



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

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May 27, 2011

Mr. Thomas Bott, Town Planner  
Town of Kingston  
26 Evergreen Street  
Kingston, Massachusetts 02364

RE: CONDITIONAL APPROVAL  
APPLICATION FOR: BWP SW 36  
POST CLOSURE USE - MAJOR  
WIND TURBINE CONSTRUCTION

AT: KINGSTON SANITARY LANDFILL  
CRANBERRY ROAD  
KINGSTON, MA

Transmittal Number: X231941

Dear Mr. Bott:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section (the "MassDEP") has completed its administrative and technical review of the permit application listed above in regard to a proposed post closure use of the Kingston Sanitary Landfill ("Landfill") on Cranberry Road as the location for a wind turbine. MassDEP has determined that the application is administratively and technically complete and hereby approves construction of wind turbine at the Landfill, subject to the conditions herein.

The original Application was prepared and submitted on behalf of the Town of Kingston (the "Town") by Weston & Sampson Engineers, Inc. ("W&S") and received by MassDEP on July 13, 2010. The original Application consisted of a bound document entitled:

**Post Closure Use – Major Permit Application  
BWP SW 36  
Transmittal No. X239141  
for  
Wind Turbine at Cranberry Road Landfill  
Kingston, Massachusetts  
July 8, 2010**

The Application consisted of a transmittal form assigned number X239141, a completed BWP SW 36 application form, a project narrative, site plans, design drawings, a geotechnical report and copies of existing permits.

On July 17, 2010 and August 9, 2010, MassDEP sent technical comments to W&S via e-mail regarding the application. On May 16, 2011, Lynnfield Engineering submitted a response to MassDEP's technical comments including responses to individual comments, a Geotechnical Evaluation prepared by AAT Engineering, LLC ("ATT"), project specifications, and three 24" x 36" drawings prepared by Meridian Associates.

On May 25, 2011, Lynnfield Engineering submitted a revised project narrative via e-mail.

On May 26, 2011, Lynnfield Engineering submitted additional information including a statement that Lynnfield Engineering has assumed responsibility as the engineer of record for the construction phase of the project and a professional engineer's stamped copy of the ATT Geotechnical Evaluation.

## **Proposal**

The Town has proposed construction of a 1.8 megawatt wind turbine at the Kingston Sanitary Landfill. The Landfill finish grade elevation at the wind tower base will be 130 feet above mean sea level, the rotor center will be 200 feet above finish grade, and the peak blade height will be 331 feet above finish grade.

The existing final cover system in the project area consists of 6 inches of top soil overlying 12 inches of drainage sand, overlying a 30 mil PVC membrane. An area of the Landfill encompassing approximately 32,000 square feet will be regraded to facilitate construction of the wind turbine foundation, a crane pad area, and a new access road. In this area, the existing top soil will be removed and compacted gravel fill will be added to meet proposed grades. Eight inches of top soil will be added to areas outside the wind tower foundation, crane pad and access road.

The access road has been designed with a minimum thickness of 3.5 feet, which has been determined by ATT to be adequate to protect the existing PVC cap under HS20 loading. A condition of this permit will require that all construction equipment utilizing the access road meet the maximum HS20 loading requirement. The access road will remain in place as a permanent feature.

A crane pad will be constructed in an area covering approximately 40 feet by 70 feet. ATT has determined that the crane load in the crane pad area will not be protective of the existing PVC membrane and the Town has proposed to replace the existing membrane with a new 40 mil high density polyethylene ("HDPE") based final cover system (described below) after completion of the wind turbine erection.

An area measuring approximately 50 feet by 30 feet, containing the wind tower foundation, a transformer pad and a gravel working area, will be enclosed by a chain link fence. To avoid penetration of the final cover system, the fence posts will be supported by concrete “Jersey Barriers”.

The turbine foundation system will consist of a 25-foot square by 6-foot thick pile supported concrete foundation. Combinations of compression and tension piles will be arrayed in two concentric rings about the center of the foundation to the final design depth. The inner ring of the compression piles will consist of 10 concrete/steel mini pile anchors. The outer ring of tension piles will consist of 20 concrete/steel mini pile anchors. Both the tension and compression piles will be installed in an augured hole that will extend 100-ft deep passing through the waste layer into the glacial till layer which will provide the required support for the turbine. A 2.5-inch diameter anchor will be installed and the remainder of the augured hole will be filled with 3000 psi cement grout.

Construction of the turbine foundation will require that the existing 30-mil PVC flexible membrane be penetrated. The 6 foot foundation will penetrate the landfill surface to a depth of approximately 5 feet, with the remaining foot extending above grade to allow finish grading to promote surface water runoff away from the foundation. The foundation hole will be advanced an additional foot to construct a 12-inch bedding/gas venting layer below the foundation slab. The existing cap is 32-inches thick. The area of disruption will extend approximately 3 feet beyond the 25-foot by 25-foot diameter foundation. The waste displaced as part of the auguring activities and the foundation excavation will be properly disposed at a DEP approved disposal facility.

The piles and pile cap are the only features that will penetrate the landfill cap. A 10 foot by 10 foot by 12 inch thick concrete pad will be constructed above the existing cap for mounting a transformer. Electrical conduits will run within the sand drainage layer above the HDPE liner between the wind tower foundation and the transformer pad. Additional conduits, encased in concrete will run along the edge of the access road between the transformer pad and the landfill edge. Warning tape will be placed in the top soil layer above the conduit duct bank.

As a result of construction activities above the final cap, following the erection of the turbine, the final cap will be completely restored in an approximate 6,000 square foot area that encompasses the crane pad and foundation and transformer pad areas. Restoration will include a 60-mil spray of HDPE membrane applied to the entire wind turbine foundation. A cast in place HDPE ledger strip will be installed around the foundation to allow a new 40-mil HDPE geomembrane to be welded to the ledger strip. Following removal of the crane pad, the PVC FML within the limits of the crane pad footprint will be removed. All disturbed areas will be restored with 12-inches of intermediate cover and a 6-inch gas venting layer. A new 40-mil HDPE membrane will be constructed over the sand venting layer and overlap the undisturbed 30-mil PVC membrane cap. The interface area between the PVC liner and the HDPE liner will be covered by 2 foot wide strips of GCL. Once the geomembrane overlay is installed, a new geocomposite drainage layer will be placed, followed by a minimum 12-inch soil protective layer and an 8-inch topsoil layer. The topsoil layer will then be seeded to establish a vegetative cover over the disturbed area.

Wind turbine elements will be stored on the landfill prior to final assembly. ATT designed proper dunnage dimensional requirements for supporting these elements while protecting the landfill final cover system.

The Town will monitor the integrity of the Landfill cap during tower construction and operation. Any impact to the cap will be remediated. Only authorized personnel will be allowed access to the wind turbine.

### **Conditional Approval**

In accordance with its authority granted pursuant to M.G.L. c.111, s.150A, MassDEP, hereby approves the proposed wind tower construction and operation subject to the following conditions:

1. MassDEP shall be advised, both verbally (i.e. telephone) and in writing regarding the initiation of construction activities.
2. The scope of work approved by this permit shall be limited to the installation of the wind turbine and ancillary equipment as shown on the drawings submitted within the Application, and operation and maintenance of the wind turbine. In the event that it becomes necessary to deviate from the approved design, MassDEP shall be advised and shall determine whether a permit modification is warranted.
3. The final design details for the transformer and transformer pad were not submitted within the Application. A copy of the proposed final design for the transformer and pad and any other electrical and protective switchgear (interconnection equipment) proposed on-site shall be submitted to MassDEP for review and approval. The Town and their contractors are responsible to ensure that utilities/structures will not accumulate landfill gas during construction and operation.

MassDEP will require that all subsurface utilities proposed to be installed in close proximity to the edge of waste be designed to address the safety concerns (explosion, fire, asphyxiation hazard, etc.) associated with subsurface landfill gas soil-gas migration. MassDEP requires that the transformer design not create a potential safety hazard or compromise the integrity of the final cover system. Potential design features may include but are not limited to the installation of fully sealed conduits, explosion proof connections, and fittings. Utility trenches shall be designed so they do not act as a conduit for landfill gas migration.

4. Prior to installation of the transformer, sufficient design details shall be submitted to MassDEP to demonstrate that the transformer design is adequate to prevent the migration of landfill gas to any enclosed area that could develop an explosion hazard.
5. The Town and its contractors shall fully comply with all applicable local, state and federal laws, regulations and policies, by-laws, ordinances and agreements relative to the activities associated with this project. Applicable federal regulations shall include, but are

not limited to 29 CFR Part 1910, OSHA standards governing employee health and safety in the workplace.

6. Upon completion of construction, MassDEP shall be provided with “as-built” plans, a summary report demonstrating the construction was performed in accordance with the approved plan(s), and a certification statement prepared by a Massachusetts registered professional engineer certifying that construction was performed in accordance with the approved plan(s).
7. The Town shall continue to comply with the provisions of 310 CMR 16.00 and 19.000 regarding the overall operation and maintenance of the Landfill site.
8. If at any time it is determined that the PVC membrane has been adversely impacted due to puncture, or other problem, the Town shall contact MassDEP within seven days of the finding and complete all necessary repairs as approved by MassDEP.
9. The project access road has been evaluated with a maximum HS20 loading of 8000 pounds per tire. The Town shall evaluate the actual load of each vehicle proposed to utilize the access road and shall not allow any vehicle which does not meet the maximum HS20 load requirement to utilize the road. Should a larger vehicle require access, the road shall be redesigned by a geotechnical engineer and the new design and backup calculations submitted to MassDEP prior to road reconstruction.
10. Only authorized personnel shall be allowed to on the Landfill. The Landfill and wind turbine shall not be open to the general public without prior MassDEP approval.
11. MassDEP reserves the right to require additional assessment(s) or action(s), including but not limited to, modifying said corrective measures or operating techniques in order to maintain the environment free from objectionable nuisance conditions and/or dangers or threats to the public health or safety, or the environment.

## **RIGHT OF APPEAL**

**Right to Appeal** – This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.037: Procedure for Existing Facility Permits, Permit Modifications, Permit Renewals and other Approvals, of the “Solid Waste Management Regulations”. Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance of this determination may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. Chapter 111, Section 150A and M.G.L. Chapter 30A not later than thirty days following receipt.

**Notice of Appeal** - Any aggrieved person intending to appeal the decision to the superior court shall provide notice to MassDEP of the intention to commence such action. Said notice of intention shall include the MassDEP File Number X239141 and shall identify with particularity the issues and reason (s) why it is believed the approval decision was not proper. Such notice shall be provided to the Office of General Counsel of MassDEP and the Regional Director for the regional office that made the decision. The appropriate addresses to send such notices are:

Office of General Counsel  
Department of Environmental Protection  
One Winter Street  
Boston, MA 02108

David Johnston, Acting Regional Director  
Department of Environmental Protection  
20 Riverside Drive  
Lakeville, MA 02347

No allegation shall be made in any judicial appeal of this decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in those regulations, provided that matter may be raised upon showing that it is material and that it was not reasonably possible with due diligence to have been raised during such procedures, or that matter sought to be raised is of critical importance to the public health or environmental impact of the permitted activity.

If you have any questions or comments regarding this letter, please contact me at (508) 946-2833 or Dan Connick at (508) 946-2884 or at the letterhead address. In any correspondence regarding this approval, please reference Transmittal Number X231941.

Very truly yours,

*This final document copy is being provided to you electronically by the  
Department of Environmental Protection. A signed copy of this document  
is on file at the DEP office listed on the letterhead.*

David B. Ellis, Chief  
Solid Waste Management Section

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