

STORMWATER POLLUTION PREVENTION MEASURES

Ball Hill Wind Project

Towns of Villenova and Hanover
Chautauqua County, New York

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Acronym List

Ball Hill	Ball Hill Wind Energy, LLC
cf	cubic feet
CPESC	Certified Professional in Sediment and Erosion Control
NOI	Notice of Intent
NOT	Notice of Termination
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
Project	Ball Hill Wind Project
SPDES	State Pollutant Discharge Elimination System
SWPPP	Stormwater Pollution Prevention Plan

1.0 INTRODUCTION

Prior to construction of the Ball Hill Wind Project (Project), Ball Hill Wind Energy, LLC (Ball Hill) will prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP) or a series of SWPPPs to cover all aspects of Project construction and operation. The purpose of the SWPPP is to document the means and methods for controlling runoff and pollutants from the Project Site during and after construction activities. The principal objective of a SWPPP is to comply with the State Pollutant Discharge Elimination System (SPDES) General Permit No. GP-0-10-001 for Stormwater Discharges from Construction Activities by completing a Notice of Intent (NOI) and planning to implement the following best management practices:

- Reduction or elimination of erosion and sediment loading to waterbodies during construction;
- Control of the impact of stormwater runoff on the water quality of the receiving waters;
- Control of the increased volume and peak rate of runoff during and after construction; and
- Maintenance of stormwater controls during and after construction.

The SWPPP will be prepared in accordance with the following regulatory documents:

- *New York State Standards and Specifications for Erosion and Sediment Control*, New York State Department of Environmental Conservation (NYSDEC), August 2005;
- *New York State Stormwater Management Design Manual*, NYSDEC, August 2010; and
- *SPDES General Permit for Stormwater Discharges from Construction Activities – GP-0-10-001* NYSDEC, January 2010.

This document provides a description of the methods that may be employed to control stormwater and minimize erosion within the Project. The final SWPPP prepared for the Project will identify which of these measures will be used and the specific areas where they will be employed.

1.1 General Project Description

A staging area with a maximum 230-foot radius from the turbine pedestal at each turbine site (up to 36 total) will be used during construction of the wind turbines and will include a foundation for that structure, a gravel crane pad, and the surrounding construction/maintenance area. Within the staging area, an approximately 270- by 240-foot area would be cleared and graded to a slope of 2% or less to facilitate the layout of turbine components. Disturbance outside of this 270- by 240-foot area would generally be limited to selective tree cutting necessary for rotor assembly and storage of excess topsoil, subsoil, or woody material, including roots, logs, and/or wood chips. The turbine site refers to the total area associated with each turbine that would experience temporary impacts during construction, as described. Once installed, permanent impacts at each turbine site would include a 100- by 60-foot gravel crane pad, which would be left in place post- construction, and each wind turbine would permanently occupy a round, slightly exposed base approximately 18 feet in diameter.

Additional facilities at the Project Site include approximately 14.9 miles of access roads, 21.3 miles of electric collection lines, 6 miles of transmission line (with 5.4 miles of additional access roads to gain access), a substation, a switchyard, 26.1 acres for temporary staging, and an operations and maintenance building. Stormwater runoff from the proposed access roads will be via sheet flow or be collected through open road-

side channels and/or stormwater detention facilities, such as swales or ditches, where it is conveyed to the respective outfalls.

2.0 EROSION CONTROL MEASURES

2.1 General

Structural erosion and sediment control measures are classified as either temporary or permanent, according to how they are used. Temporary structural measures shall be used during construction to prevent off-site sedimentation. Permanent structural measures shall be utilized following construction and shall be implemented to convey surface water safely to the existing drainageways. The permanent structural measures shall remain in-place and continue to function and will be maintained after construction is complete. General construction notes and the maintenance plan for implementing the temporary and permanent stormwater and erosion control structures during and after construction will be developed for the site.

Erosion control measures shall be inspected weekly (or twice every seven days when more than 5 acres is disturbed at any given time) and after heavy rains by a qualified inspector experienced in erosion and sedimentation control techniques until the site reaches final stabilization in accordance with the SPDES permit. Inspections of erosion-control structures are described in Section 4.0, Site Assessment and Inspection, and shall be in accordance with *SPDES General Permit for Stormwater Discharges from Construction Activities*. Ball Hill will file an NOI Form with NYSDEC before beginning construction activities.

2.2 Temporary Structural Measures

This subsection describes the specific temporary control measures to be implemented to reduce and/or eliminate erosion and sedimentation during the construction phase of this project. All measures will be designed in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control*. The final site-specific SWPPP will apply these measures as and where appropriate in accordance with the SPDES permit and regulations.

2.2.1 Straw Bale Dike

A straw bale dike is a temporary barrier of straw or similar material used to intercept sediment-laden runoff at various disturbed site areas. The purpose of the straw bale dikes is to reduce runoff velocity and to encourage deposition of any transported sediment created during construction. Straw bale dikes have an estimated design life of three months.

2.2.2 Perimeter Dike/Swale

A perimeter dike/swale is a temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area. The perimeter dike/swale prevents off-site stormwater runoff from entering a disturbed area and prevents sediment-laden stormwater runoff from leaving the construction site or disturbed area.

2.2.3 Temporary Access Waterway Crossing

A temporary access waterway crossing is a structure placed across a waterway to provide access for construction purposes for a period of less than a year. Temporary access waterway crossings are necessary to prevent construction equipment from damaging the waterway, blocking fish migration, and tracking sediment and other pollutants into the waterway.

2.2.4 Silt Fence

A silt fence is a temporary barrier of geotextile fabric (filter cloth) used to intercept sediment-laden runoff along the borders of disturbed site areas during construction. The geotextile filter fabric fence requires periodic maintenance and should be checked for tears or clogging with silt or debris. Silt can be removed from the woven filter cloth with a stiff brush if clogging occurs. Limits imposed by the ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

2.2.5 Stabilized Construction Entrance

A stabilized construction entrance is a stabilized pad of aggregate underlain with filter cloth positioned at points where traffic will enter or leave the construction site area onto public roads. This measure will reduce the tracking of sediments onto public rights-of-way or streets.

2.2.6 Stone/Rock Outlet Sediment Traps

Stone/rock outlet sediment traps are temporary stone or rock traps utilized during construction to intercept sediment-laden runoff from disturbed areas and from dewatering of turbine foundations. The sediment traps will retain the runoff and allow sediment to settle prior to discharge. Temporary sediment traps shall be installed in the areas of construction prior to any earth disturbance. For dewatering practices, the sediment traps shall be placed adjacent to the turbine foundations, with the outlet discharging to a swale or ditch. Sediment traps will be limited to maximum drainage areas of 5 or 15 acres for stone or rock outlet sediment traps, respectively, and provide sediment storage volume of 3,600 cubic feet (cf) for each acre of drainage area.

2.2.7 Stone Check Dams

Stone check dams shall be placed within the drainage channel sections at a distance that ensures that the elevation of the crest of the downstream dam is at the same elevation of the toe of the upstream dam. These check dams shall consist of riprap stone comprising fieldstone or rough quarry stone. The stone shall be composed primarily of larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The larger stones shall have a maximum diameter of 9 inches and a minimum diameter of 2 inches. The stone shall be hard and angular and of a quality that will not disintegrate when exposed to water or weather. These structures need a low level of maintenance.

2.2.8 Level Spreader

A level spreader is a temporary non-erosive outlet for concentrated runoff, constructed to disperse flow uniformly across a slope. The level spreader will convert concentrated flow to sheet flow and release it uniformly over a stabilized area.

2.2.9 Pipe Slope Drain

A pipe slope drain is a temporary structure placed from the top of a slope to the bottom of a slope used to convey surface runoff down slopes without causing erosion. Pipe slope drains are used where concentrated flow of surface runoff must be conveyed down a slope in order to prevent erosion. The maximum allowable drainage area is 3.5 acres.

2.2.10 Dust Control

The level of dust through construction will be monitored in order to prevent surface and air movement of dust from the disturbed soil surface that may cause off-site damage, health hazards, and traffic safety problems. Control measures are anticipated to include sprinkling road surfaces with water and/or installation of silt fences or similar barriers to control air currents.

2.3 Permanent Structural Measures

2.3.1 Diversion Swales

A drainageway of parabolic or trapezoidal cross-section with a supporting ridge on the lower side would be constructed across the slope. Diversions are used to intercept and convey runoff to stable outlets at non-erosive velocities. Diversion locations will be determined by considering outlet conditions, topography, land use, soil type, length of slope, and the development layout.

2.3.2 Rock Outlet Protection

Rock outlet protection consists of stone erosion protection aprons that are placed at the inlet and outlet of culvert pipes for the purpose of reducing the depth, velocity, and energy of water movement. Materials used to construct the rock erosion-protection aprons consist of riprap stone comprising fieldstone or rough quarry stone. The riprap stone shall comprise primarily larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The larger stones shall have a minimum diameter of 6 inches. The minimum thickness of the apron shall be 18 inches. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The maintenance needs of these structures are very low. They should be inspected after high flows to see if scour beneath the rock protection has occurred, or if any stones have been dislodged.

2.3.3 Grassed Waterway

A grassed waterway is a natural or man-made channel that is below adjacent ground level and is stabilized by suitable vegetation to convey runoff without causing damage by erosion. The flow channel is traditionally wide and shallow and conveys the runoff down slopes.

2.3.4 Lined Waterway

Lined waterways are drainage channels with a lining of stone to provide for the disposal of concentrated runoff without damage from erosion or flooding where grassed waterways would be inadequate due to high velocities.

2.3.5 Subsurface Drain

A subsurface drain consists of a conduit, such as a tile, pipe, or tubing, installed beneath the ground surface, which intercepts, collects, and/or conveys drainage water. The drain may serve one or more purposes, including improvement of the environment for vegetative growth by regulating the water table and groundwater flow, replacement of existing subsurface drains that are interrupted or destroyed by construction operations, removal of surface runoff, prevention of water movement into wet areas and/or installation for drainage in steep slopes or behind retaining walls.

2.3.6 Dry Swale

Dry swales are vegetated, open channel systems designed to capture and treat stormwater within dry cells formed by check dams or other means. Each dry swale will include a permeable soil layer and a 4-inch underdrain to enhance water quality treatment. The channels are trapezoidal in shape with a minimum bottom width of 2 to 4 feet and a maximum side slope of 2:1 (H:V).

2.4 Maintenance of Temporary and Permanent Control Structures

2.4.1 Temporary and Permanent Stormwater Facilities during Construction

Temporary stormwater and erosion control structures must be constructed in accordance with their design intent and maintained to prevent sediment-laden runoff from leaving the site during construction. In general, during construction, the temporary structures should be inspected by a qualified inspector (see section 4.1 below) at least every seven calendar-days, twice every seven days when more than 5 acres is disturbed at any given time, and after *precipitation events in accordance with the New York State Standards and Specifications for Erosion and Sediment Control*, and maintained as follows:

- The stabilized construction entrance shall be inspected periodically and after each rainfall and the entrance shall be cleaned, repaired, or replaced, as required. The temporary construction entrance shall be removed when construction is completed and all disturbed areas are stabilized.
- Temporary sediment traps shall be installed prior to earth disturbance. Sediment traps shall be inspected weekly and after every rainfall and the traps cleaned and restored to their original size when sediment has accumulated to one-half of the basin depth. Temporary sediment traps shall be removed and the area stabilized when their contributory drainage area is stabilized.
- Temporary silt fences, stone check dams, and sediment interceptors shall be installed prior to earth disturbance to reduce runoff velocity and transportation of sediment. The stabilization structures shall be inspected weekly and after every rainfall, and the structures shall be cleaned, repaired, or replaced as required. Temporary stabilization structures shall be removed when their contributory drainage area is stabilized.
- Temporary grass-lined swales and channels shall be installed to divert runoff to sediment traps. The channels shall be inspected weekly and after each rainfall to ensure their stability and to locate points of scour, rodent-holes, breaches, and deposition of sediment or other obstructions. The channels shall be cleaned, repaired, and re-seeded, as required. Temporary channels shall be removed and the area stabilized when their contributory drainage area is stabilized.
- Temporary channel protection consisting of stone check dams shall be provided to prevent sediment-laden runoff from entering downstream drainage facilities. The stone check dams shall be inspected weekly and after every rainfall, and the structures shall be cleaned, repaired, or replaced, as required. The stone check dams shall be removed when all disturbed areas are stabilized.
- All permanent drainage structures, installed as part of the site improvements, shall be inspected weekly and after every rainfall to ensure structural integrity, to detect vandalism and damage, and for cleaning. Permanent drainage structures shall be repaired or replaced, as required.
- Upon final grading of topsoil, all disturbed soil areas shall be seeded and mulched. All seeded areas shall be inspected monthly and after every rainfall and the areas repaired and re-seeded, as required.

2.4.2 Permanent Stormwater Facilities after Construction

Permanent stormwater control structures must be constructed in accordance with their design intent and maintained on a routine basis to remain effective. In general, the following measures must be taken:

- Permanent stormwater drainage facilities (i.e., culverts, channels, and dry swales) shall be inspected semiannually and after every heavy rainfall to ensure structural integrity and to detect vandalism and damage, and for cleaning. The facilities shall be repaired or replaced, as required.

- Stone erosion-protection aprons shall be inspected semiannually and after every heavy rainfall to ensure their structural integrity and that the stone has not been bypassed nor developed excessive scour at the stone base or that sediment not accumulated. Sediment accumulated within the riprap stone erosion protection shall be removed, or stone replaced, as required, to allow runoff to drain through the stone to reduce erosive velocities and prevent large flows from carrying sediment over their tops.
- Permanent lawns and landscaped areas shall be inspected and maintained on a regular basis, consistent with favorable plant growth, soil, and climatic conditions to ensure soil protection and structural integrity of the site's plant cover. Maintenance involves regular seasonal work for mowing, fertilizing, liming, watering, pruning, fire controls, weed and pest control, re-seeding, and timely repairs, as required. Maintenance of vegetative areas shall also include removal of debris and protection from unintended uses or traffic.

3.0 SITE WASTE MANAGEMENT AND SPILL PREVENTION

The following measures will be implemented to ensure the proper storage and disposal of construction site wastes:

- Designate waste collection areas that do not receive significant runoff from upland areas and that are not adjacent to waterbodies;
- Cover waste containers;
- Schedule waste collection at appropriate intervals to prevent overfilling of containers;
- Conduct all maintenance and vehicle washing off-site or an approved on-site location;
- Clean up any spills immediately and dispose of in accordance with applicable state and local laws;
- Maintain (contractor) adequate spill prevention materials (e.g., absorbent pads, booms) on-site;
- Place any petroleum products stored on-site in curbed/diked areas;
- Include storage areas and waste containers in the regular inspection program of the site;
- Take the following actions in the event of a spill:
 1. Document the spill and report to the Project Site foreman and construction inspector.
 2. For spills less than 5 gallons on an impervious surface, attempt to confine and clean the spill.
 3. For spills greater than 5 gallons, attempt to confine the spill and call a remediation contractor if assistance is required with product recovery and containment.
 4. All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within two hours of discovery, except spills that meet all of the following criteria:
 - The quantity is known to be less than 5 gallons; and

- The spill is contained and under the control of the spiller; and
- The spill has not and will not reach the state's water or any land; and
- The spill is cleaned up within two hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

5. Provide written documentation of the spill.
6. Disposal of recovered materials must be conducted in accordance with state and federal regulations.

4.0 SITE ASSESSMENT AND INSPECTION

4.1 Initial Inspection

Ball Hill will employ a qualified inspector (defined as a person knowledgeable in the principles and practices of sediment and erosion control, such as a licensed Professional Engineer, Certified Professional in Sediment and Erosion Control [CPESC], licensed landscape architect, or other NYSDEC-endorsed individual), to conduct an assessment of the site prior to the commencement of construction. The qualified inspector will certify that the appropriate erosion and sediment control methods as described in this SWPPP and as required by the permit have been adequately installed or implemented to ensure overall preparedness of the site for commencement of construction. The qualified inspector will meet the requirements of the *SPDES General Permit for Stormwater Discharges from Construction Activity*.

4.2 Inspections and Records during Construction

4.2.1 Inspection Frequency

After commencement of construction, site inspections will be conducted by a qualified inspector at least every seven calendar days (weekly), twice every seven calendar days when 5 or more acres is disturbed at one time, and after storm events in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control*. Prior to filing a Notice of Termination (NOT) form with NYSDEC or at the end of the permit term, Ball Hill will have the qualified inspector perform a final site inspection and provide a signature on the NOT that affirms that the site has undergone final stabilization in accordance with the *SPDES General Permit for Stormwater Discharges from Construction Activities*.

4.2.2 Records during Inspection

A site map and the SWPPP will be maintained on the Project Site indicating the extent of all disturbed on-site areas and drainageways throughout the duration of construction. The site map will contain all areas expected to undergo initial disturbance or significant site work within every 14-day period. The map will indicate all areas of the site that have undergone temporary or permanent stabilization. All disturbed areas that have not undergone active site work during the previous 14-day inspection period shall be noted on the map. All sediment control measures shall be inspected and the degree of accumulation as a percentage of the sediment storage volume will be recorded. Any maintenance required for installed erosion and sediment control structures will be noted, and documentation of areas where adjustments are needed to those measures shall be provided within one business day of completion of the inspection. Any deficiencies identified with the implementation of the SWPPP shall be recorded.

4.2.3 Inspection Log Book

Ball Hill and the selected contractor(s) shall maintain an inspection log book containing a record of all inspection reports. The log book shall be maintained on-site and shall be made available to the permitting authority upon request.

4.2.4 Certifications

At the final site inspection, a qualified inspector will certify that the site has undergone final stabilization, meaning that all soil disturbance activities have ceased and a uniform perennial vegetative cover with a density of 80% over the entire pervious surface has been established or other equivalent stabilization methods. The qualified inspector must also certify on the NOT that all temporary erosion and sedimentation measures have been removed and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational. Ball Hill will certify that the requirements of the permit have been satisfied within 48 hours of actually meeting such requirements and will submit an NOT form to NYSDEC.