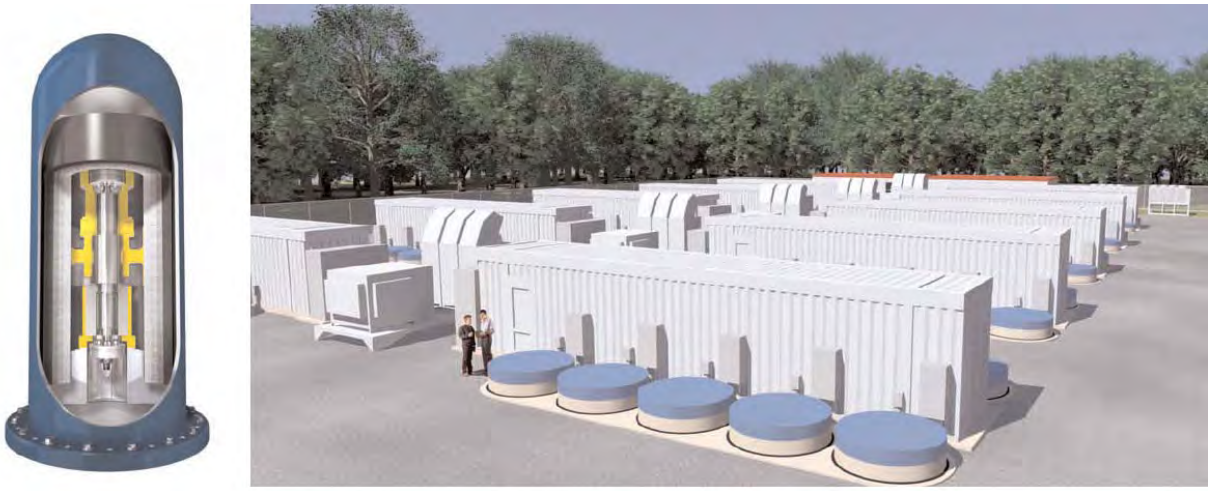
In the U.S., electricity must be delivered at a frequency of 60 hertz (Hz), or cycles per second, to comply with Federal reliability standards. The supply of and demand for electricity are constantly fluctuating, which causes fluctuations in the frequency. A safe, reliable, and energy efficient electricity grid must closely balance power supply with power demand on a second-to-second basis to maintain a constant frequency. Grid operators accomplish this frequency regulation by requiring about one percent of their generating capacity to increase or decrease output in response to frequency changes. Currently, additional electric power for frequency regulation is primarily provided by power plants burning fossil fuels (coal or natural gas).

Beacon's flywheel system can provide additional electric power to the grid very quickly, and unlike fossil fuel plants, can also draw power from the grid when the supply exceeds demand. This is because the Beacon facility does not generate electricity directly. Instead, power from the grid is used to set or keep flywheels in motion at high speeds when electricity supply on the grid exceeds demand. At times when additional electric power is required, the energy from the spinning flywheels is converted back to electricity and supplied to the grid. A flywheel system

stores energy that has been generated and put on the grid at times when supply exceeds demand and thus alleviates the need to burn fuel to generate additional electric power at times when demand exceeds supply. This is more energy-efficient and cost-effective than using fossil fuels to meet peaks in demand. In addition, a flywheel facility emits no direct air pollutants in providing additional electric power. A flash movie entitled "Flywheels and Frequency Regulation," describing the grid operation and flywheel interaction in more detail, is available on Beacon's website (www.beaconpower.com).

A flywheel energy storage system is the basic unit of the proposed Stephentown frequency regulation facility. A flywheel is a mechanical device that consists of a large, heavy cylinder that spins inside a vacuum-sealed housing. The flywheel is a kinetic energy storage device that rotates at high speeds. The flywheel rotor is completely enclosed in a cylindrical vessel about seven feet high and about four feet in diameter and has been designed for nearly frictionless and maintenance free operation. The proposed frequency regulation facility would consist of 20 frequency regulation pods, each containing 10 individual flywheels and associated energy conversion, electrical control, and power distribution equipment. Comprising 200 high-speed, high-energy flywheels and associated electronics, the proposed Beacon frequency regulation facility would be able to provide 20 MW of "up and down" frequency regulation.

Figure 1: Flywheel and 1 MW Frequency Regulation Pods



2.2.2 Project Elements

The project is planned with the following elements:

- A supplementary electric substation

- Twenty flywheel-based regulation pods
  - Each of one megawatt capacity
  - Each containing 10 individual flywheels and associated energy conversion, electrical control, and power distribution equipment

- Each located within a below ground pre-cast concrete housing approximately 25 feet by 70 feet in size at a depth of eight to ten feet below grade

- An electric service equipment unit with underground electric conduit connecting to all 20 pods

- A cooling system with underground mechanical piping that connects to the electric service equipment unit and all 20 pods

- A visitor center, a 25-foot by 40-foot one story building (may be a temporary structure) with electric heat and a closed tank domestic wastewater disposal system

- A storage shed, a 20-foot by 40-foot one story building

- A gravel entrance driveway and access ways through the site

- Five parking spaces

- A water supply well with a capacity of four gallons per minute

- A black vinyl-coated chain link perimeter fence and entrance gate

- Mechanical building (i.e., pump house) approximately 40 feet by 25 feet in size

- Landscaping to improve the visual appearance of the facility for residents and passing motorists

2.2.3 Project Systems

The project is planned with the following major systems:

- Electric Power Supply System: The supplementary electric substation would provide the interconnection point to the high voltage transmission lines. The transmission line voltage would be reduced to a much lower operating voltage. Switch gear would direct electric power to one pad-mounted oil-filled transformer for the building power loads and to ten (10) pad-mounted oil-filled transformers for the process loads, one transformer for every two pods. The power distribution conduit to the building transformer and to the transformers for the pods would be polyvinyl chloride (PVC) pipe in underground concrete duct banks.

- Cooling System: There would be a cooling loop to circulate coolant to cool the twenty pods. The coolant would be 75% water and 25% propylene glycol, a widely available biodegradable antifreeze. The central cooling system that removes the heat from the cooling loop would consist of four chillers and pumps. The pipelines distributing the coolant to the twenty pods would be underground copper pipe. The cooling loop is intended to be a closed system with no waste or emissions. A monitoring system would

indicate losses or leaks in the cooling loop as mandated per the "Notification of Zoning Review Action" contained in Appendix C.

- Plant Control System: Beacon would remotely operate the facility's plant control system. The facility is planned to operate as an unmanned facility with only occasional site visits to monitor operations and perform routine maintenance. The design of the plant control system has not been completely developed.

- Stormwater Management System: The stormwater management system would consist of catch basins, manholes, PVC pipeline, a collection area, and outfalls. Catch basin grates would be covered with removable filter fabric, the collection area would be a gently sloped grassed area, and the pipeline outfalls would include a crushed stone apron to dissipate energy and prevent erosion.

- Fire Alarm System and Security System: The fire alarm and security systems would be automatic sensor-based systems that are approved by and connected to the Stephentown Fire Department and the Stephentown Police Department. The designs of these systems have not been completely developed.

- Water Supply System: The water supply system would consist of an electric powered water supply well located at the front of the site. The well would have a demand of four gallons per minute. The only demand for water at the site would be for domestic use at the Visitor's Center and for topping off the chiller system.

- Wastewater Disposal System: The wastewater disposal system would be a closed tank system requiring periodic servicing. The only demand on the system would be for domestic wastewater generated from the Visitor's Center.

2.2.4 Construction Operations

The following are the planned major steps in the construction of the facility:

- Clearing: There has been some dumping, mostly asphalt shingles, at the site in the past. Any dumped material, the remains of fencing, and other miscellaneous material would be removed from the site. Approximately 1.7 acres of the wooded area would be completely cleared and stumps would be removed. (See Section 3.2 Site Features for a description of the site). Equipment required for site clearing would include the following: skidder, truck mounted chipper, log loader, hand tools (chainsaws), chip trucks, log trucks, excavator, dozer, and dump trucks.

- Excavation: The topsoil on the site would be stripped and stockpiled for future use. The site would be graded to a uniform slope over the area to be developed (approximately 5 acres). Cuts and fills of as much as four feet in depth would be required to create the proposed grades of the site. Excavated material would be reused on the site. The equipment required for Excavation would include the following: excavator, dozer, front end loader, uni-loader, backhoe, and dump trucks.

- Housings and Foundations: Pre-cast concrete housings - one for each of the flywheels - would be placed at a depth of eight to ten feet below grade. Groundwater control may be necessary at the base of the excavations for the housings. The housings would be founded on a crushed stone base over a geo-textile fabric. Buildings and other equipment would have shallow spread footing foundations. Equipment required for construction would include the following: uni-loader, compactor (driven), compactor (hand), air compressor and tools, delivery trucks, concrete trucks, truck cranes, 100 ton crane, and hand tools. Additional general use items would include hand tools, power tools, personal vehicles, trade vehicles, and a construction trailer.

- Pipelines: Underground PVC pipelines would be placed for the stormwater management system, the electric power distribution system, and the cooling system.

- Equipment Placement: The flywheels and other equipment that make up the pods would be placed on piers within the housings. Other equipment would be placed on foundations.

- Surfaces: Surface treatment would include impervious asphalt pavement, gravel surfaces, and loam and seed areas.

- Testing and Start-Up Process: The system would be tested in stages prior to becoming completely operational. Testing of each pod would be based on the procedure defined during the operation of Beacon's 1 MW pod at its Tyngsboro, Massachusetts facility.

2.2.5 Facility Life Span

The facility is expected to have a life span of at least twenty years as system components, including flywheel and power electronics, can continually be replaced over the facility's operation. The flywheel system represents the latest technological approach in frequency regulation to this point, but new developments may eventually supplant this technology in future years. The equipment is of such a scale that it can be readily removed from the site. The Special Use Permit (Appendix B) has several provisions under "Conditions" to cover decommissioning.

2.3 No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee for the proposed frequency regulation facility and, as a result, the facility would not be built as part of a DOE action. Unless project funding was obtained from another source, frequency regulation services would continue to be provided by a combination of traditional technologies, including coal- and natural gas-fired plants. As a result, the NYISO region would not realize the environmental benefits of reductions in CO_2 emissions and potential reductions in SO_2 and NOx emissions that flywheel technology would provide.

The decision for DOE consideration covered by this NEPA review is whether to approve the loan guarantee for the proposed Beacon project or not. This is a go/no-go decision. Beacon's

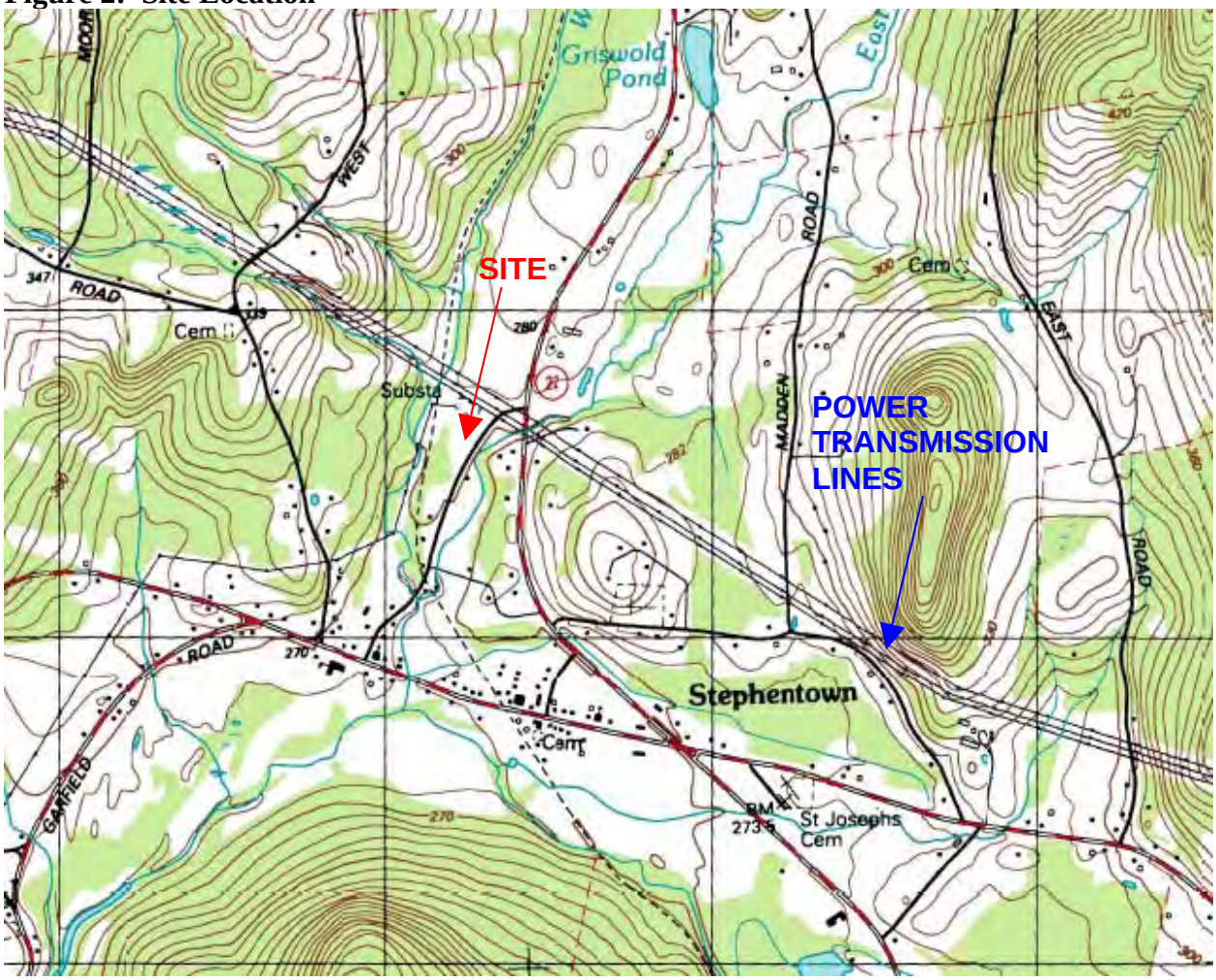
decision to select the Stephentown site is supported by the negative declaration issued by the Stephentown Planning Board pursuant to the environmental review conducted under the New York State Environmental Quality Review Act (Appendix A). Further, there are no unresolved conflicts concerning alternative uses of available resources associated with the project site that would suggest the need for other alternatives. Therefore, other than no action, there is no alternative to providing a loan guarantee to Beacon Power Corporation for construction of a flywheel-based frequency regulation facility in Stephentown, New York considered in this NEPA review.

3.0 AFFECTED ENVIRONMENT

3.1 Project Site

The site is located in Rensselaer County, New York, about a quarter of a mile north of the village of Stephentown, at the upper reaches of Kinderhook Creek. It is located in an area of fields and very low density woodlands on the west side of Grange Hall Road, near the point where the power transmission lines cross Route 22. The site is immediately south of an existing electric substation, encompassing approximately 7 acres and consisting of a cornfield, a wooded area, and a brush covered section of former railroad right of way. There are 360 feet of frontage on Grange Hill Road, a two lane paved roadway with a forty nine and a half foot layout that runs diagonally between Route 22 to the north and Route 43 to the south. There is a residence immediately to the south of the site and a residence to the southeast of the site on the east side of Grange Hall Road. The site is currently zoned Residential 1 (low density residential).

Figure 2: Site Location



U.S. Geological Survey Topographic Map, 1998
1 centimeter on the map represents 250 meters on the ground. Contour interval 6 meters.

3.2 Site Features

The existing site is undeveloped with the following features:

- Cornfield: A 2.2 acre cornfield is in the front half of the site facing Grange Hall Road.

- Wooded Area: A 2.6 acre wooded area is at the back half of the site. The wooded area backs up to the former railroad right of way that is at the rear of the site. The vegetation is mostly mature white pine and red pine. Some deciduous species – beeches, oaks, and cherries – have begun to intrude on the edges and in open areas. There are no trees present that are over one hundred years old or that are of local importance.

- Former Railroad Right of Way: The former railroad right of way of the Rutland Railroad forms the far west end of the site. The right of way is no longer continuous and is in multiple ownership. There are no remnants of track, ties, or signal equipment. The area is partially brush-covered. Some of this material may be removed during the facility installation. There is no indication that this area has ever been regularly used for the disposal of solid or hazardous waste.

- Trail: There is a trail that runs diagonally across the site from the existing substation to the north to the southeast corner of the site at Grange Hall Road. It is not known how long this trail has been in use or if it is considered an access route. There are no distinct origins or destinations associated with the trail and there are no easements or rights of way associated with the property. This trail is reportedly used by all terrain vehicles, although this type of use is not encouraged and is considered trespassing.

- Soil: The soils on the site are Hoosick gravelly sandy loam, which is a well-drained and structurally sound material.

- Geology: Test pits at the site have shown four to eight inches of overlying topsoil, then alluvial sand and gravel, then lacustrine silt, and then glacial till at approximately thirty feet below the ground surface. There are no bedrock outcroppings at the site and no unusual land forms. The soil is classified as “Site Class D – Stiff Soil Profile” based on the New York State Building Code. The potential for soil of this type to liquefy during an earthquake is minimal.

- Waterways: West Brook, a tributary of Kinderhook Creek, runs from north to south along the west side of the site adjacent to the former railroad right of way. East Brook, another tributary of Kinderhook Creek, runs from north to south along the other side of Grange Hall Road from the site. The New York State Department of Environmental Conservation (NYSDEC) has classified both these streams as Class C (TS). Class C waters are fresh surface waters and TS indicates that the classified waters are trout spawning waters. Any disturbance to the bed or banks of these streams would require a permit from the NYSDEC. The waterways in the area of the site – West Brook to the west and East Brook to the east – are not identified or designated under any wild or scenic river program.

- Wetlands: There are wetlands bordering West Brook. The NYSDEC has found that there are no freshwater wetlands under their jurisdiction on the site. There are wetlands contiguous to West Brook under Federal jurisdiction; however, they are not on the project site. The site topography rises sharply up from West Brook and the former railroad right of way, and wetlands do not extend from the immediate environs of West Brook to the site. There are pockets of isolated wetlands in the southeast corner of the site approaching the culvert under Grange Hall Road. These isolated pockets are not Federal or state regulated wetlands.

- Drainage Patterns: There is a high point on the north side of the site. Most of the site is gently sloping southeastward towards Grange Hall Road. There is a gentle swale that directs runoff towards an existing culvert in the southeast corner of the site. This eighteen inch diameter culvert crosses under Grange Hall Road and towards East Brook. The far west end of the site that consists of the former railroad right of way slopes more steeply off to the west. There are no clear drainage patterns in this area; the destination of runoff from the far west end of the site is West Brook, running along the edge of the former railroad right of way.

- Groundwater: The groundwater depth on the site ranges from eight to ten feet below the surface, with seasonal variations. The groundwater follows the overall topography of the site, sloping downward to the south and to the west.

- Aquifers: Stephentown has no public water supply wells and there is not a defined aquifer in the area. This is based on a review of the United States Geological Survey map of "Unconsolidated Aquifers in Upstate New York."

3.3 Air Quality

Under the Clean Air Act (CAA) of 1970, as amended (42 United States Code [USC] §§ 7401 et seq.), national ambient air quality standards have been adopted for six criteria pollutants—ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (PM10 and PM2.5), and airborne lead. The national ambient air quality standards are enforced by the states via local air quality agencies. States may choose to adopt their own air quality standards, but state standards must be at least as stringent as Federal standards.

The U.S. Environmental Protection Agency (EPA) evaluates whether the criteria air pollutant levels within a geographic area meet national ambient air quality standards. Areas that violate air quality standards are designated as nonattainment areas for the relevant pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme for ozone, and moderate and serious for carbon monoxide and PM10). Areas that comply with air quality standards are designated as attainment areas for the relevant pollutants.

The Beacon project would be located in Stephentown, NY in Rensselaer County. Rensselaer County is classified as a marginal non-attainment area for 8-hour ozone and an attainment area for other criteria air pollutants.

4.0 POTENTIAL ENVIRONMENTAL IMPACTS

This section contains an evaluation of the potential environmental impacts from the proposed Beacon 20 MW flywheel-based frequency regulation facility.

4.1 Reduced Dependence on Fossil Fuels and Energy Efficiency

Adoption of flywheel-based frequency regulation would reduce the amount of fossil fuels normally used by power plants to accomplish this function, resulting in a reduced dependence on fossil fuels. Fossil-based plants must cycle up and down to perform frequency regulation. For coal and natural gas plants, thermal cycling while performing frequency regulation reduces efficiency for the entire plant and results in the consumption of 0.5 to 1.5% more fuel than what would be used if operated on a steady state basis.[3] Commercial deployment of flywheel-based frequency regulation could mean that higher-cost coal- and gas-fired plants would be able to drop the regulation function and focus on providing wholesale energy. The net impact of operating coal- and gas-fired plants on a constant basis would be to raise their efficiency by 0.5 to 1.5%.

4.1.1 Increased Generation Capacity

Flywheel-based frequency regulation can be sited almost anywhere on the grid. Installing additional flywheel-based frequency regulation allows the recapture of the fraction of generation capacity that must otherwise be reserved to perform frequency regulation. The regained base load capacity would not require permitting or incur long construction cycles and delays since those fossil plants are already in place.

4.1.2 Facilitation of the Integration of Renewable Energy Sources

Deployment of flywheel-based frequency regulation can accelerate the integration of large-scale wind and solar power projects reliably and cost effectively, which will help reduce dependence on fossil fuels and vulnerability to fuel disruption, lower energy costs, and reduce carbon emissions and other forms of pollution. A safe, reliable, and efficient modern grid should be capable of integrating pollution-free renewable energy generation resources without causing deterioration of generation, transmission or distribution operations.

The advent of renewable portfolio standards, state policies that requires electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date, has furthered the development of renewable energy sources. States, including New York, are adopting and implementing renewable portfolio standards that encourage higher market penetration of wind and solar power. The highly variable nature of these resources presents a challenge for utilities and grid operators. For example, a study published in November 2007 by the California Independent System Operator (CAISO) "focused on integrating a total of approximately 6,700 MW of wind generation" on its operating systems. The report stated, "ISO

[3] Emissions Comparison for a 20 MW Flywheel-based Frequency Regulation Power Plant, May 18, 2007, KEMA, p. 4, 10, 19.

regulation capacity requirements will increase by 170 MW to 250 MW for 'Up Regulation [(power increase)]' and 100 MW to 500 MW for 'Down Regulation [(power decrease)].' "[4]

As the penetration of wind energy increases, the grid's ability to buffer its intermittency may degrade because of the length of time required for fossil and hydro-based frequency regulation to adjust for demand. Flywheel-based frequency regulation has a ramp rate more than 10 times that of conventional frequency regulation providers; therefore, it can be a far more effective frequency regulation resource and balancing buffer between variable wind and solar generation, slower ramping conventional fossil generation, and demand response resources.[5]

4.2 Floodplains

The project site is not in a floodplain. The Federal Emergency Management Agency flood insurance map of this area shows a "Zone A" floodplain bordering West Brook and East Brook (see Figure 3). The Zone A 100-year floodplain definition applies to areas subject to inundation by a 1-percent-annual-chance flood event. The easterly extent of the West Brook floodplain is limited by the old railroad grade, and the westerly extent of the East Brook floodplain is limited by Grange Hall Road. The project would have no impact on the 100-year floodplain.

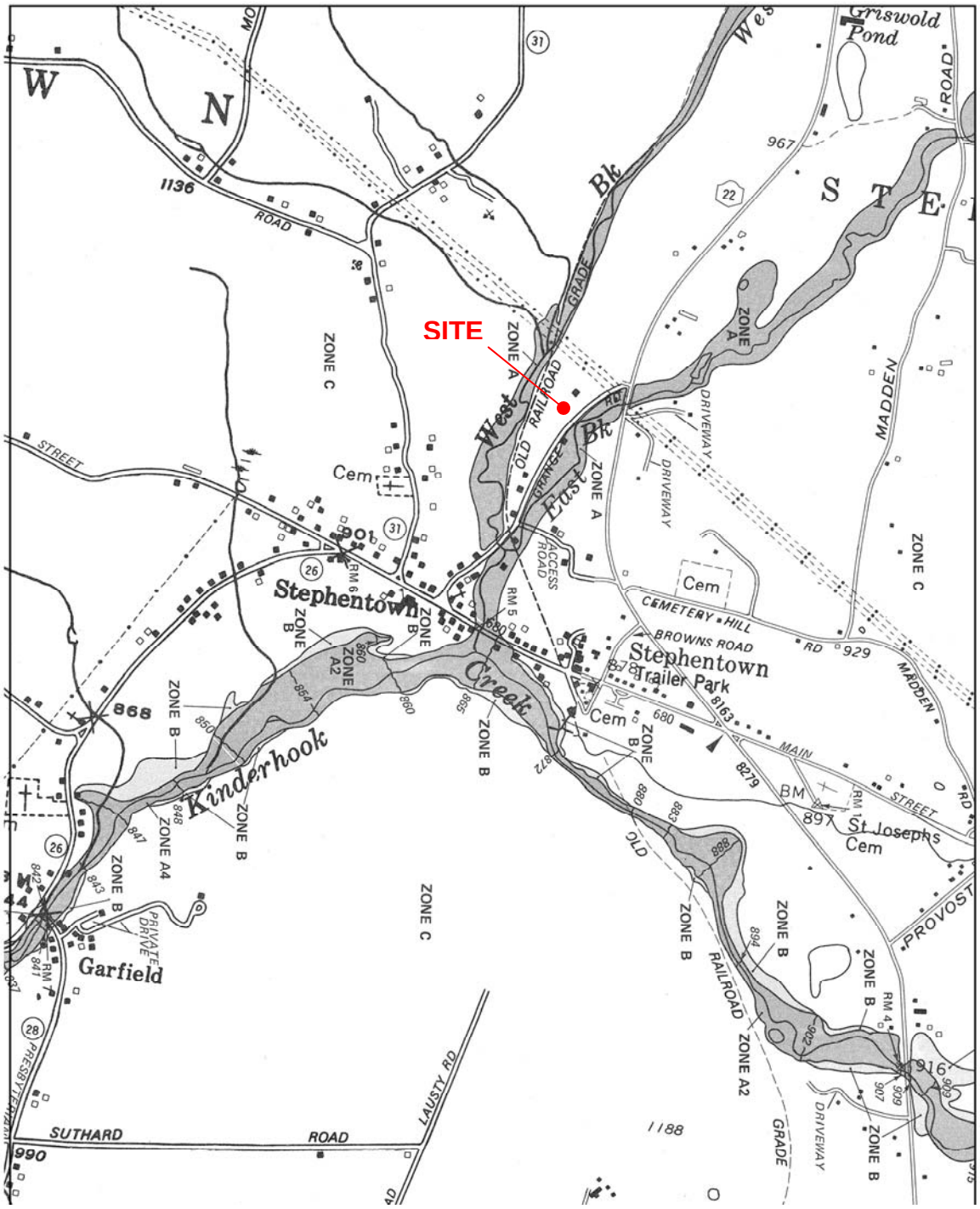
4.3 Wetlands

The NYSDEC has found that there are no freshwater wetlands on the site that are under their jurisdiction; therefore, an NYSDEC permit would not be required. Section 404 of the Clean Water Act regulates development in wetlands and requires a permit from the U.S. Army Corps of Engineers to dredge or fill in wetlands. There are wetlands contiguous to West Brook that are under Federal jurisdiction; however, the site topography rises sharply up from West Brook and the wetlands do not extend from the immediate environs of West Brook to the project site. The development of the site would take place approximately 90 to 130 feet from West Brook, and the outfalls of the stormwater system would be set back from any wetlands bordering West Brook. The project would not impact wetlands along West Brook. There are pockets of isolated wetlands in the southeast corner of the site approaching the culvert under Grange Hall Road. The proposed action would have no impact on these wetlands.

[4] Integration of Renewables, November 2007, CAISO, http://www.caiso.com/1ca5/1ca5a7a026270.pdf.

[5] Ramp rate is the rate at which the amount of electric power delivered or required can be increased. Demand response resources are businesses and facilities that have agreed to curtail their energy use during times of peak demand.

Figure 3: Site Location



Federal Emergency Management Agency Flood Insurance Rate Map
Town of Stephentown, New York; Panel 20 of 30; Effective date: August 3, 1981

4.4 Water Resources and Water Quality

- Waterways: The waterways immediately to the west and east of the site – West Brook and East Brook – would not be altered or impacted by the proposed project.

- Aquifer: The site is not within a defined aquifer based on a review of the United States Geological Survey map of "Unconsolidated Aquifers in Upstate New York."

- Water Supply Wells: The Town of Stephentown does not have a public water supply and there are no public water supply wells in the area. Town residents get their water from private wells. The water supply well at the site would have a very low demand of four gallons per minute that would not interfere with the availability of water for wells in the area. Water Well Notification would be made to the NYSDEC if the well were constructed.

- Groundwater: The site design for the project would allow the groundwater to be recharged through infiltration through large areas of pervious gravel surface and a loam and seed storm water collection area. No backfilled structural foundations or backfilled pipeline trenches at the site would be deep enough to be an impediment to the flow of groundwater. There would be no storage of material on site that would have the potential to affect the quality of the groundwater in the area. The Rensselaer County Bureau of Economic Development and Planning has requested that a monitoring system be provided for the propylene glycol coolant system to warn of losses or leaks so that the propylene glycol coolant would not find its way into the groundwater (see Appendix C). Such a monitoring system would be provided.

- Stormwater: A State Pollutant Discharge Elimination System Permit from the NYSDEC is required to regulate stormwater management where there is a disturbance of more than one acre of land, as would be the case with this project. This permit requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP). In its July 17, 2008 findings and Decision of the Planning Board of Stephentown, the Planning Board set out a condition that the final site and building plan be submitted to the Board by the Town designated engineer prior to the issuance of any building or site disturbance permit (Appendix B). The final permit submission would include a Final Stormwater Management Report documenting compliance with NYSDEC standards in effect at the time of construction and a Final SWPPP.

4.5 Fish and Wildlife

The existing woodlands and open fields and the border between these two environments provide wildlife habitat. The project would result in the permanent loss of approximately 2 acres of wooded area consisting of mostly mature white pine and red pine. The developed areas of the site – with paved and graveled surfaces and equipment foundations - would provide little in the way of habitat as replacement.

The waterway immediately to the west of the site, West Brook, would not be altered by the project. The stream to which this waterway is a tributary, Kinderhook Creek, is stocked with brown trout by NYSDEC. Some natural reproduction of brown trout or brook trout may occur in West Brook. The developed area of the site would be approximately 90-feet to 130-feet from West Brook, and any stormwater system outfalls would be set to avoid impact on the banks of the brook or any bordering wetlands. Best management practices to control sediment and stormwater runoff to West Brook would be employed; therefore, the proposed action is not expected to impact aquatic life in the brook.

Migratory birds in North America are an international resource, with numerous species breeding throughout the United States and Canada. In the fall these birds migrate south to winter in the southern parts of the US, Mexico, and Central and South America. Because of the migratory nature of these species and their interstate and international movements, ultimate management authority lies with the Federal government. The project area is located in the Atlantic flyway. The project site may be utilized by migratory birds foraging or migrating through the area; however, the project would not take or otherwise harass migratory birds.

4.5.1 Threatened, Endangered, or Candidate Species and Critical Habitats

There are three species of concern in Rensselaer County identified by the United States Fish and Wildlife Service – the Bald Eagle, the Indiana Bat, and the Shortnose Sturgeon. The Bald Eagle is no longer endangered or threatened, but it is protected under the Bald Eagle and Golden Eagle Protection Act. No eagles or eagle nesting areas have been observed at the site. The Indiana Bat is endangered and may or may not be present in the County. It would not typically be found in the pine woodlands and the open fields of the site. The Shortnose Sturgeon is endangered. It occurs primarily in the Hudson River and is unlikely to be found in the small waterways in the area of the site. (Appendix E contains a list of Federally listed species).

The NYSDEC has reviewed the site as a potential resource with regard to rare animals, rare plants, and significant natural communities. The NYSDEC Division of Fish, Wildlife & Marine Resources has determined that they have no records of known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats on or in the immediate vicinity of the site (Appendix D). No threatened, endangered, or candidate species or their habitat would be affected by the project. The U.S. Fish and Wildlife Service New York Field Office acknowledged the no impact determination for the project and indicated that no further coordination or consultation was required (Appendix E).

4.6 Prime or Unique Farmlands

The project would result in the permanent loss of approximately 2 acres of land that has been cultivated and used as a cornfield in recent years. The length of time this section of the property has been in this use is not known. The project would remove this site from future use as agricultural land; however, the farmland that would be lost is not prime or unique.[6]

[6] U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

4.7 Geology and Soils

The soils on the site are typical of the central valley of Stephentown, that is, Hoosick gravelly sandy loam, a well drained and structurally sound material. A percolation test has shown that the soil is suitable for onsite wastewater treatment (Appendix H). The soil is classified as "Site Class D – Stiff Soil Profile" based on the New York State Building Code. The potential for soil of this type to liquefy during an earthquake is minimal and the seismic hazard for the area is low.[7] Construction of the proposed facility will not cause geological or soils-related impacts.

4.8 Visual, Recreational, and Aesthetic Resources

Part of Cherry Plain State Park is located in the north end of Stephentown several miles from the site. The site is not open space that is available or has ever been available for community use. No state or national parks, forest conservation areas, or areas of recreational, ecological, scenic, or aesthetic importance would be affected by the project. There is no formal recreation, hunting, or fishing activity at the site. The trail through the site is reportedly used for all-terrain vehicles, but this use is not encouraged and is considered trespassing. The Rensselaer County Bureau of Economic Development and Planning has indicated that members of the community have expressed interest in using the former railroad right of way as a walking path. The proposed location of the facility would not preclude this use.

The woodlands and fields are a pleasant environment, but not unusual in this area or unique in any way. Views in the area are dominated by the electric power transmission lines that are located immediately to the north of the site. Landscaping around the facility would minimize any visual impacts from the project.

4.9 Property of Historic, Archaeological, or Architectural Significance

The National Historic Preservation Act requires under Section 106 that Federally funded, licensed, or permitted projects be reviewed for their potential impact on historic properties. Section 14.09 of the New York State Parks, Recreation, and Historic Preservation Law requires the review of projects funded, licensed, or permitted by the State of New York for their potential impacts on historic properties. Beacon consulted with the New York State Historic Preservation Officer and the NYSDEC, which found that the project site is in an area of potential archaeological significance. As a result, a Phase One Archaeological Survey was conducted on 4.84 acres within the project site that included background research, site reconnaissance, and limited field exploration. There are no buildings or structures on the site. The survey revealed a small historic deposit in the northwestern portion of the site consisting of glass fragments, ceramics, and nails. This deposit was found to have very low research value and no potential for listing on the State and National Register of Historic Places (Appendix F includes a summary of the final report and site photos).

[7] U.S. Geological Survey Seismic Hazard Maps, http://earthquake.usgs.gov/regional/states/new_york/hazards.php.

The New York State Office of Parks, Recreation and Historic Preservation issued an opinion that the project would have no impact on cultural resources in or eligible for inclusion in the State and National Register of Historic Places (Appendix G).

If unanticipated archaeological materials are encountered during construction, appropriate actions will be taken pursuant to Section 800.13 of the Protection of Historic Properties regulations (36 CFR Part 800), including contacting the New York State Historic Preservation Officer.

4.10 Native American Concerns

There are no Tribal properties or sites of religious and cultural significance to Tribes in the area. The U.S. Department of Housing and Urban Development's Tribal Directory Assessment Tool, designed to identify Tribes and assist with consultations under the National Historic Preservation Act, does not list any Tribes with an interest in Rensselaer County.[8] No Native American concerns associated with the project have been identified.

4.11 Environmental Justice

In February 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order requires that "each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities, on minority populations and low-income populations" (Executive Order 12898, 59 Federal Register 7629 [Section 1-201]).

CEQ has issued guidance to Federal agencies to assist them with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. DOE guidance recommends that DOE consider pathways or uses of resources that are unique to a minority or low-income community before determining that there are no disproportionately high and adverse impacts on the minority or low-income population.[9]

There minority population in Stephentown is approximately 2%. According to the 2000 census, 98% of the population is white. Hispanic or Latino people of any race were approximately 1% of the population. In terms of low income residents, 6.6% of the population was below the poverty line according to the 2000 census. It is not expected that any radical changes in the minority or low income population have taken place since the 2000 census. There are no concentrations of low-income or minority populations in the vicinity of the proposed Beacon site.[10] The project would not have disproportionally high and adverse environmental impacts to minority or low-income populations.

[8] http://www.hud.gov/offices/cpd/environment/tribal/.
[9] Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements, Second Edition, December 2004, DOE.
[10] U.S. Environmental Protection Agency, EnviroMapper Justice Geographic Assessment Information, http://www.epa.gov/enviro/html/em.

4.12 Public Health and Safety

- Equipment Malfunctions: It is possible that a flywheel unit could become out of balance. If a flywheel unit goes out of balance, the flywheel would shut down. Each flywheel is currently planned to be electrically isolated so individual flywheels can be swapped out without shutting down the complete 1 MW pod.

- Dust: The principal operating elements of the facility are the flywheels, which would be contained in vacuum sealed vessels. This operation would not generate dust. The gravel surfaces on the site would be of sufficient particle size that they would not generate dust. All areas other than paved surfaces and gravel surfaces would be surfaced with loam and seed.

- Worker Safety: All construction and maintenance activities would be conducted in accordance with Occupational Safety and Health Administration (OSHA) guidelines.

4.13 Air Quality

Both direct and indirect air quality impacts are discussed in this EA. Direct impacts are those caused by the project and occur at the same time and place. Indirect impacts are those that occur later in time or are farther removed in distance from the project site but are still reasonably foreseeable (40 CFR Part 1508.8).

4.13.1 Direct Impacts

The Beacon facility would not generate air emissions directly related to facility operation. The operation of the facility would generate very little traffic and would not burn fossil fuels. No air quality impact would be directly associated with the project.

Emissions estimates for construction of the project cannot be accurately calculated without a detailed construction schedule, which is not available at this time. Given the size of the project site and temporary nature of construction activities, no air quality impacts from construction are anticipated.

4.13.2 Indirect Impacts

Frequency regulation could be provided by several sources, including plants that burn coal or natural gas to generate electric power. Pumped storage hydro systems are also capable of providing frequency regulation.[11] Coal plants directly emit carbon dioxide (CO_2), sulfur dioxide (SO_2), and nitrogen oxides ($NO_{x)}$. Natural gas plants emit CO_2 and NO_x.

The use of coal- and natural gas-fired power frequency regulation results in increased fuel consumption of 0.5 to 1.5% because power plants that have to produce fluctuating levels of

[11] Pumped storage hydro systems do not directly emit air pollutants; however, they consume energy to perform frequency regulation functions.

electricity are less efficient than those producing at a more consistent level.[12] An appropriate analogy to exemplify this loss in efficiency is that cars achieve a lower fuel economy in stop-and-go city traffic than they do during continuous highway driving. The flywheel facility, by responding to commands from the ISO, would take electric power from the grid when required, store it, and make it available when the power is needed. By providing frequency regulation more efficiently, flywheel-based technology reduces the need to burn additional fossil fuels, resulting in less greenhouse gas (CO_2) emissions. The Beacon facility is expected to reduce CO_2 emissions in the NYISO region from levels that would exist if equivalent frequency regulation were provided by sources using coal, natural gas, or pumped storage hydro systems.

The operation of Beacon's facility is not 100% efficient. The energy Beacon would use in providing frequency regulation would come from a variety of sources providing power to the NYISO grid (i.e., the generation mix). These power sources emit various levels of CO_2, SO_2, and NO_x. Figure 4 shows the overall percentage of power sources for the NYISO region.

The frequency regulation provided by Beacon would displace electricity produced for regulation purposes that otherwise would have been supplied to the grid by a variety of sources which emit varying levels of CO_2, SO_2, and NO_x. Since the Beacon facility draws power from the grid (i.e., net consumer of energy) to perform its frequency regulation function, SO_2 and NO_x emissions could decrease, remain the same, or increase in the NYISO region at various times depending on the generation mix used by the Beacon facility and which source of frequency regulation Beacon would displace in the frequency regulation market.

Figure 4: NYISO Air Emissions per Power Source and Total for 2004

Emissions Per Fuel Mix

Fuel Type	Fuel Mix (%)	CO_2 (lbs/MWh)	CO_2 (tons)	SO_2 (lbs/MWh)	SO_2 (tons)	NO_x (lbs/MWh)	NO_x (tons)
Coal Power Plant	16.6	2,158	24,656,302	13.47	153,909	2.80	31,973
Natural Gas	19.6	1,309	17,623,812	0.10	1,360	0.63	8,512
Oil	15.3	1,707	18,019,712	6.04	63,745	2.12	22,350
Nuclear	29.5						
Hydro	17.0						
Wind	0.1						
Biomass	1.5						
Other	0.4						

[12] Emissions Comparison for a 20 MW Flywheel-based Frequency Regulation Power Plant, May 18, 2007, KEMA, p. 4, 10, 19.

Total Regional Emissions

	Total Generation (MWh)	CO_2 (tons)	SO_2 (tons)	NO_x (tons)
NYISO	137,716,250	62,400,602	238,895	72,857
NYISO Total Emission Rate (lbs/MWh)		906	3.47	1.06

4.13.3 Global Climate Change

The only cumulative impact associated with the proposed project is the reduction of CO_2, a greenhouse gas, and the resulting beneficial impact on global climate change. The demand rate for electric energy and the generation rate are both constantly fluctuating; as a consequence, frequency regulation is necessary to help maintain balance in the electricity grid. Across the United States, frequency regulation facilities provide this balancing by increasing or decreasing their power output around a predetermined set point as required. Currently, frequency regulation plants may be fueled by natural gas, coal, or pumped storage hydro systems. It is estimated that frequency regulation results in increased fuel consumption on the order of 0.5 to 1.5%. By providing frequency regulation more efficiently, flywheel-based technology reduces the need to burn additional fossil fuels, resulting in fewer emissions of CO_2, a greenhouse gas. The Beacon facility is expected to result in the reduction of CO_2 emissions in the NYISO region equal to the amount of CO_2 that would be generated if frequency regulation were provided by sources using coal, natural gas, or pumped storage hydro systems. Use of flywheel frequency regulation would reduce CO_2 emissions in the NYISO region and have a beneficial impact on global climate change. If used widely throughout the U.S., this beneficial impact would be amplified.

4.14 Waste Management

The following are the waste management issues associated with the site:

- Domestic Wastewater: The domestic wastewater generated from the site would be related to the use of the Visitor's Center. This would be an unoccupied facility intended for occasional meetings or office use. The on-site closed tank system for the collection of domestic wastewater would be periodically pumped and maintained by a contract service.

- Solid Waste: The generation of solids waste would be limited to the gathering of wind-blown papers from site cleanup, the solid waste generated by use of the Visitor's Center, and the material trapped in the filter fabric of the storm water management system. Stephentown has a municipal transfer station where this material can be disposed of by a contract service.

- Hazardous Waste: Currently, the only known potentially hazardous material used at the site would be the transformer oil. Current plans are to use mineral-based oil, the specific amount to be determined. The mineral-based oil would be recycled or properly disposed of if required and is not considered a hazardous waste per the Resource Conservation and Recovery Act regulations at 40 CFR 261, Identification and Listing of Hazardous Waste.

4.15 Transportation

The operating facility would not be a major generator of vehicle trips. Vehicle trips would be limited to occasional monitoring visits and occasional scheduled maintenance visits. There would be temporary traffic associated with the construction of the facility. Grange Hall Road is a two-lane paved road able to accommodate this limited increase in traffic. Per the Negative Declaration from the Stephentown Planning Board, the Town of Stephentown has documented that the proposed project will not create traffic, danger, or congestion as a result of construction or operation of the proposed facility (Appendix A).

4.16 Socioeconomic Conditions

There would be little change in socioeconomic conditions related to the construction and operation of the facility:

- Community Facilities: The facility would be located about a quarter of a mile to the north of the center of the village of Stephentown. The Stephentown Memorial Library, churches, and schools are located in this area. The facility would not affect these or other community facilities.

- Employment: The construction of this facility would take one year or less and would result in a temporary demand for construction services. The existing construction industry in the area would be able to handle this demand with no disruptions. Once constructed, the facility would have no on-site personnel and no employment demand. Services required at the site would be limited and can be readily assimilated by local service providers.

- Community Service Requirements: The facility would have very limited demands for public services other than those related to public safety. It is assumed that the facility can be incorporated into regular police patrols of the area. The Fire Department would have key access to the facility. Orientation would be provided to the Police Department and the Fire Department to familiarize them with the facility and its operation.

4.17 Noise

The principal operating elements of the facility would be the flywheels, which would be contained in vacuum sealed vessels. These vessels would be located in pre-cast concrete housings that would be set below ground level. There would be very little noise generated from flywheel operations. The chillers and other electrical equipment necessary to support operations would generate some noise. The goal is to maintain and control any noise that is generated from the facility to a level that does not significantly increase the background noise level at the south and east of the property. Two noise studies have been performed and were included as findings before the Stephentown Planning Board, which unanimously approved the State Environmental Quality Review (SEQR) indicating that the project is environmentally sound (i.e., a “Negative Declaration”). Appendix I, the noise analysis report prepared by Novus Engineering, provides an explanation of the study of sound (Noise Basics) as well as information on the project.

In its report cited above, Novus Engineering noted that the NYSDEC policy, "Assessing and Mitigating Noise Impacts" (DEP-00-1, Rev. 2/2/01), referenced an EPA document, "Protective Noise Levels" (550/9-79-100, November, 1978), which states that ambient noise levels of 55 dB(A) L_{dn} are sufficient to protect public health and welfare. Novus also observed that the NYSDEC recommends that the sound pressure level in non-industrial areas should not exceed ambient noise by more than 6 dB(A) at the receptor (DEP-00-1, p. 13). Based on measurements taken on and near the site, Novus concluded that a 55 dB(A) L_{dn} would meet this recommendation. In order to add an extra margin of protection to mitigate any adverse noise impacts, the Planning Board of Stephentown established a slightly lower maximum level of 50 dB(A).

In its July 17, 2008 Findings and Decision, the Stephentown Planning Board stated that the project would produce average noise levels under 45 dB(A) and a maximum L_{dn} of less than 50 dB(A) and established that as the standard for the project (Appendix B). The Board also set out a condition that, based on final equipment for the site, a final noise study would be submitted by Beacon certifying that the frequency regulation facility operation complies with the noise standards outlined in the Board's SEQR Findings.

During the construction phase of the project (approximately 12 months), the construction time on the site will be Monday through Saturday from 7:00 a.m. to 5:00 p.m. The only exceptions would be to accommodate for specific circumstances, such as concrete pouring, equipment not on site on time, and transit trucking arriving early or departing late. Any scheduled time outside of the listed hours would require approval and or permits from the police and or public works department. There are no plans to use equipment out of the ordinary for any part of the construction. The construction company only owns or rents the newest excavation equipment available, which are designed to keep construction noise to a minimum. It is anticipated that the loudest phase will be the tree clearing, which would take a week or less barring any problems. All construction activities would be conducted in accordance with OSHA guidelines, which address noise and hearing conservation in specific standards for the construction industry. Noise from construction would be temporary and limited to day time hours and is not anticipated to impact local residents.

4.18 Evaluation of Terrorism-Related Impacts

DOE believes that the proposed Beacon flywheel-based frequency regulation facility presents an unlikely target for an act of terrorism and has an extremely low probability of attack. The potential for the proposed action considered in this EA to result in terrorism-related activity or impacts would be negligible. A black vinyl-coated chain link perimeter fence and entrance gate would limit access and deter potential intruders.

4.19 State Environmental Quality Review Act

The purpose of the State Environmental Quality Review Act is to incorporate the consideration of environmental factors in the planning, review, and decision-making processes of state, regional, and local government agencies at the earliest possible time. The Town of Stephentown

Planning Board assumed the role of lead agency for the SEQR process. A Negative Declaration and Determination of Non-Significance was unanimously approved by the Stephentown Planning Board and issued on July 7, 2008 (Appendix A).

4.20 Local Zoning and Permitting

A Notification of Zoning Review Action was received from the Rensselaer County Bureau of Economic Development and Planning on March 11, 2008, with the determination that "…the proposal does not have a major impact on County plans and that local consideration shall prevail" (Appendix C). The facility would be located on a property parcel that lies within the "Residential 1" Zoning District. The use of the parcel for the frequency regulation facility requires a Special Use Permit from the Town of Stephentown Planning Board, which was granted on July 17, 2008 (Appendix B). The facility would also require a Building Permit from the Stephentown Building Department, which can not be approved until a full set of construction drawings has been finalized.

4.21 Environmental Impact of No Action Alternative

Under the No Action Alternative, DOE would not issue a loan guarantee for the proposed frequency regulation facility and the facility would not be built as part of a DOE action. Unless project funding was obtained from another source, frequency regulation would have to be provided by other facilities, most likely using fossil fuel. In such an instance, expected CO_2 and potential SO_2 and NOx emission reductions would not occur. If the Beacon facility were not built, the field and forest at the site would remain, although the property could still be used for other purposes, e.g., residential property. If DOE does not issue a Federal loan guarantee for this project, the Agency would not be encouraging commercial use of flywheel-based power frequency regulation to achieve the environmental benefits of reductions in anthropogenic emissions of greenhouse gases and other air pollutants.

5.0 REGULATORY REQUIREMENTS

5.1 Applicable Federal Regulatory Requirements and Coordination

Federal requirements include:

- National Environmental Policy Act (42 USC 4321-4370)
- Endangered Species Act (16 USC 1531-1543)
- Fish and Wildlife Coordination Act (16 USC 661, et seq.)
- Migratory Bird Treaty Act (16 USC 701, et seq.)
- Clean Water Act (33 USC 1251 et seq., as amended)
- Farmland Protection Policy Act (7 USC 4201 et. seq., as amended)
- National Historic Preservation Act (16 USC 470 et seq., as amended)
- Archeological Resources Protection Act (16 USC 470)
- Clean Air Act (42 USC 7401 et seq., as amended)
- DOE Compliance with the National Environmental Policy Act (10 CFR Part 1021)
- DOE Compliance with Floodplain and Wetland Environmental Review Requirements (10 CFR Part 1022)
- Executive Order 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991)
- Executive Order 11990, Protection of Wetlands
- Executive Order 11988, Floodplain Management
- Executive Order 12088, Federal Compliance with Pollution Control Standards
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations
- Executive Order 13186, Protection of Migratory Birds

5.2 State, Regional, and Local Environmental Review Requirements

State environmental review requirements include:

- State Environmental Quality Review Act
- State Pollutant Discharge Elimination System Permit
- State Department of Environmental Conservation Wetlands Permit
- State Department of Environmental Conservation Rare Animals, Rare Plants, and Significant Natural Communities Review
- State Historic Properties Review
- State Department of Environmental Conservation Water Well Notification

Regional review requirements include:

- Rensselaer County Bureau of Economic Development and Planning Zoning Review

The Town of Stephentown review requirements include:

- Town of Stephentown Special Use Permit
- Town of Stephentown Building Permit

5.3 Existing or Pending Legislation, Regulation, or Litigation

No pending legislation, regulation, or litigation that could impact the project has been identified.

6.0 LIST OF PREPARERS

The following persons were primarily responsible for preparing this EA:

Matthew McMillen, NEPA Compliance Officer, Office of the Chief Financial Officer, DOE

Sharon Thomas, NEPA Document Manager, Loan Guarantee Program Office, DOE

Joseph Montgomery, Senior Associate, Technology and Management Services, Inc.

Matt Polimeno, Director of Government Programs, Beacon Power Corporation, with support from other Beacon Power personnel and Jacobs Carter Burgess

7.0 LIST OF AGENCIES CONTACTED AND REFERENCES FOR APPENDICES

New York State Environmental Quality Act Negative Declaration and Special Use Permit	Town of Stephentown Planning Board Thomas Morelli, Chairman Town Hall, 26 Grange Hall Road Stephentown, NY 12168
Notification of Zoning Review Action, RCBP # 08-14, March 11, 2008	Rensselaer County Bureau of Economic Development and Planning 1600 Seventh Ave. Troy, NY 12180
State-listed Species Letter, April 7, 2008	New York State Department of Environmental Conservation Division of Fish, Wildlife and Marine Resources New York Natural Heritage Program 625 Broadway Albany, NY 12233
U.S. Fish and Wildlife Service	New York Field Office 3817 Luker Rd. Cortland, NY 13045
Phase I Archaeological Investigation, April 16, 2008	Hartgen Archeological Associates, Inc. 1744 Washington Ave. Exit Rensselaer, NY 12144
Percolation Test, Nov. 27, 2007	Aiken Engineering 287 Mannix Road East Greenbush, NY 12061
Noise Analysis for the Beacon Power Project, May 7, 2008	Novus Engineering, P.C. 25 Delaware Avenue Delmar, NY 12054
Project Review Letter	New York State Office of Parks, Recreation and Historic Preservation Historic Preservation Field Services Bureau Peebles Island PO Box 189 Waterford, NY 12188

APPENDIX A
NEW YORK STATE ENVIRONMENTAL QUALITY REVIEW
NEGATIVE DECLARATION

14-12-7 (2/87)-9c SEQR

617.21
Appendix F
State Environmental Quality Review
NEGATIVE DECLARATION
Notice of Determination of Non-Significance
Town of Stephentown Planning Board

Project Number / Name: **2008-1 / Beacon Power Special Use Permit** **Date: July 7, 2008**

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The **TOWN OF STEPHENTOWN PLANNING BOARD**, as lead agency, has determined that the proposed action described below will not have a significant effect on the environment and a Draft Environmental Impact Statement will not be prepared.

Name of Action: BEACON POWER CORPORATION SPECIAL USE PERMIT

SEQR Status: **Type I**
Unlisted X

Conditioned Negative Declaration: **_ Yes**
X No

Description of Action: **Granting of a Special Use Permit for the construction of an electrical energy storage facility and ancillary buildings.**

Location: (Include street address and the name of the municipality/county. A location map of appropriate scale is also recommended.)

The project is located on the west side of Grange Hall Road on a parcel adjoined on the north by a National Grid electrical substation.

APPROVED
TOWN OF STEPHENTOWN
PLANNING BOARD
BY
DATE 7-7-08

SEQR Negative Declaration Page 2

Reasons Supporting This Determination:
(See 617.6(g) for requirements of this determination; see 617.6(h) for Conditioned Negative Declaration)

- **See attached report from Clough, Harbour and Associates LLP for supporting documentation. Report provides summary of information included in the following, the contents of which are incorporated herein and by reference:**
  - **Site Plans dated last 5/7/2008 by Carter Burgess**
  - **Noise Study dated May 7, 2008 by Novus Engineering**
  - **Application package dated 12/18/2007 submitted by Brian Baker**
  - **Supplemental Information**
    - **Submitted 4/11/2008 by Brian Baker**
    - **Submitted 5/6/2008 by Brian Baker**
    - **Submitted 5/14/2008 by Brian Baker**
    - **Wetland Assessment dated 4/4/2008 by Carter Burgess**
    - **Phase IA Archeological Study May 2008 by Hartgen Associates**
    - **Submitted 3/17/2008 by Beacon Power**
    - **July 3, 2008 letter from Lori J. Blair to Cynthia Blakemore of NYSOPRHP with attachments; E-mail from Mike Bianchino dated July 7, 2007.**
  - **Public Comments from Planning Board Meetings**
  - **Correspondence**
    - **Cheryl Roberts dated April 17, 2008**
    - **Cheryl Roberts dated May 15, 2008**
    - **Noise Study review dated June 17, 2008 by Richard Horonjeff**

If Conditioned Negative Declaration, provide on attachment the specific mitigation measures imposed.

For Further Information: **TOWN OF STEPHENTOWN PLANNING BOARD**
Contact Person: **THOMAS MORELLI, CHAIRMAN**
Address: **TOWN HALL**
26 GRANGE HALL ROAD
STEPHENTOWN, NY 12168
Telephone Number: **(518) 733-9195**

For Type 1 Actions and Conditioned Negative Declarations, a Copy of this Notice Sent to:
Commissioner, Department of Environmental Conservation, 625 Broadway Albany, New York 12233-0001

The Department of Environmental Conservation Region 4 Office at 1130 North Wescott Road, Schenectady, NY 12306-2014

Office of the Chief Executive Officer of the political subdivision in which the action will be principally located.

Applicant (if any)

Other involved agencies (if any)

APPROVED
TOWN OF STEPHENTOWN
PLANNING BOARD
BY _____
DATE 7-7-08

CLOUGH HARBOUR & ASSOCIATES LLP

June 23, 2008

Mr. Thomas Morelli, Chairman
Town of Stephentown Planning Board
26 Grange Hall Road
PO Box 268
Stephentown, NY 12168

RE: Beacon Power Corp., Grange Hall Road
SEQRA and Special Use Permit Review
CHA Project No.: 18113-1001-1101

Dear Chairman Morelli:

As a follow up to our May 12, 2008 letter, we have reviewed all the material for the above referenced project, the latest of which was an Evaluation of Beacon Power Project Environmental Noise Impact Report, prepared by Richard D. Horonjeff, dated June 17, 2008, a response submitted by Novus Engineering dated June 19, 2008 and the presentations / discussion which occurred at the Board's June 19th meeting. In addition, we had previously reviewed material submitted on May 7, 8 and 9, 2008 by Brian C. Baker, Attorney at Law, Beacon Power and Jacobs Carter Burgess. At the Board's March 20, 2008 meeting, the applicant presented a summary of the previous submissions and we outlined for the applicant many of the SEQRA related issues and Public comments that were still to be addressed. In addition, following the April 17, 2008 Public Hearing we provided a summary of comments made and specific items which needed to be addressed. These follow up submissions from the applicant have been presented to provide all necessary background information about the proposed project as well as address all comments and concerns raised by the Planning Board, CHA and the public.

We offer the following summary on the project information to assist the Board in the SEQRA Determination of Significance, Special Use Permit Decision and status of the Site Development Plans:

A. SEQRA

1. The SEQRA process began through the issuance of letters and Part 1 of the Full Environmental Assessment Form (FEAF) to involved agencies on January 24, 2008 and the public hearing to be held on February 21st for the Planning Board to accept lead agency status. Having received no objections within the required time frame, the Planning Board officially accepted Lead Agency Status at their March 20, 2008 meeting.

"Satisfying Our Clients with Dedicated People Committed to Total Quality" | 111 Winners Circle, P.O. Box 5269, Albany, NY 12205-0269
T 518.453.4500 • F 518.458.1735 • www.cloughharbour.com

2. Public comment has been received which suggests that the Town's Zoning Board of Appeals may be an involved agency due to the need for an Area Variance. It was suggested that the proposed development exceeds the allowable site coverage in the R-1 Zone. Research of the code shows that the site coverage requirements relate to the coverage of the site by "structures". Based upon the revised site plan, the area of structures on the site is approximately 0.72 acres or 11.54% of the total parcel. This is less than the 25% of the parcel allowed in the R-1 Zone. As such, no area variance is required and the Zoning Board of Appeals is not an Involved Agency.

3. Based upon the information submitted, Part 2 of the FEAF was prepared for the Board's review and several potential impacts were identified upon which the project MAY have had a significant impact. The applicant was asked to provide additional information for the Town to review in order to better understand the proposal and to assist in making a Determination of Significance. This additional information has been submitted and compiled in the Town Planning Board files as support for this letter, which is prepared as an Expanded Part 3 for the Board's consideration.

4. The following items were identified in Part 2 and addressed in the Expanded Part 3 support documents. A summary and recommendation are provided for each area.

Impact on Land

a) Based on the original plans, construction was proposed in the northwest corner of the site where grades are in excess of 30%. This can be mitigated by reconfiguring the site layout.
   - The site layout and grading plans have been modified to avoid the steep slope area completely, thereby eliminating that potential impact.

b) There will be a need for a SPDES permit for stormwater and site disturbance. A narrative description of the proposed plan for stormwater management and erosion and sedimentation control should be included along with the previous statements that appropriate permits and final reports will be obtained prior to final issuance of building permits.
   - The Final Site Plans will include all details required of the SPDES permit, which will be applied for upon completion of the construction documents. The storm water will be addressed per NYSDEC standards as represented on Sheet C104.
     - A series of catch basins will be utilized to collect the storm water within the area of the pods.
     - The collected water will be removed from the area in a series of PVC pipes routed to the west of the property, toward the West Brook.
     - The outlet will include an area of erosion control stone for energy dissipation.
     - The plan is proposed to reduce the runoff to the adjacent residential property to the south of the site.
     - A final Stormwater Management Report will be submitted with the final engineering drawings to document that the final design is in compliance with

CHA

all applicable NYSDEC standards. This will make up the large part of the final Stormwater Pollution Prevention Plan (SWPPP).

c) The revision of the stormwater management plan was considered in conjunction with possible lowering of the existing Town culvert which crosses Grange Hall Road at the southeast corner of the parcel.
   - The lowering of the culvert was investigated and it has been determined that the work necessary to accomplish it would have required the removal of a portion of the existing wooded area we are trying to preserve. In order to maintain as much of the buffer as possible in that area, we suggest this culvert work not be undertaken.

d) Action would affect groundwater, flood waters, development in a floodway, and cause significant erosion.
   - The proposed action will not involve discharges which would contaminate the groundwater. Construction activities would include excavations to depths typical of residential construction in the area. Test Pits were performed on the site to depths of 8 to 10 feet. Groundwater was only encountered in two of the pits in the lowest 2 to 3 inches. As such, we would expect groundwater depths to be in the 8 to 10 foot range or deeper.
   - The site was investigated for the presence of federally jurisdictional wetlands. Small wetland areas were found in the south end of the parcel, in the wooded area. The site plans were modified to preserve this wooded area to the greatest extent practical. As such, no disturbances are proposed for the wetland areas.
   - Construction is not proposed in any flood zones and appropriate stormwater management techniques in accordance with NYSDEC requirements are proposed to handle site runoff.
   - Final plans will include appropriate soil erosion and sedimentation control measures as required by NYSDEC regulations and will be monitored as part of a stormwater pollution preventions plan.
   - With regard to the use of antifreeze and potential impact to the groundwater, the cooling equipment will be a closed loop system with monitoring devices capable of detecting leaks. The propylene glycol is approved for use in refrigeration and food processing systems due to the potential for exposure to food products because it breaks down easily and has minimal toxicity risks. When necessary, replacement of the coolant will occur in a controlled environment so that any spillage will be contained and disposal will be off site by approved means and methods.

e) Construction activities may impact the area.
   - The installation for the full 20 MW capacity will take approximately 1 year or less from beginning of construction.
   - The schedule is dependent on final interconnection and market rule approvals by the NY Independent System Operator (NYISO). Interconnection requests have

been submitted and are in process by the NYISO. Typically such requests take 60-90 days, which would suggest approval in early summer.

- Construction will utilize conventional earthmoving equipment such as bulldozers and excavators. There will be concrete foundations for the equipment. It is unlikely there will be more than 20 people present at one time.

Based upon the above project revisions and additional investigation, it appears that these issues have been adequately addressed and that the project will not have a significant impact on the environment with respect to land.

Impact on Plants and Animals

a) Need a review by NYSDEC and USFWS regarding potential impacts to endangered or threatened species
   - Correspondence has been received supporting that no records of threatened or endangered species on the subject parcel have been indicated.

Based upon the above and the additional correspondences supplied, it appears that the project will not have a significant impact on the environment with respect to plants and animals.

Impact of Agricultural Resources

a) The use of less than 10 acres of agricultural land for a utility-type use.
   - The existing parcel is one of many parcels in the Town which is available for agricultural use. In light of its location next to an existing electrical substation, the proposed use would appear to logically fit with the surrounding use.

Based upon the above, it appears that the project will not have a significant impact on the environment with respect to agricultural resources.

Impact on Aesthetic Resources

a) Consideration should be given to retaining as much of the existing wooded area along the south side of the proposed improvements as possible in order to screen the existing neighbors.
   - The site plan has been modified to reduce the amount of existing vegetation to be disturbed along the south side of the site. Specifically, an area the full depth of the property and 185 feet from north to south is now proposed to be undisturbed and the vegetation will remain.

b) Significantly more and larger landscape material will be required in order to attain the description provided by the applicant in their narrative ("...this power plant, totally surrounded by trees and shrubs, would be barely noticeable..."). This will be addressed further in the site plan comments below.

CHA

- The site plan has been modified to include the landscaping material proposed by CHA in the email follow up to our March 26th letter. We would suggest the final site plan reflect a slight expansion to fill in the gap to the northerly property line and the gap at the southeast corner of the proposed fence.
- The grading plan should be modified to include complete grading for the berm areas to insure that the berms are constructed as they are depicted in the site renderings provided by the applicant.
- In order to ensure that the landscaping is maintained properly and continues to provide the visual screening for which it is intended, the Town may wish to require the applicant to provide a bond to cover replacement of landscaping material.

c) The site as proposed will be in sharp contrast to current surrounding land uses.
   - As noted above, the project is proposed on land which is adjacent to an existing electrical substation. As such, the project is not out of character with the area. Based upon review of the visual addenda and the knowledge of the Planning Board, the project would not appear to significantly impact State or other public parkland in the area.
   - No site lighting is proposed on the parcel. The only lighting that may be proposed is on the visitor center building and it will be cut-off style fixtures. Details of any lighting proposed for this purpose will be shown on the final site engineering drawings to ensure compliance with the above requirements.
   - If a sign is proposed, it will be limited to a fence mounted identification sign.
   - The reference to a "Hybrid Vehicle Charging Station" proposed near the site driveway has been removed and is not proposed for the site.

Based upon the above site plan modifications and the additional information provided, it appears that the project will not have a significant impact on the environment with respect to aesthetic resources.

Impact on Historic and Archeological Resources

a) Based on information located on the SHPO website, the project lies within an archeo sensitive area. As such a Phase 1A Cultural Resources Sensitivity Assessment should be completed.
   - A Phase 1A Cultural Resources Sensitivity Assessment has been completed by Hartgen Archeological Associates, Inc. The findings were as follows.
     The materials retrieved represent a relatively low-density deposit in a somewhat discrete area approximately 100 by 100-feet in size. Because the material was not found throughout the previously plowed area, it is not likely the deposit resulted from the spreading of night soil. Based upon the field results, the materials identified in the project area more likely represent a single dumping episode. The materials were then dispersed over the relatively small area by subsequent plowing. Because several of the items were burned and no evidence of burning was identified within the project area and documentary research does not indicate

that a structure was located on this parcel, the material apparently originated off-site.

- The dispersal of materials over the years via plowing, combined with the lack of a clear association with a specific structure or person, results in a very low research value for the deposit. **As a result, the deposit does not have the potential for listing on the State and National Register of Historic Places and no further archeological investigation is recommended.**
- The formal report has been submitted to the town and SHPO.

Based upon the above, it appears that the project will not have a significant impact on the environment with respect to Historic and Archeological Resources.

Impact on Noise and Odor

a) Proposed action may produce operating noise exceeding local ambient noise levels.
   - The flywheels will be installed in pods and be below grade, thus helping to attenuate whatever noise the mechanical actions associated with the operation would generate. The flywheels operate in a frictionless vacuum therefore the vibration and noise generated by their operation will be negligible.
   - At the source, the cooling facilities and chillers appear to be the highest generator of noise at the site. A formal analysis of the existing and projected noise conditions has been completed and submitted to the Town. The analysis included noise generation projections based on equipment specifications assumed at the present time. In addition, a review of the report by an independent consultant (hired by neighbors) was submitted and reviewed. Both experts presented their reports at the Board's June 19, 2008 meeting and debated their findings.
   - The project site is consistent with a designation as a residential area, farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use. With the close proximity of State Route 22 and Grange Hall Road, the site would not be considered an "environment free sound of human origins for long, uninterrupted periods of time."
   - Project modifications (revised chiller equipment, sound attenuating fencing and higher berms) and natural noise attenuation factors such as distance have been proposed to reduce the noise levels to below the current ambient levels at the closest neighbor's property line.
   - The project will produce average noise levels under 45 dB(A) and maximum Ldn of less than 50 dB(A). This requirement will be established as the standard for which the project must comply and is more conservative than generally accepted standards outlined in EPA guidelines.
   - Final engineering plans and submittals for equipment will be required to document that these levels are met prior to issuance of any building permits.

Based upon our review of the noise / sound related information, the project which will be limited to a maximum Ldn of less than 50 dB(A) will not have a significant impact on the environment.

CHA

b) What is used for the cooling system and does the process produce odor or mist to the air?
   - The system is a closed system which contains a typical residential type of coolant. The system is equipped with sensors, alarms and communications so that it will shut down and service engineers notified.

Based upon the above, it appears that the project will not have a significant impact on the environment with respect to noise and odors.

Impact on Public Health

a) Proposed action may cause a risk of explosion or release of hazardous substances (i.e., oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may be a chronic low level discharge or emission.
   - The proposed flywheel system has been rigorously tested and its safety has been documented. The testing incident raised by several sources has been explained in detail by the applicant and information from the incident, although totally unrelated to the proposed operation, has been used to improve the system design.
   - Potential releases into the air or groundwater have been addressed in previous items. No low level discharges or emissions are expected as a result of operations.
   - The operations will not produce any magnetic fields, so no health risk is expected.
   - Beacon Power has proposed setting up meetings with the local emergency services personnel to review the construction, operations and expectations of the site. Training sessions will be offered to the local emergency services personnel.
   - As part of the building permit package, Beacon Power will supply the Town with all applicable OSHA standards related to the operations at the site.
   - Independent reports have been researched and confirm the acceptability of the proposed technology.

Based upon the above, it appears that the project will not have a significant impact on the environment with respect to public health.

Impact on Growth and Character of the Community or Neighborhood

a) Intensification of utility use in a residentially zoned area.
   - The area currently contains an electrical substation on the north end of Grange Hall Road. The application proposes a similar utility use adjacent to and south of the existing use. That will make it closer to the existing residences.
   - The plans have been modified to retain 185 feet of the existing wooded area along the south side of the subject parcel to provide a buffer to the existing neighbors.
   - The plans include a landscaped berm along its frontage on Grange Hall Road. The berm is proposed to be 3 to 4 feet high with evergreen trees (6-7 feet in height), deciduous trees and shrubs (3 to 4 feet high).

CHA

- The south and east sides of the site are proposed to have an 8 foot high stockade fence behind the landscaped berm to provide additional buffering.
- The proposed use will improve the efficiency of energy distribution in the grid and thus help in reducing energy consumption, producing a positive impact on the environment.
- The proposed projects could lead to a need to some ancillary businesses in the area to support the operation. Since the site will not contain employees on a regular basis, these would not include typical retail and restaurant uses that surround a factory type use.

b) How often will crews visit the site? What is the duration of maintenance/operation activities? What materials, equipment, vehicles, will be employed?
   - Scheduled maintenance will be approximately twice a year to check coolant levels and change air filters. Snow removal, landscaping maintenance and light housekeeping will be done at regular intervals, as required. This is not expected to take more than a day each time. These are low level efforts involving one or two people. The landscaping maintenance will be aimed at maintaining a good presentation to the street.

c) What is the lifespan of the equipment? What would be required for typical equipment change-out activities (i.e. manpower, materials, equipment etc.)? What would be the duration of the work?
   - The total system comprised of different types of equipment is designed for a minimum 20 year useful life. While the electronics will require servicing and occasional replacement, the mechanical hardware is very robust and is expected to require virtually no regular servicing or replacement for 20-years.
   - The plant is modular so only affected components would be serviced. Maintenance time will be short since quick connect sub-modular approaches have been incorporated into the design. Flywheel and electronic equipment will require a medium-sized truck with a crane for replacement.
   - Duration of unscheduled work may take a few days to allow for diagnosis, ordering replacements, delivery, and repair.

d) Building Materials for the visitor center and storage shed and building heights should be indicated on the plans.
   - The visitor's center and storage shed are expected to be modular outbuildings. The visitor's center will have the capacity to allow for a presentation to approximately 30 people, and will have a small office space for administrative functions and a self contained restroom. Dimensions are expected to be approximately 40 ft x 25 ft and less than 10 ft tall. The size of the storage shed has not yet been determined because the equipment that will be stored in it has not yet been finalized; however, it is expected to be approximately 40 ft x 20 ft and less than 10 ft tall.

CHA

Based upon the above, it appears that the project will not have a significant impact on the environment with respect to growth and character of the community or neighborhood.

Therefore, based upon the EAF Part 2 previously completed and reviewed by the Planning Board and the Expanded Part 3 summarized above, it would appear that the project will not have a significant impact on the environment. As such, we recommend that the Planning Board issue a Negative Declaration pursuant to SEQRA.

B. Special Use Permit

In Article VI, Special Use Permits, of the Town Land Use Regulations, it states that in authorizing any special permit use, the Planning Board shall take into consideration the public health, safety and welfare, the comfort and convenience of the public in general and that of the residents of the immediate neighborhood in particular. The Planning Board shall also consider where appropriate whether the special use permit will create noise, traffic, danger or congestion, fire hazard, noxious fumes or other adverse conditions which will be seen, heard or smelled by other residents of the Town.
These features are also considered as part of the Planning Board's State Environmental Quality Review (SEQR) as outlined above. It has been documented that the proposed project will not create noise, traffic, danger or congestion, fire hazard, noxious fumes or other adverse conditions will be seen, heard of smelled by other residents of the Town. Further, we have taken into consideration the health, safety and welfare, the comfort and convenience of the general public and that of the residents of the immediate neighborhood in particular.

It should also be noted that the proposed use is allowed by right in the R-1 Zone subject to the special permit. That means that while the Planning Board has to be sure that certain standards are considered and met for the application, it does not have the same standard of proof as a use variance would. The purpose of the Special Use Permit is to allow the Board the ability to apply additional protection for an allowed use which MAY have impacts on the public.

The project has been modified since its original submission based upon review by the Planning Board and its consultants as well as input from the public. Specifically, the following modifications to the plans have occurred:

- The existing wooded area containing mature evergreen trees and undergrowth has been maintained for a depth of 185 feet to buffer the adjoining residence.
- Berming and landscaping has been proposed in front of stockade fencing to provide some screening along the south and east sides of the site.
- Equipment changes have been proposed to reduce the amount of noise generated to at or below ambient noise levels. In addition, the internal site layout has been modified to improve sound attenuation characteristics.

CHA

As a result of all information submitted to date and the proposed modifications to the application, it would appear that the general standards for special permit uses have been met and that the application has included additional protection to protect the health, safety and welfare of the public.

Based upon the above, we recommend that the Special Use Permit be approved with the conditions outlined in this report. We would further recommend that final site and construction plans be reviewed thoroughly to ensure that they are consistent with the SUP and SEQR findings prior to the issuance of any permits.

C. Site Development Plans

The following comments to the Site Development Plans should also be addressed as part of the final permit / construction plan submission:

1. The grading plan should show the proposed berm grading to ensure the area matches that depicted in the exhibits.

2. The small drive connecting the visitor parking to the southerly entrance drive should be eliminated. That connection is unnecessary since there are two proposed gates into the site and it will allow a wider and higher berm in that location.

3. A complete set of final site engineering drawings, including all SWPPP details and reports should be submitted prior to the issuance of any building permits.

Should you have any questions or comments please feel free to call me at 453-3933.

Very truly yours,
Clough Harbour & Associates LLP

Michael J. Bianchino
Principal

cc: Planning Board
Craig Crist
Brian Baker
John Stewart
Beacon Power

CHA

CLOUGH HARBOUR & ASSOCIATES LLP

June 25, 2008

Mr. Thomas Morelli, Chairman
Town of Stephentown Planning Board
26 Grange Hall Road
PO Box 268
Stephentown, NY 12168

RE: Beacon Power Corp., Grange Hall Road
Draft Special Use Permit Conditions
CHA Project No.: 18113-1001-1101

Dear Chairman Morelli:

As a follow up to the Board's issuance of a Negative Declaration pursuant to SEQRA and our May 16, 2008 letter, we wanted to expand on our comments related to the Special Use Permit by providing some draft conditions for your consideration

In Article VI, Special Use Permits, of the Town Land Use Regulations, it states that in authorizing any special permit use, the Planning Board shall take into consideration the public health, safety and welfare, the comfort and convenience of the public in general and that of the residents of the immediate neighborhood in particular. The Planning Board shall also consider where appropriate whether the special use permit will create noise, traffic, danger or congestion, fire hazard, noxious fumes or other adverse conditions which will be seen, heard or smelled by other residents of the Town.

It should be noted that the proposed use is allowed by right in the R-1 Zone subject to the special permit. That means that while the Planning Board has to be sure that certain standards are considered and met for the application, it does not have the same standard of proof as a use variance would. The purpose of the Special Use Permit is to allow the Board the ability to apply additional protection for an allowed use which MAY have impacts on the public.

The project has been modified since its original submission based upon review by the Planning Board and its consultants as well as input from the public. Specifically, the following modifications to the plans have occurred:

- The existing wooded area containing mature evergreen trees and undergrowth has been maintained for a depth of 185 feet to buffer the adjoining residence.

"Satisfying Our Clients with Dedicated People Committed to Total Quality" | 111 Winners Circle, P.O. Box 5269, Albany, NY 12205-0269
T 518.453.4500 • F 518.458.1735 • www.cloughharbour.com

- Berming and landscaping has been proposed in front of stockade fencing to provide some screening along the south and east sides of the site.
- Equipment changes have been proposed to reduce the amount of noise generated to at or below ambient noise levels. In addition, the internal site layout has been modified to improve sound attenuation characteristics.

As a result of all information submitted to date and the proposed modifications to the application, it would appear that the general standards for special permit uses have been met and that the application has included additional provisions to protect the health, safety and welfare of the public. The following is a list of conditions that the Board may wish to place on the Special Use Permit:

1. Final Site and Building Plans shall be submitted for review and approval by the Town designated engineer prior to the issuance of any building or site disturbance permit for the project. Final permit submission should include:

    - Complete final construction drawings for site and building improvements including all construction details (temporary and permanent)
    - Specifications for all equipment, especially related to noise generation. This should also include details on anti-freeze, etc. that will be used in the equipment
    - Final Stormwater Management Report documenting compliance with NYSDEC Standards in effect at the time of construction
    - Final Stormwater Pollution Prevention Plan (SWPPP)
    - The grading plan should show the proposed berm grading to ensure the area matches that depicted in the exhibits.
    - The small drive connecting the visitor parking to the southerly entrance drive should be eliminated. That connection is unnecessary since there are two proposed gates into the site and it will allow a wider and higher berm in that location.
    - The berm should be continuous around the southeast corner of the fence so that no gap in the berm of the landscaping exists once completed.

2. Based upon the final equipment specified for the site, a final noise study will be submitted certifying that the operation will comply with the Noise standards outlined in the Board's SEQRA Findings. The project will produce average noise levels under 45 dB(A) and maximum Ldn of less than 50 dB(A). This requirement will be established as the standard for which the project must comply and is more conservative than generally accepted standards outlined in EPA guidelines.

3. The limits of clearing and grading outlined on the plans shall be clearly delineated in the field prior to the issuance of a site disturbance permit.

4. Separate bonds or Irrevocable Letters of Credit shall be provided for the following:
    - Total replacement costs for all landscaping and fencing material
    - Final site clean up, closure and removal of all above ground site improvements in the event of abandonment by the owner

CHA

5. Provide multiple copies of an Operations Manual to the Town for distribution to local emergency services agencies. Manual should describe operations in adequate detail to assist agencies with procedures for handling emergencies at the site.

6. Along with the manual, provide training sessions to emergency services personnel on operations.

7. Documentation of receipt of all required agency approvals should be submitted prior to issuance of building or site disturbance permits.

8. Final review and sign-off of all construction prior to the issuance of a Certificate of Occupancy.

9. Applicant shall perform regular monitoring of the site operations to confirm compliance with all applicable standards and conditions of this SUP and SEQRA Findings. The applicant shall provide a written report to the Town on an annual basis certifying its compliance with these standards and conditions.

10. A term for the SUP was discussed and should be confirmed and included in the conditions.

These draft conditions are specific to our review and discussions on the project to date. They do not include any "boiler plate" conditions which are typically provided by the Town Attorney. Let me know if you have any comments or other specific conditions you would like to consider prior to the next meeting. I will include any comments or additions in a final draft for your consideration. Should you have any questions or comments please feel free to call me at 453-3933.

Very truly yours,
Clough Harbour & Associates LLP

Michael J. Bianchino
Principal

cc: Planning Board
Craig Crist
Brian Baker
John Stewart
Beacon Power

CHA

APPENDIX B
SPECIAL USE PERMIT FINDINGS AND DECISION

FINDINGS AND DECISION OF THE PLANNING BOARD TOWN OF STEPHENTOWN

PLANNING BOARD
TOWN OF STEPHENTOWN

In the Matter of the Application of Beacon Power Corporation for a Special Use Permit To Allow the Construction and Usage of a Flywheel Technology Energy Storage Facility on Grange Hall Road, Stephentown, New York

---

TO: Beacon Power Corporation
65 Middlesex Road
Tyngsborough, MA 01879

Brian Baker, Esq.
PO Box 430
Stephentown, NY 12168

Findings of Fact

1. Beacon Power Corporation (hereinafter "Applicant") seeks to construct and operate a state of the art facility, the goal of which is to make the electrical power grid more efficient to operate. Based on flywheel technology, the facility would aid in the provision of additional supply when same is needed over the grid and store additional supply during periods of low demand. It is the finding of the Board that the technology promotes energy conservation.

2. The location that applicant proposed is on the west side of Grange Hall Road on a parcel of land next to the National Grid substation. The location is less than one mile from the Town Hall (the location of all Planning Board meetings) and is an area that all Board members have repeatedly viewed, both before and after the submission of the aforementioned application.

3. Pursuant to the Town of Stephentown Local Law Number 1 of 1986, also known as the "Land Use Regulations of the Town of Stephentown, New York", Article VI, the subject use

is allowed upon issuance of a Special Use Permit by this Board.

Procedural History

4. The Board's review of this matter began shortly after Applicant's submission of its application for building permit, dated December 10, 2007, which was soon thereafter supplemented with several additional submissions which were received by the Town on December 18, 2007.

5. Shortly thereafter, at the request of the Board, Applicant met with the Board and made a presentation to the Board and members of the public in attendance at both the December 18, 2007 and January 17, 2008 meetings of the Board. At both of these meetings the Board asked numerous questions, as did many members of the public. Applicant answered all questions and also covenanted to, and later did, provide all requested additional data and information as requested by the Board.

6. This Board served as lead agency for the project. It therefore conducted the review process mandated by the New York State Environmental Quality Review Act ("SEQRA"). The proposed action was classified as an unlisted action.

7. In order to assist in its review, the Board, at the expense of the Applicant, retained the services of the engineering firm of Clough Harbour Associates (Michael Bianchino, P.E.) (hereinafter "CHA") and the law firm of Dreyer Boyajian LLP (Craig Crist, Esq.). Following their retention both firms have been present at every regular meeting of the Board in which the subject application was discussed.

8. In the meetings that followed since that time (including at the February 21, 2008, March 20, 2008; April 17, 2008; May 15, 2008; June 19, 2008; July 7, 2008 meetings) the application was discussed and debated. During every one of these meetings, in addition to the

meetings noted as public hearings, any member of the public that desired to speak on the application was allowed to do so. Moreover, Applicant, as requested by the Board, in addition to retaining the engineering firm Jacobs Carter Burgess, also retained both a private archeological company as well as an acoustical engineering company. As further detailed below, at least one neighbor also hired an acoustical engineering expert during the process to aid the Board in its analysis.

9. Numerous modifications have been made to the plans that were submitted throughout the review process as a result of the requests of the Board and its engineer. Virtually all of these modifications were aimed at reducing or further mitigating possible impacts from the project.

10. At the July 7, 2008 meeting the Board adopted a Negative Declaration. The Negative Declaration incorporated numerous letters and other documents, all of which are incorporated herein by reference, including, but not limited to the review letters submitted by the Board's engineer. Letters like the June 23, 2008 and June 25, 2008 letters fully and amply describe the nature of the analysis and decision-making process of the Board with regard to both the SEQRA determination as well as the decision as to whether to grant a special use permit. Such documents and the findings contained therein are incorporated and adopted herein and are therefore part of this Decision and will therefore not be restated.

11. Especially worthy of note is the fact that the Board agreed to re-open testimony on the issue of possible negative environmental impacts, especially with regard to sound, at the June 19, 2008 meeting.

12. Specifically, following the May 18, 2008 presentation by Applicant's acoustical engineer the Board voted to issue a Negative Declaration. However, as was requested of the

Board by the attorney for an unincorporated neighborhood group, the Board was asked to hear additional testimony from an acoustical engineer for that group. At that June 19, 2008 meeting, which lasted in excess of three hours, the Board opened the floor to that acoustical engineering expert as well as to Beacon's acoustical engineering expert once again. A lengthy and healthy debate took place with both experts evaluating the other expert's position. After hearing the aforementioned testimony it was resolved by the Board to re-affirm its decision to issue a negative declaration.

13. Similarly, at the July 7, 2008 meeting the Board considered the letter from NYSOPRHP as well as the responsive report by Hartgen & Associates on the issue of archaeological concerns. Thereafter, the Board resolved to adopt the written negative declaration.

The Applicable Standard For the Grant of A Special Use Permit

14. As previously noted, the standard for the grant of a special use is set forth in Article VI Special Permit Uses of the Land Use Regulations of the Town of Stephentown:

> In authorizing any special permit use, the Planning Board shall take into consideration the public health, safety, and general welfare, the comfort and convenience of the public in general and that of the residents of the immediate neighborhood in particular. The Planning Board shall also consider where appropriate, whether the special permit use will create noise, traffic, danger or congestion, fire hazards, noxious fumes or other adverse conditions which will be seen, heard or smelled by other residents of the Town.

15. This Board has thoroughly reviewed the aforementioned criteria and has taken into consideration all of the information presented in the over seven months that it has considered the application. The Board has examined all possible impacts, including but not limited to the arguments presented by counsel for the aforementioned neighborhood group. As

detailed herein, it is the belief of this Board that, subject to the conditions presented herein, the subject application meets the aforementioned criteria. As such, once again, the Board adopts the findings on these matters as set forth in the Clough Harbour review letters, including, but not limited to the letters of June 23, 2008 and June 25, 2008.

16. It is the Board's belief that any impacts upon any neighboring properties can be mitigated and/or eliminated to a significant degree by the conditions set forth below.

17. The Board found the conclusions of the expert produced by the neighborhood group simply not persuasive. Specifically on the issue of sound, this decision was made because the Board, after evaluating the competing expert testimony, and at the advice of its own engineer, decided to accept the findings of the Applicant's engineer. It is noted, purely by way of example, that said expert conceded that he had not even visited the site prior to submitting his report. It is noted that the sound restrictions are more restrictive than the EPA standards.

18. The Board further determines that there has not been any evidence presented the project poses any danger or risk to the public safety or health. Notably, the subject technology has been rigorously tested in at least two different areas in the country. Moreover, the system is a closed system with no discharges during operations which would contaminate the groundwater. The essentially ten pages of suggested conditions and recommendations when implemented will weigh in favor of the action promoting the general welfare. It is also the finding of the Board that the benefits of the project to the Town far exceed any of the claimed detriments.

19. In addition, the Board finds that the placement of this facility in the location desired will ultimately increase the Town's tax base and tax revenue. Moreover, the Board notes the beneficial attributes of the project to the environment in general, partly making the community, state, and the nation less dependent upon fossil fuels by assisting in making the

electrical power grid more efficient to operate.

Conditions

A. All conditions imposed herein shall run with the land and shall therefore bind any successors and/or assigns of Applicant.

B. Should Applicant sell the subject facility or there be a change in the ownership of Applicant via a purchase of a majority of the outstanding stock of Applicant, the new owner must provide a certification to the Board within sixty (60) days of the completion of said change that it agrees to comply with all conditions imposed herein.

C. All other conditions/recommendations set forth in the June 23, 2008 and June 25, 2008 review letters from CHA are adopted.

D. Applicant is to fix any roads that are damaged during construction.

E. Final Site and Building Plans shall be submitted for review and approval by the Town designated engineer prior to the issuance of any building or site disturbance permit for the project. Final permit submission should include:

a) Complete final construction drawings for site and building improvements including all construction details (temporary and permanent).

b) Specifications for all equipment, especially related to noise generation. This should also include details on anti-freeze, etc. that will be used in the equipment.

c) Final Stormwater Management Report documenting compliance with NYSDEC Standards in effect at the time of construction.

d) Final Stormwater Pollution Prevention Plan (SWPPP).

e) The grading plan should show the proposed berm grading to ensure the area matches that depicted in the exhibits.

f) The small drive connecting the visitor parking to the southerly entrance drive should be eliminated. That connection is unnecessary since there are two proposed gates into the site and it will allow a wider and higher berm in that location.

g) The berm should be continuous around the southeast corner of the fence so that no gap in the berm of the landscaping exists once completed.

F. Based upon the final equipment specific for the site, a final noise study will be submitted certifying that the operation will comply with the noise standards outlined in the Board's SEQRA Findings. The project will produce average noise levels under 45 dB(A) and maximum Ldn of less than 50 dB(A). This requirement will be established as the standard for which the project must comply and is more conservative than generally accepted standards outlined in EPA guidelines.

G. The limits of clearing and grading outlined on the plans shall be clearly delineated in the field prior to the issuance of a building permit.

H. Separate bonds or Irrevocable Letters of Credit shall be provided by the Applicant for the following:

a) Total replacement costs for all landscaping and fencing material.

b) Final site clean up, closure and removal of all above ground site improvements in the event of abandonment by the owner.

c) Such bonds shall be in an amount as required by the engineer for the Town based upon his review of the aforesaid submissions. A bond shall be posted in the amount to cover the cost of the removal of all permanent structures at the facility, including the concrete, etc. Not to be included in the cost of the bond is the machinery, although same is part of the real property as the Board is confident that Applicant will have incentive to remove and sell same due to the value of said machinery.

I. Applicant is to provide multiple copies of an Operations Manual to the Town for distribution to local emergency services agencies. The Operations Manual should describe operations in adequate detail to assist agencies with procedures for handling emergencies at the site. Provided that safety is not compromised, Applicant can excise any operations or scientific information that it deems to be confidential or significantly proprietary for placement in said manual.

J. Along with the manual, Applicant is to provide training sessions to emergency services personnel on operations at reasonable, appropriate, and mutually agreed upon times;

K. Applicant is to provide documentation of receipt of all required agency approvals prior to issuance of building or site disturbance permits.

L. Final review and sign-off of all constructions shall be provided prior to the issuance of a Certificate of Occupancy, unless otherwise stated herein.

M. Applicant shall perform regular monitoring of the site operations to confirm compliance with all applicable standards and conditions of this SUP and SEQRA

Findings. The applicant shall provide a written report to the Town on an annual basis, or such other longer term as the Board deems appropriate, certifying its compliance with these standards and conditions.

N. Applicant shall have permission and authority to operate each individual flywheel pod, which are once again affixed to the land, as it is installed and becomes commercially viable during the construction and installation phase of the facility and prior to the issuance of the final Certificate of Occupancy for the entire facility, with each flywheel pod, as installed, being subject to all standards, requirements, laws and construction plans as previously approved by the Planning Board and then jointly overseen during said construction phase by the Town's consulting engineer and the Code Enforcement Officer, to include the town's attorney on an as needed basis. As with all inspections of the subject property, CHA shall review each installation or as shall be determined by CHA.

O. The applicant will continue to pay for the Town's reasonable legal, engineering, and associated costs of this process up through the completion of the construction of the applicant's energy storage facility, using the consultants and attorneys that have thus far been hired, at the continued discretion of the Planning Board, with the coordination of the building inspector/code enforcement officer and the grant of the Certificate of Occupancy. The Applicant shall also pay all costs associated with the periodic review and review of the annual reports, as set forth above.

Periodic Review

19. Finally, Article VI (B)(4) states that: "The Planning Board will require in its resolution of approval that a special use permit be renewed periodically. Such renewal may be

withheld only after public hearing and upon determination by the Planning Board that such conditions as may have been prescribed in conjunction with the issuance of the original permit have not been, or are not longer complied with. In such cases, a period of sixty (60) days shall be granted for full compliance by the applicant prior to revocation of the special use permit."

20. The Board has discussed and debated the periodic review that would be required at several meetings of the Board. The Board is fully cognizant of the fact that Applicant proposes to expend tens of millions of dollars and the fact that Applicant is likely unable to obtain financing if the time period for renewal is short. The Board hereby imposes a twenty (20) year term with the caveat that at the end of year 1, 2 and 3 and every three years thereafter a report is to be supplied to the Board by a professional engineer certifying that the property is in compliance with all conditions set forth herein. However, this in no way obviates the ability of the Town Code Enforcement Officer to notify this Board that Applicant is in violation of a condition. Should that be the case this Board reserves the right to revoke the subject permit following the conducting of an appropriate hearing and the aforementioned sixty (60) day period.

Conclusion

21. The Board hereby resolves to grant the aforementioned Special Use Permit with the aforementioned conditions and therefore adopts this Decision as follows:

	Approve	Deny	Abstain	Absent
Thomas Morelli	X			
Lewis Sharp	X			
Robert Lobdell	X			
Derrick Gardner				X
Freling Smith	X			

July 17, 2008

Thomas Morelli, Chairman
Planning Board
Town of Stephentown

J:\CMC\STEPH - 07455 Beacon Power\cmc SUP Decision.rtf

RECEIVED
JUL 17 2008
Patricia Dalby
Town Clerk

APPROVED
TOWN OF STEPHENTOWN
PLANNING BOARD
BY
DATE 7-17-08

APPENDIX C
NOTIFICATION OF ZONING REVIEW ACTION

RCBP # 08-14

Returned by Municipality

NOTIFICATION OF ZONING REVIEW ACTION

TO: Craig Christ MUNICIPALITY: Stephentown

APPLICANT: Beacon Power Corporation

SUBJECT: Special Permit/Site Plan Review

LOCATION: Grange Hall Road

Project Description: Applicant proposes to create flywheel power storage facility.

Please be advised that the Rensselaer County Bureau of Economic Development and Planning has acted on the above subject as follows:

After having carefully reviewed the information submitted as part of the subject referral, the Bureau of Economic Development and Planning has determined that the proposal does not have a major impact on County plans and that local consideration shall prevail.

Members of the community have expressed interest in re-using the old rail right-of-way as a path. Location of the facility off the old rail bed would preserve the bed for a path.

A monitoring system for the glycol coolant should be installed to warn of losses or leaks so that the glycol can be kept out of the groundwater, the water source for the Stephentown hamlet.

Please return a report of the final action you have taken to the Bureau of Economic Development and Planning. This report is due within seven days after the final action. If your action is contrary to the recommendation of the County Bureau of Economic Development and Planning, Section 239-m of Article 12-B requires the adoption of a resolution fully setting forth the reasons for such contrary action.

Date 3/11/08

ROBERT L. PASINELLA, JR, DIRECTOR
Economic Development and Planning
1600 Seventh Avenue
Troy, New York 12180
(518) 270-2914

RCBP # 08-14

Return within 7 days of final action to:

Rensselaer County Bureau of Planning
County Office Building
Troy, New York 12180

REPORT OF FINAL ACTION

FROM: Municipality: Stephentown

Local Action
__ Legislative Body
__ Board of Appeals
X Planning Board

APPLICANT: Beacon Power Corporation
65 Middlesex Road
Tyngsboro, MA 01879

ACTION REQUESTED:
__ New Ordinance
__ Zoning Map Amendment
__ Zoning Text Amendment
XX Special Permit
__ Variance
XX Other Site Plan Review

COUNTY ACTION:
XX Local Consideration
__ Approval
__ Approval with Modifications
__ Disapproval

LOCAL ACTION:
__ Approval
__ Approval with Modification
__ Disapproval

DATE OF LOCAL ACTION:

If local action is contrary to the recommendation of the County Planning Bureau, Section 239-m of Article 12-B requires adoption of a resolution fully setting forth the reasons for such contrary action.

APPENDIX D
STATE LISTED SPECIES LETTER

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925

Alexander B. Grannis
Commissioner

April 7, 2008

Brian C Baker
Attorney at Law
PO Bx 430, 386 Rte 43, (Main Street)
Stephentown, NY 12168

Dear Mr. Baker:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Beacon Power Corporation - Flywheel Technology Plant, site as indicated on the map you provided, located on Grange Road, Town of Stephentown, Rensselaer County.

We have no records of known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your site.

The absence of data does not necessarily mean that rare or state-listed species, natural communities or other significant habitats do not exist on or adjacent to the proposed site. Rather, our files currently do not contain any information which indicates their presence. For most sites, comprehensive field surveys have not been conducted. For these reasons, we cannot provide a definitive statement on the presence or absence of rare or state-listed species, or of significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, significant natural communities and other significant habitats maintained in the Natural Heritage Data bases. Your project may require additional review or permits; for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,
Tara Seoane
Tara Seoane, Information Services
NY Natural Heritage Program

Enc.
cc: Reg. 4, Wildlife Mgr.
Reg. 4, Fisheries Mgr.

APPENDIX E
FEDERALLY LISTED SPECIES

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New York Field Office
3817 Luker Road, Cortland, NY 13045
Phone: (607) 753-9334
Fax: (607) 753-9699

Long Island Field Office
3 Old Barto Rd., Brookhaven, NY 11719
Phone: (631) 776-1401
Fax: (631) 776-1405

Endangered Species Act List Request Response Cover Sheet

This cover sheet is provided in response to a search of our website* for information regarding the potential presence of species under jurisdiction of the U.S. Fish and Wildlife Service (Service) within a proposed project area.

Attached is a copy of the New York State County List of Threatened, Endangered, and Candidate Species for the appropriate county(ies). The database that we use to respond to list requests was developed primarily to assist Federal agencies that are consulting with us under Section 7(a)(2) of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Our lists include all Federally-listed, proposed, and candidate species known to occur, as well as those likely to occur, in specific counties.

The attached information is designed to assist project sponsors or applicants through the process of determining whether a Federally-listed, proposed, or candidate species and/or "critical habitat" may occur within their proposed project area and when it is appropriate to contact our offices for additional coordination or consultation. You may be aware that our offices have provided much of this information in the past in project-specific letters. However, due to increasing project review workloads and decreasing staff, we are now providing as much information as possible through our website. We encourage anyone requesting species list information to print out all materials used in any analyses of effects on listed, proposed, or candidate species.

The Service routinely updates this database as species are proposed, listed, and delisted, or as we obtain new biological information or specific presence/absence information for listed species. If project proponents coordinate with the Service to address proposed and candidate species in early stages of planning, this should not be a problem if these species are eventually listed. However, we recommend that both project proponents and reviewing agencies retrieve from our online database an *updated* list every 90 days to append to this document to ensure that listed species presence/absence information for the proposed project is *current.*

Reminder: Section 9 of the ESA prohibits unauthorized taking** of listed species and applies to Federal and non-Federal activities. For projects not authorized, funded, or carried out by a Federal agency, consultation with the Service pursuant to Section 7(a)(2) of the ESA is not required. However, no person is authorized to "take**" any listed species without appropriate authorizations from the Service. Therefore, we provide technical assistance to individuals and agencies to assist with project planning to avoid the potential for "take**," or when appropriate, to provide assistance with their application for an incidental take permit pursuant to Section 10(a)(1)(B) of the ESA.

Additionally, endangered species and their habitats are protected by Section 7(a)(2) of the ESA, which requires Federal agencies, in consultation with the Service, to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. An assessment of the potential direct, indirect, and cumulative impacts is required for all Federal actions that may affect listed species.

For instance, work in certain waters of the United States, including wetlands and streams, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended;16 U.S.C. 661 *et seq.*), the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).*

For additional information on fish and wildlife resources or State-listed species, we suggest contacting the appropriate New York State Department of Environmental Conservation regional office(s) and the New York Natural Heritage Program Information Services.*

Since wetlands, ponds, streams, or open or sheltered coastal waters may be present in the project area, it may be helpful to utilize the National Wetlands Inventory (NWI) maps as an initial screening tool. However, they may or may not be available for the project area. Please note that while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Online information on the NWI program and digital data can be downloaded from Wetlands Mapper, http://wetlands.fws.gov/mapper_tool.htm.

Project construction or implementation should not commence until all requirements of the ESA have been fulfilled. After reviewing our website and following the steps outlined, we encourage both project proponents and reviewing agencies to contact our office to determine whether an accurate determination of species impacts has been made. If there are any questions about our county lists or agency or project proponent responsibilities under the ESA, please contact the New York or Long Island Field Office Endangered Species Program at the numbers listed above.

Attachment (county list of species)

*Additional information referred to above may be found on our website at:
http://www.fws.gov/northeast/nyfo/es/section7.htm

** Under the Act and regulations, it is illegal for any person subject to the jurisdiction of the United States to *take* (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import or export, ship in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered fish or wildlife species and most threatened fish and wildlife species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. "Harm" includes any act which actually kills or injures fish or wildlife, and case law has clarified that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.

Rensselaer County

Federally Listed Endangered and Threatened Species and Candidate Species

This list represents the best available information regarding known or likely County occurrences of Federally-listed and candidate species and is subject to change as new information becomes available.

Common Name	Scientific Name	Status
Bald eagle[1]	*Haliaeetus leucocephalus*	D
Indiana bat (S)[2]	*Myotis sodalis*	E
Shortnose sturgeon[3]	*Acipenser brevirostrum*	E

Status Codes: E=Endangered T=Threatened P=Proposed C=Candidate D=Delisted

W=Winter S=Summer

[1] The bald eagle was delisted on August 8, 2007. While there are no ESA requirements for bald eagles after this date, the eagles continue to receive protection under the Bald and Golden Eagle Protection Act (BGEPA). Please follow the Service's May 2007 Bald Eagle Management Guidelines to determine whether you can avoid impacts under the BGEPA for your projects. If you have any questions, please contact the endangered species branch in our office.

[2] While Indiana bats could be present in this county, we do not have any specific roost information to date and they are in such small numbers that is unlikely that they would be present and impacted by any specific proposed projects. This determination may change once we have conducted spring emergence or mistnetting studies for the Albany County hibernaculum.

[3] Primarily occurs in Hudson River. Principal responsibility for this species is vested with the National Oceanic and Atmospheric Administration/Fisheries.

Information current as of: 9/12/2008

Print Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Field Office
3817 Luker Road
Cortland, NY 13045
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo

To: Sharon Thomas Date: Oct 1, 2008

USFWS File No: 80743

Regarding your: ☐ Letter ☐ FAX ☒ Email Dated: September 15, 2008

For project: Beacon Power Corporation Frequency Regulation Facility

Located: Grange Hall Road

In Town/County: Town of Stephentown / Rensselaer County

Pursuant to the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), the U.S. Fish and Wildlife Service:

☒ Acknowledges receipt of your "no effect" and/or no impact determination. No further ESA coordination or consultation is required.

☐ Acknowledges receipt of your determination. Please provide a copy of your determination and supporting materials to any involved Federal agency for their final ESA determination.

☐ Is taking no action pursuant to ESA or any other legislation at this time but would like to be kept informed of project developments.

As a reminder, until the proposed project is complete, we recommend that you check our website (http://www.fws.gov/northeast/nyfo/ee/section7.htm) every 90 days from the date of this letter to ensure that listed species presence/absence information for the proposed project area is current. Should project plans change or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered.

USFWS Contact(s): [signature]

Supervisor: [signature] Date: 10/2/08

APPENDIX F
PHASE I ARCHAEOLOGICAL INVESTIGATION

Hartgen Archeological Associates, Inc.
Cultural Resource Specialists
1744 WASHINGTON AVENUE EXT. • RENSSELAER, NEW YORK 12144

April 16, 2008

Matthew Lazarewicz
Beacon Power Corporation
65 Middlesex Road
Tyngsboro, MA 01879

Re: Archeological Investigation
Beacon Power Project
Grange Hall Road
Town of Stephentown, Rensselaer County, New York
OPRHP 08PR01330

Dear Mr. Lazarewicz,

This letter summarizes the results of the Phase I archeological investigation conducted for the Beacon Power Project on Grange Hall Road in the Town of Stephentown, Rensselaer County, New York.

Project Information

The project area encompasses approximately 4.84 acres on the west side of Grange Hall Road in the Town of Stephentown. It is bounded on the west by West Creek and a former railroad alignment, on the north by an overhead electric line and a NYSEG substation and on the east by Grange Hall Road. The property is characterized by rolling topography, with elevations ranging from 84 to 100 feet above mean sea level. An ATV trail bisects the property from north to south, separating open cultivated fields in the east from wooded areas to the west. Based on the project maps, the proposed construction will impact approximate 1.7 acres of the wooded area and 1.8 acres of the agricultural field, for a total area of potential effect (APE) of approximately 3.5 acres.

The Office of Parks, Recreation and Historic Preservation (OPRHP) reviewed the project information and recommended that a Phase I archeological investigation be conducted. The OPRHP had no concerns about buildings/structures or districts in the project area.

Documentary Research

The site files of the OPRHP were examined for previously reported archeological sites within one mile of the project area as well as for properties listed on or determined eligible for listing on the State/National Registers of Historic Places located in the immediate vicinity. Archeological surveys previously conducted in the immediate vicinity of the project area were also reviewed.

The archeological site files contained one site recorded at the New York State Museum. The site is shown encompassing a large area, including the project area. The site is merely described as

CERTIFIED DBE/WBE IN NEW YORK, NEW JERSEY, VERMONT,
MASSACHUSETTS, CONNECTICUT, PENNSYLVANIA,
AND NEW YORK CITY AGENCIES
TELEPHONE (518) 283-0534 email hartgen@hartgen.com FAX (518) 283-6276

an "Indian trail" from an old site file. No other information was recorded. There are no properties listed on or determined eligible for listing on the State/National Registers.

An examination of a series of historical maps ranging in date from the late 18th century to the late 20th century did not indicate any structures within or immediately adjacent to the project area. Deed and census research conducted also does not indicate that structures were located in the project area.

The OPRHP library contained the report of one archeological survey previously conducted in the immediate vicinity. A Phase I was conducted in 1999 for a proposed fiber optic line extending through Rensselaer County between Albany and the Massachusetts state line. Part of the survey (Study Area 6) was conducted along the right-of-way of the power line located just north of the Beacon project area. Plowed fields in the vicinity of the project area were visually inspected for surface materials, but none were identified in Study Area 6. Limited testing was conducted between Grange Hall Road and NY Route 22 to the east and no cultural materials were recovered.

Field Reconnaissance

The field methodology consisted of a walkover survey of the entire property, excavation of screened shovel tests in the wooded area and agricultural fields, and surface collection within the previously plowed field. Due to its small size, the cornfield was not replowed for this survey, however, surface visibility was generally good and surface collection was utilized to supplement the shovel testing. During the initial field reconnaissance of the APE conducted on March 31, 2008, a total of 67 shovel test pits (STPs) and 4 radial confirmation tests was excavated and a surface reconnaissance of the previously plowed field area was conducted. Based on the results of the initial testing, another 37 STPs and two one-by-one-meter excavation units were excavated in the northwest corner of the cornfield on April 9, 2008.

Results

The Phase IB field survey of the Beacon Power project area identified a small historic deposit in the northwestern portion of the cornfield. The deposit consists of items that appear to have a production date range from the late 19th century to early 20th century. They include glass fragments, some of which were burned, ceramics, including a few burned fragments, and nails. The material was found in the plowzone level of the shovel tests and on the surface of the previously plowed field. Overall, the tests and surface deposit are located in an area roughly measuring 100 feet by 100 feet. No precontact items were found during the Phase IB survey.

No evidence of a structure or structural remains was present in any of the tests or in the larger excavation units. Other than some burned artifacts, there was no evidence that a significant burning event occurred, such as large amounts of charcoal or burned soils.

Discussion and Recommendations

The materials retrieved represent a relatively low-density deposit in a somewhat discrete area approximately 100 by 100-feet in size. Because the material was not found throughout the previously plowed area, it is not likely the deposit resulted from the spreading of night soil. Based upon the field results, the materials identified in the project area more likely represent a single dumping episode. The materials were then dispersed over the relatively small area by subsequent plowing. Because several of the items were burned and no evidence of burning was identified within the project area and documentary research does not indicate that a structure was located on this parcel, the material apparently originated off-site.

The dispersal of materials over the years via plowing, combined with the lack of a clear association with a specific structure or person, results in a very low research value for the deposit. As a result, the deposit does not have the potential for listing on the State and National Register of Historic Places and no further archeological investigation is recommended.

A report detailing the results of the Phase I is currently being prepared. The report will be in accordance with *The Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State* and the OPRHP Phase I Archaeological Report Format Requirements. In the meantime, if you have any questions, please call me at 518-283-0534 or email lblair@hartgen.com.

Sincerely yours,

Lori Blair

Lori J. Blair
Project Manager

1. South view of the open field in the central and eastern part of the project area.

2. South view of the wooded space in the western part of the project area.

3. Northwest view of the electrical power substation north of the project area (background) and an area of previous disturbance along the edge of Grange Hall Road.

4. South view of an area of brush-filled standing water in the southern part of the project area near a small channel. Leaf scatter and poor visibility prevented a better view of the width of the wet area. The area was inspected for evidence of structural remains, but none were present.

5. Northwest view of an area of previous disturbance in the northwest corner of the project area. This appears to be a large push-pile, likely associated with the construction of the power transmission lines and station.

6. Northeast view of the area where scattered historic materials were visible at the ground surface, close to the ATV trail and partly in an area of soil percolation testing.

7. Southwest view of shovel testing in the open field.

8. Southeast view of close-interval testing in the area of scattered historic materials. A surface collection of the project area was also conducted.

9. East view of testing at 5-meter intervals in the area of scattered historic materials. Positive tests were delineated with red flags. Excavation units were conducted where artifact concentration were identified.

10. Northeast view of Unit 1 excavation in an area where multiple cut nails were recovered in successive close-interval tests.

11. North profile of Unit 1. The soil stratigraphy consisted of a distinct plow zone (Ap Horizon) over subsoil (B Horizon), with no evidence of an occupation floor, burn episode or structural remains.

12. North view of Unit 2 in the area of artifact concentration. There was no evidence of structural remains.

APPENDIX G
PROJECT REVIEW LETTER

OFFICE OF PARKS, RECREATION, HISTORIC PRESERVATION
NEW YORK STATE

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

07-29-08A10:50 RCVD

David A. Paterson
Governor

Carol Ash
Commissioner

July 24, 2008

Brian C. Baker
P.O. Box 430
386 NY 43
Stephentown, New York 12168

Re: DEC
Beacon Power Corporation Flywheel Project
Grange Hall Rd.
Town of Stephentown, Rensselaer County
08PR01330

Dear Mr. Baker:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Parks, Recreation and Historic Preservation Law, Section 14.09.

Based upon this review, it is the OPRHP's opinion that your project will have No Impact upon cultural resources in or eligible for inclusion in the State and National Register of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above. If you have any questions, please call me at (518) 237-8643, extension 3288.

Sincerely,

Cynthia Blakemore

Cynthia Blakemore
Historic Preservation Program Analyst

cc. Lori Blair, HAA

APPENDIX H
PERCOLATION TEST

AIKEN
ENGINEERING
CARL R. AIKEN, P.E. ■ 287 Mannix Road ■ East Greenbush, NY 12061 ■ (518) 283-1501 ■ Fax: (518) 283-3600

NOVEMBER 27, 2007

MR. BRIAN BAKER
PO BOX 430
STEPHENTOWN, NY 12168

Dear Mr. Baker,

This letter pertains to a parcel of property located on Grange Hall Road in the Town of Stephentown. As you are aware, the Beacon Power Corporation is interested in this site for the installation of flywheel-based frequency power modules. The purpose of this report is intended to provide you and the Beacon Power Corporation with information associated with my initial site evaluation. I performed my site inspection yesterday, November 26. The inspection consisted of the excavation of 8 deep test holes, percolation testing, and general site feature evaluation.

The parcel of property contains approximately 5.75 acres of land and is located on the west side of Grange Hall Road adjacent to a Niagara Mohawk Power transmission line. The topography can be described mostly as gently sloping with a more aggressive slope off the rear of the property which drains to a water course. The majority of the property recently contained a farmer's corn field. The westerly portion of the property transitions to a wooded area prior to sloping off to the water course.

The eight deep test holes were essentially consistent with each other and consistent with the soil maps of Rensselaer County. The soil is described as Hoosick gravelly sandy loam. This type of soil is very well drained, structurally sound, and is often used as a source of sand and gravel for other construction sites. The depth of the test holes varied from 8 to 10 feet. Two of the holes developed water in the lower 2" – 3" of the excavation. Managing the water table on this site should be relatively easy with the adjacent slope to the west of the site. Excavations on this site for any type of construction can be kept dry and free of ground water with the installation of a typical footing drain system pitched to daylight.

Percolation testing in the upper 12" – 18" of soil resulted in a stabilized rate of 1" in 5 minutes. Based on the deep test-hole inspection, the deeper soil layers have the potential to result in even faster rates. Generally speaking, the soil present on this site is very good for on-site sewage treatment. It is possible, however, that the percolation tests performed with the Rensselaer County Health Department could result in the need to modify the soil slightly in order to meet design requirements. In any event, sewage system design and construction is likely to be relatively simple and inexpensive.

In closing, this office has concluded that the physical characteristics of this site are favorable for the proposed use. Soil characteristics were found to be well drained and structurally sound. Ground and surface water can be managed effectively. Access to the site is safe and convenient.

All proposed construction will require proper planning and permitting. Permitting is likely to be required from the Town of Stephentown, the Rensselaer County Health Department, and possibly the New York State Department of Environmental Conservation. As you are aware, the site is not zoned for the proposed use. The necessary variance should be obtained prior to purchasing the property.

Please feel free to contact me for any questions that you may have.

Sincerely,

Carl D. Aiken, P.E.

Carl Aiken, P.E.

APPENDIX I
NOISE ANALYSIS

Noise Analysis for the Beacon Power Project
Stephentown, New York

May 7, 2008

Prepared by:

Novus Engineering, P.C
25 Delaware Avenue
Delmar, NY 12054
Contact: Mark J. Bagdon, P.E.
(518) 439-8235

Prepared for:

Beacon Power Corporation
65 Middlesex Road
Tyngsboro, MA 01879

Noise Analysis for the Beacon Power Project
Stephentown, New York

I. Introduction

The proposed Beacon Power Project for a power frequency plant is located in a fairly quiet rural area in Stephentown, New York. There is concern among the town and a few of its residents that the proposed project will create a significant noise impact that would be out of character with the area and therefore disturbing to the project's neighbors.

The Town of Stephentown has no legislated noise standards. Therefore, there are no existing local requirements that would provide guidance on what constitutes an acceptable noise level for a new project. While residents might know approximately what level of noise impact to expect from a new commercial development based on prior experience, they have no prior experience with this type of project. Therefore, there is a heightened level of concern about the project's noise impacts.

This main purpose of this document is to propose noise standards for the project that will protect the health and welfare of surrounding residents and then to discuss how those standards will be achieved. It also provides some background technical information on noise, background information on a commonly used noise standard developed by the United States Environmental Protection Agency (USEPA), and information on existing background levels in the project area.

II. Noise Basics

A. Sound Pressure Level and the Decibel Scale

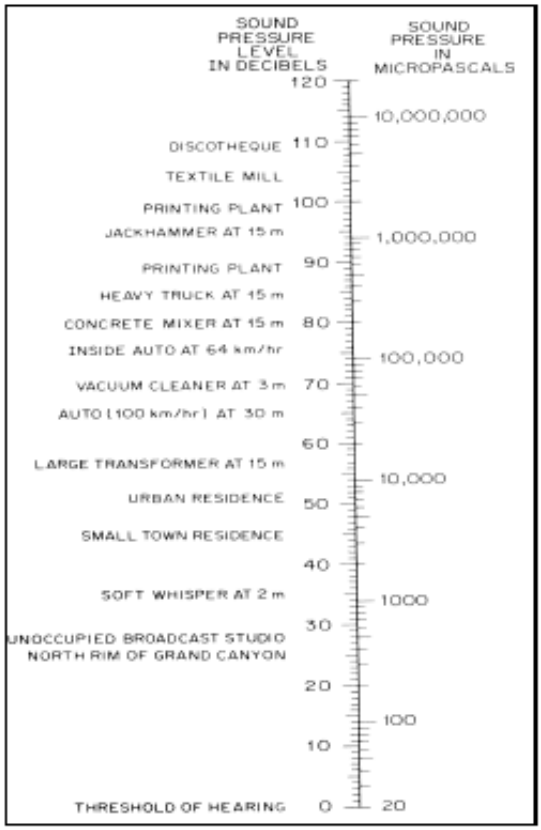
Sound intensity, or loudness, is commonly measured in terms of sound pressure. Generally speaking, sound pressure is the amplitude of the vibration of air caused by a sound source, and is measured in units called Pascals. The human ear is sensitive to a very large range of sound pressures, from 20 micropascals to over 10,000,000 micropascals. In order to make the numbers more manageable, a logarithmic sound pressure scale, known as the decibel scale and denoted "dB", is used. Each increase of 10 dB in sound pressure level (SPL) is equivalent to 3.2 times greater sound pressure. Each increase of 20 dB is equivalent to a 10 times greater sound pressure.

For analysis of environmental noise the A-weighted decibel scale, or dB(A) scale, is generally used. This scale assigns weights to the different frequencies present in a complex sound in proportion to the human ear's sensitivity and assigns one dB(A) value to the sound. The dB(A) scale provides a good measure of a person's ability to perceive the loudness of a sound.

In terms of human perception, a 10 dB increase is generally considered a doubling of the perceived sound level. A 6 dB increase is noticeable. A 3 dB increase is barely noticeable. Less than a 3 dB change is not generally perceptible.

Long-term average decibel levels are measured in a unit called equivalent sound level, abbreviated L_{eq}. This is the steady noise level, which in a given period of time would contain the same noise energy as the time-varying noise during the same time period. With this unit, a single decibel level can be assigned to a long-term sound level measurement, even if the sound level changes continuously during the measurement. This type of measurement is useful for determining ambient noise levels.

Sound Pressure Levels of Typical Sounds



The figure above shows sound levels of common sounds according to their decibel level and their pressure level in Pascals. Note that the decibel levels are measured on the A-weighted decibel scale, dB(A).

Statistical parameters are also commonly used to describe varying sound levels. For instance, L_{10} is the noise level that is exceeded only 10% of the time during a measurement period. This is close to the highest level of sound during a measurement period. L_{90} is the noise level that is exceeded 90% of the time. L_{90} is commonly called the "residual noise level" and is close to the lowest level of sound during a measurement period. This is the level of background noise that is left after intermittent sources, such as airplanes or loud passing trucks, are removed.

B. Noise Attenuation

When sound travels from its source, the sound pressure level (SPL) measured along a point further from the source typically will be lower than the SPL measured closer to the source. The reason for this difference is noise attenuation. Noise attenuation is produced largely by five mechanisms:

Geometrical Divergence: As you go further from the noise source, there is less sound energy present over a given area. Over soft ground, sound levels attenuate about 6 dB for each doubling of distance. This rule is commonly used in environmental noise analysis.

Air Absorption: As sound travels through air, its energy is gradually converted to heat. The conversion rate is dependent on humidity, temperature and frequency.

Attenuation by the Ground: Normally, noise is received through two paths: one which comes directly and one which is reflected from the ground. The amount of attenuation due to the ground depends on the type of ground. Acoustically hard ground, like water, provides little to no attenuation. Conversely, soft ground, like lawn, provides significant attenuation.

Attenuation Due to Foliage: Sparse trees and bushes are poor noise barriers and provide relatively little sound attenuation. Direct foliage attenuation occurs if foliage is dense enough to completely obstruct the view and if it intercepts the path of sound propagation. Vegetated areas provide good ground attenuation by keeping the ground soft and porous.

Attenuation by Barriers: A solid barrier that blocks the line of sight between the source and the receiver can provide a substantial level of attenuation. Passage through houses or other features that block the line of sight all attenuate noise to some degree. Reflections from walls can reinforce noise.

II. Existing Noise Levels

Sound level measurements were taken on April 16, 2008 between 7:45 pm and 11:00 pm east of the proposed Beacon Power site near the Sowycz residence, on April 24, 2008 between 4:30 pm and 10:00 pm on the site itself, and on May 5-6, 2008 between 10:00 pm and 1:00 am on the site itself. A Type-I sound analyzer, the Norsonic 118, was set to record L_{10}, L_{eq}, and L_{90} readings every 5-minutes for the duration of each sampling period. Noise measurements were taken in compliance to ASTM Standard E 1503 – 97, the *Standard Test Method for Conducting Outdoor Sound Measurements Using a Digital Statistical Analysis System*. The attached charts show the results of each sampling period.

Chart 1 shows measurements taken just north of the Sowycz residence east of Grange Hall Road on April 24, 2008. Recorded values produced a residual (minimum) sound level of nearly 53 dB(A). A stream runs past the residence and levels are heavily influenced by the sound of the moving water. During periods when the steam is flowing, noise levels in this area are more typical of a suburban or even urban location. This noise likely masks most of the other background noises in the area. When the stream flow is reduced, it is likely that background noise in this area is dominated by traffic on Route 22.

Charts 2, 3, and 4 show levels on the Beacon site itself, where the stream is not a dominant factor. These levels are much more typical of rural background noise. The charts show that from 4 pm until 10 pm average levels (L_{eq}) typically exceed 45 dB(A). Maximum levels (L_{10}) frequently exceed 50 dB(A) and occasionally exceed 55 dB(A). Residual levels (L_{90}) are around 40 dB(A). During later hours, 10 pm to 1 am, levels drop by approximately 5 dB(A) as nighttime traffic decreases. It is expected, however, that levels near the Sowycz and Bentley/Brazie residences remain higher, as shown in Chart 1, due to the impact of streams running near both properties.

III. USEPA Noise Guidance

In 1974, the USEPA published a document called *"Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety"* (Publication PB-239-429). This document is still the most commonly referenced source document used for establishing environmental (outdoor) noise target levels. It is a large document that provides a number of methodologies for evaluating environmental noise. The target level established for rural areas is 55 dB(A) L_{dn}. This is identified as the long-term level that will protect the public with a 5 dB(A) margin of safety.

As discussed above, L_{dn}, or day-night noise level, is the average 24-hour noise level with nighttime (10 pm - 7 am) noise levels penalized by 10 dB(A). A sound that is 55 dB(A) from 7 am to 10 pm and 45 dB(A) from 10 pm to 7 am would have an L_{dn} of exactly 55 dB(A).

The 45 dB(A) nighttime level was chosen by the EPA for several reasons. It is considered to be the outdoor level that will not disturb sleep in a bedroom. This assumes a 15 dB(A) reduction from outdoors to indoors with partly open windows. The 55 dB(A) level is chosen as the appropriate daytime level to preserve 95% of speech intelligibility outdoors for two speakers two meters apart and 100% of speech intelligibility indoors during the day with open windows.

The New York State Department of Environmental Conservation's (DEC) program policy for "Assessing and Mitigating Noise Impacts" (DEP-00-1, Rev. 2/2/01), also references noise thresholds established by the EPA. Specifically, the DEC references EPA 550/9-79-100 (November, 1978) "Protective Noise Levels," which states that ambient noise levels of 55 dB(A) L_{dn} are sufficient to protect public health and welfare. The DEC also recommends that the SPL in non-industrial areas should not exceed ambient noise by more than 6 dB(A) at the receptor (DEP-00-1, page 13). Using the 55 dB(A) L_{dn} target at the Beacon site will also meet the requirements of not exceeding the existing ambient noise level by more than 6 dB(A), based on the measurements taken on and near the site and shown in Charts 1-4.

IV. Recommended Standard for the Beacon Power Project

In the absence of a legislated noise standard in the Town of Stephentown, Novus Engineering, P.C. suggests that the USEPA L_{dn} standard referenced above be applied to the Beacon Power Project. As mentioned above, this is most commonly referenced and most reliable source document for environmental noise target levels. Because noise levels from any source vary, it is sensible to establish a maximum noise level as well.[1] The maximum level, however, must permit occasional short-term events such as car doors slamming, people shouting, or a maintenance truck arriving on site. Therefore, it is proposed to use the L_{10} as the measure of maximum noise levels. This is the level that is exceeded no more than 10 percent of the time during a measurement period.

Therefore, the project would meet the following two requirements:

1. The project will meet a day-night noise level (L_{dn}) of 55 dB(A) at the surrounding residences.
2. The project's maximum 60-minute L_{10} level shall not exceed 50 dB(A) at the surrounding residences.

[1] Since the Ldn is a 24-hour average, it could still be met if there are short duration noises that are very loud.

V. Noise Generation at the Beacon Site

There are a variety of components that will generate noise on the Beacon site. These include transformers, chillers, air-cooled condensers, and load banks. As discussed elsewhere, the flywheels themselves will not emit any sound or vibration.

During the project design process, a tremendous amount of attention has been paid to noise generation by on-site equipment in order to make sure that the project meets the above standards. The following design refinements have been made to limit project noise:

1. Earlier design concepts contained 20 small chillers distributed around the site. The most recent concept utilizes four larger, but quieter chillers. The chillers will be located on the west side of the site, distant from residences.

2. Project equipment has been shifted north and west to place it further from residential receptors.

3. The flywheel pods have been re-oriented to provide better screening of noise by the containers.

4. Earlier design concepts incorporated 40 dry coolers. In the most recent concept, the dry coolers have been eliminated, with cooling load shifted to the chillers.

As currently designed, the project will have an average noise level under 45 dB(A) and an L_{dn} of less than 50 dB(A), which meets the proposed L_{dn} standard. While a suitable load bank has not yet been identified to meet the L_{10} requirement, Beacon has been working with several load bank manufacturers to provide sound attenuation features to their equipment to meet the project's requirements and it is expected that the units can be modified to accomplish this goal. Beacon is committed to utilizing the best equipment with the least noise impact.

VI. Follow-up Testing and Mitigation

Beacon will commit to making sure that project noise levels meet the above stated standards. To verify that these goals have been achieved, Beacon will carry out follow-up noise testing once the project is completed. This will include 24-hour measurements to verify L_{dn} levels and a series of 60-minute measurements to verify the L_{10} levels. If the levels are exceeded, Beacon will installed additional noise mitigation measures, as required, to meet the standards.

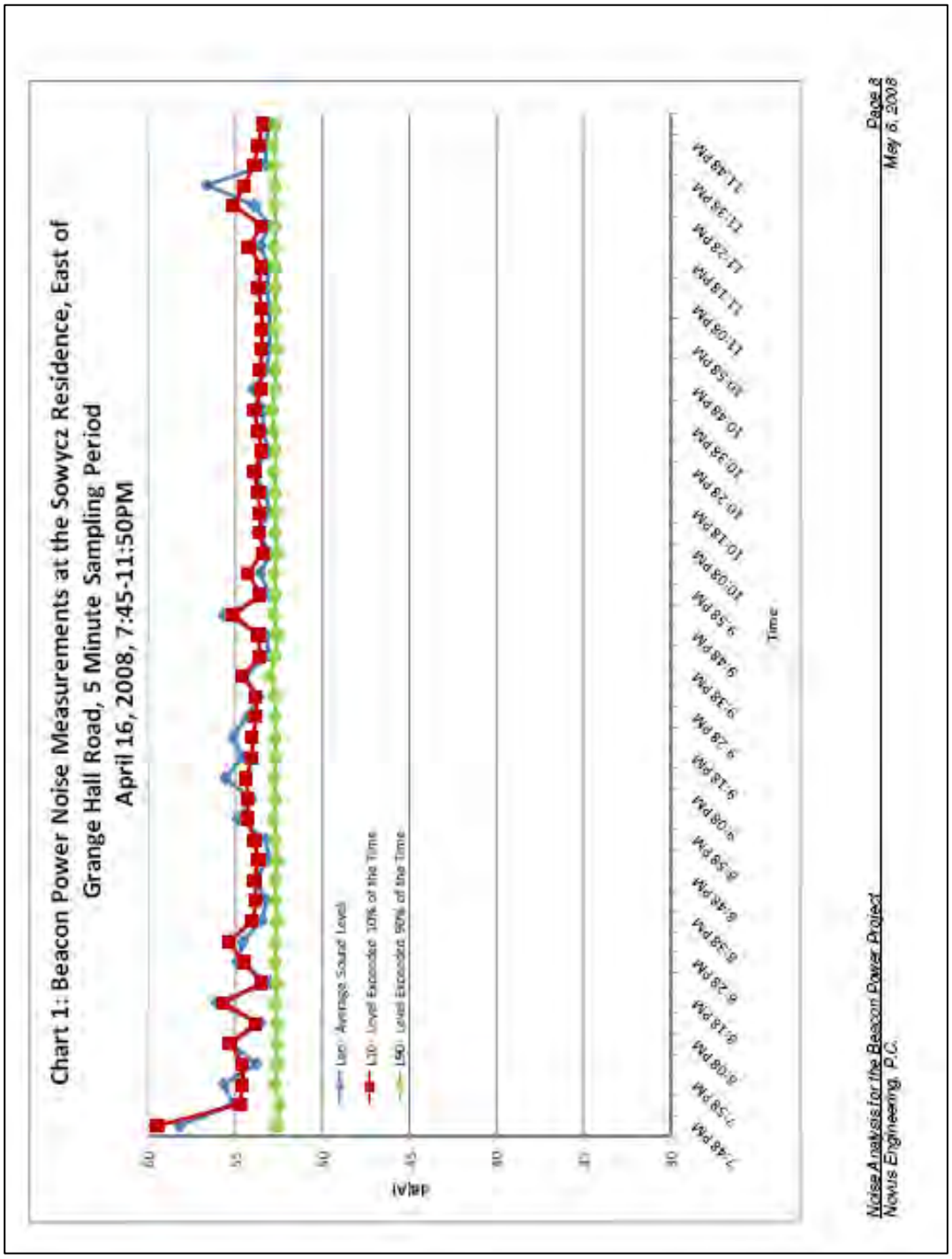


Chart 1: Beacon Power Noise Measurements at the Sowycz Residence, East of Grange Hall Road, 5 Minute Sampling Period
April 16, 2008, 7:45-11:50PM
dB(A)
Time
Leq: Average Sound Level
L10: Level Exceeded 10% of the Time
L90: Level Exceeded 90% of the Time
Noise Analysis for the Beacon Power Project
Nowus Engineering, P.C.
Page 8
May 6, 2008

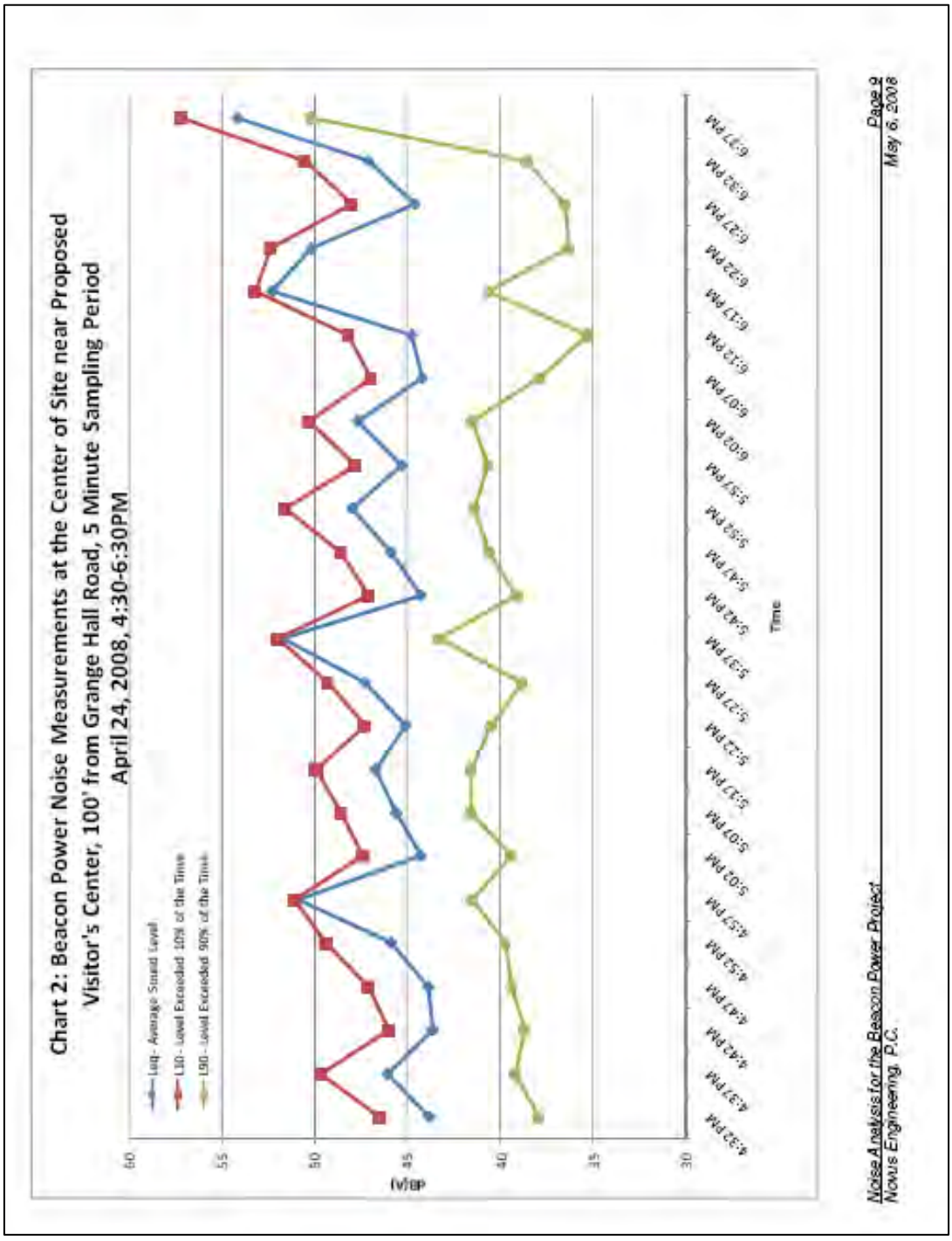


Chart 2: Beacon Power Noise Measurements at the Center of Site near Proposed Visitor's Center, 100' from Grange Hall Road, 5 Minute Sampling Period
April 24, 2008, 4:30-6:30PM
Leq - Average Sound Level
L10 - Level Exceeded 10% of the Time
L90 - Level Exceeded 90% of the Time
dB(A)
60
55
50
45
40
35
30
4:32 PM
4:37 PM
4:42 PM
4:47 PM
4:52 PM
4:57 PM
5:02 PM
5:07 PM
5:12 PM
5:17 PM
5:22 PM
5:27 PM
5:32 PM
5:37 PM
5:42 PM
5:47 PM
5:52 PM
5:57 PM
6:02 PM
6:07 PM
6:12 PM
6:17 PM
6:22 PM
6:27 PM
6:32 PM
6:37 PM
Time
Noise Analysis for the Beacon Power Project
Novus Engineering, P.C.
Page 9
May 6, 2008

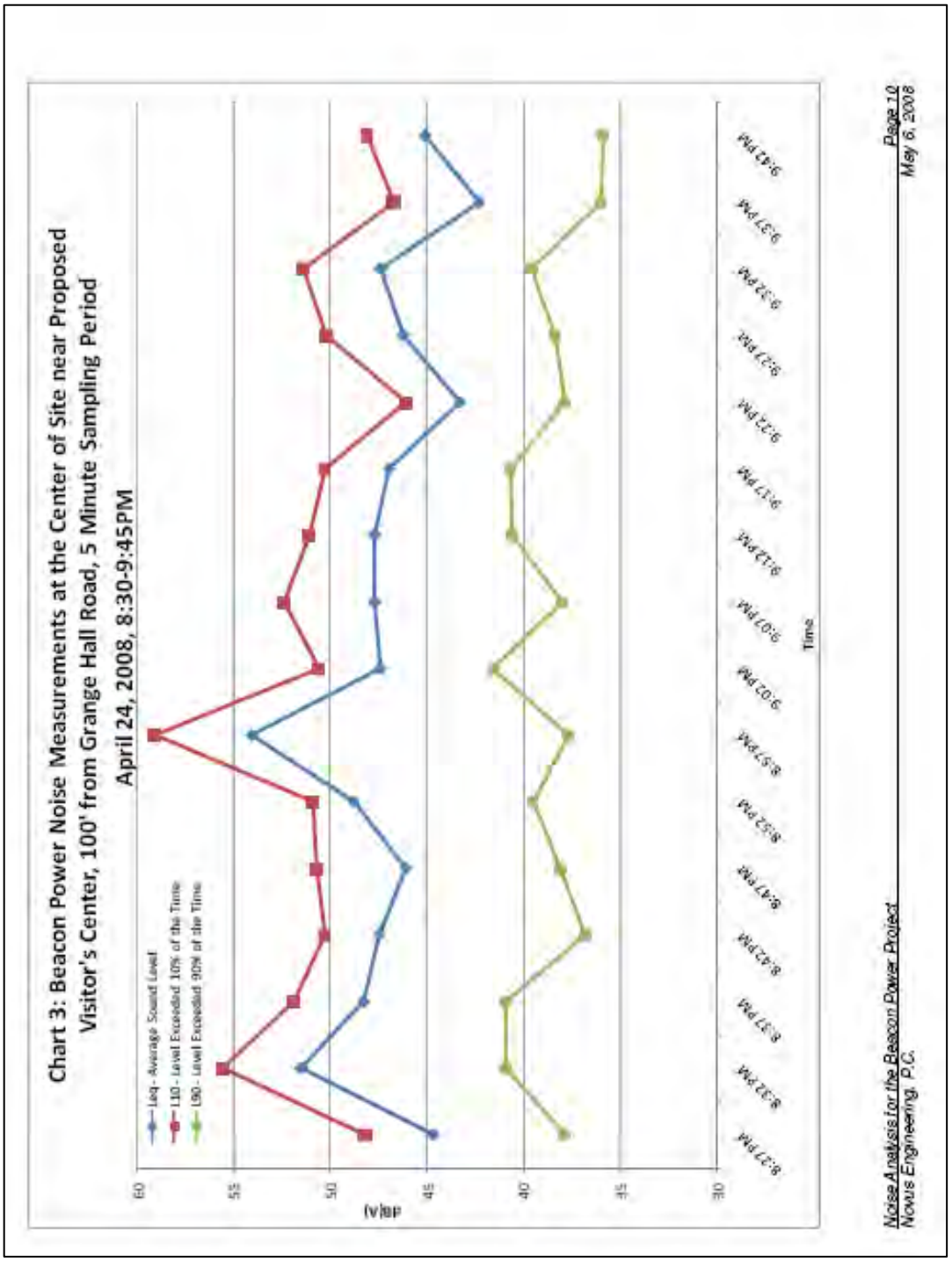


Chart 3: Beacon Power Noise Measurements at the Center of Site near Proposed Visitor's Center, 100' from Grange Hall Road, 5 Minute Sampling Period
April 24, 2008, 8:30-9:45PM
Leq - Average Sound Level
L10 - Level Exceeded 10% of the Time
L90 - Level Exceeded 90% of the Time
dB(A)
60
55
50
45
40
35
30
8:27 PM
8:32 PM
8:37 PM
8:42 PM
8:47 PM
8:52 PM
8:57 PM
9:02 PM
9:07 PM
9:12 PM
9:17 PM
9:22 PM
9:27 PM
9:32 PM
9:37 PM
9:42 PM
Time
Noise Analysis for the Beacon Power Project
Nowus Engineering, P.C.
Page 10
May 6, 2008

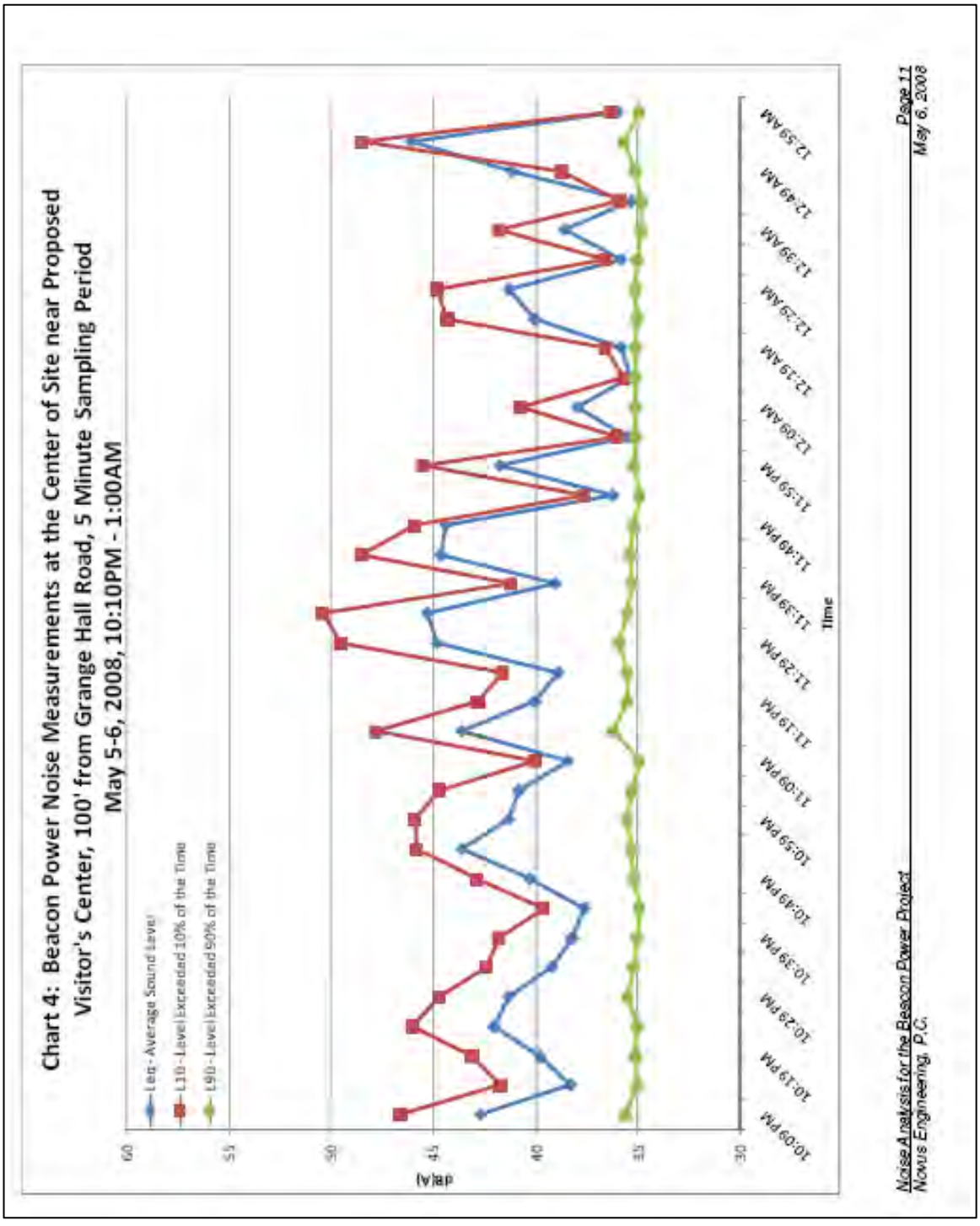


Chart 4: Beacon Power Noise Measurements at the Center of Site near Proposed Visitor's Center, 100' from Grange Hall Road, 5 Minute Sampling Period
May 5-6, 2008, 10:10PM - 1:00AM
Leq - Average Sound Level
L10 - Level Exceeded 10% of the Time
L90 - Level Exceeded 90% of the Time
dB(A)
60
55
50
45
40
35
30
10:09 PM
10:19 PM
10:29 PM
10:39 PM
10:49 PM
10:59 PM
11:09 PM
11:19 PM
11:29 PM
11:39 PM
11:49 PM
11:59 PM
12:09 AM
12:19 AM
12:29 AM
12:39 AM
12:49 AM
12:59 AM
Time
Noise Analysis for the Beacon Power Project
Nowus Engineering, P.C.
Page 11
May 6, 2008

APPENDIX J
RESPONSE LETTER

New York State Department of Environmental Conservation
Division of Environmental Permits, 4th Floor
625 Broadway, Albany, New York 12233-1750
Phone: (518) 402-9167 • **FAX:** (518) 402-9168
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

December 1, 2008

Ms. Sharon Thomas
US Department of Energy
1000 Independence Ave, SW
Suite 4H-023 CF1.3
Washington, DC 20585

Re: Beacon Power Corp. Flywheel-Based Frequency Regulation Facility
Draft Environmental Assessment

Dear Ms Thomas:

The New York State Department of Environmental Conservation (DEC) has reviewed the Draft Environmental Assessment for the proposed Beacon Power Corp. Flywheel-Based Frequency Regulation Facility, Town of Stephentown, Rensselaer County, New York, November 2008. The proposed frequency modulation project would be constructed on an undeveloped seven acre site and consist of a supplementary electric substation, twenty flywheel-based regulation pods (each 1 MW capacity), an electric service equipment unit, a cooling system, a visitor's center, a storage shed, a water well, and a mechanical building (pump house).

The DEC finds that the proposed project as described in DOE/EA-1631 should not require any permits from our agency.

If you have any questions or comments, please contact me at (518) 402.9150.

Sincerely,

Rudyard G. Edick

Rudyard G. Edick
Environmental Analyst II