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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February 3, 2016

Mr. Michael R. Milanoski
Town Administrator
108 Main Street
Carver, MA 02330

and

Francis X. McMahon
Southern Sky Renewable Energy Carver, LLC.
40 Court Street Suite 1150
Boston, MA 02108

RE: Approval with Conditions
Application for: BWP SW 36 Post-Closure Use - Major
Ground Mounted Solar Photovoltaic (PV) Array
Transmittal #: X262842

AT: North Carver Landfill
North Main Street (Route 58)
Carver, Massachusetts
Facility ID #: 39146 Regulated Object#: 172400

Dear Mr. Milanoski and Mr. McMahon:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section (the "MassDEP"), has completed its Administrative and Technical review of the referenced Post-Closure Use permit application (the "Application") for the North Carver Landfill (the "Landfill").

MassDEP has determined the Application and supplemental submittals are administratively and technically complete and hereby **Approves** the Post-Closure Use of the Landfill for a 1.7 megawatt DC solar photovoltaic ("PV") array subject to conditions as specified herein.

I. SUBMITTALS:

The Application consists of the following enclosed in three bound volumes:

A. A permit application transmittal form assigned No. X262842, a completed for Post-Closure Use - Major (BWP SW 36) application form, a narrative describing the proposed use and Appendices A through F.
B. Appendix A included four 24" x 36" design drawings prepared by Morse Engineering Co. Inc. Signed and stamped by Jeffrey M. Hassett, Massachusetts Registered Professional Civil Engineer No. 49293, and five 24" x 36" ground mount design detail drawings, prepared by RBI Solar, and designated "not for construction" and not stamped by a professional engineer.
C. Appendix B contains previous applications and approvals related to the North Carver Landfill, including but not limited to Corrective Action Design drawings for the North Carver landfill, prepared by Norfolk Ram Group dated November 2002, and an "As-Built" drawing by Allen & Major Associates, dated December 7, 2005.
D. Appendix C contained a Geotechnical Report prepared by GZA GeoEnvironmental, Inc. ("GZA") dated November 2015.
E. Appendix D contained a Stormwater Report prepared by GZA dated June 10, 2015.
F. Appendix E contained an Operations and Maintenance Plan prepared by GZA, structural calculations prepared by Rough Brothers Inc. stamped by Mohamed A. Aly, Massachusetts Registered Professional Structural Engineer No 50028, and structural calculations prepared by RBI Solar, Inc.
G. Appendix F includes an Interconnection Service Agreement between NSTAR Electric and Southern Sky Renewable Energy Carver, LLC., a Notice of Intent filed with the Carver Conservation Commission, an Order of Conditions issued by the Carver Conservation Commission, a letter issued by the Massachusetts Division of Fish and Wildlife, and documents related to property ownership.

Revised Application documents were received on February 1, 2016, with revisions consisting of the following:

A. A revised project narrative.
B. Revisions to the four drawing prepared by Morse Engineering Co. Inc.
C. Twenty-two new 24" x 36" PV system drawings prepared by Construction Engineering Group and stamped and sealed by David E. Alley, Massachusetts Registered Professional Electrical engineer No. 19649.
D. A revised Geotechnical Report in Appendix C prepared by GZA GeoEnvironmental, Inc. ("GZA") dated November 2015, revised January 2016, including geomembrane puncture analysis.
E. Revised Structural Calculations in Appendix E identifying RBI Solar as the engineer for this entire aspect of the submittal.
F. The Lease Agreement between the Town and Southern Sky Renewable Energy Carver, LLC. was added to Appendix F - "Required Permit Documentation".

The Application was signed on behalf of the Town of Carver by Michael R. Milanoski, Town Administrator, by Francis X. McMahon for Southern Sky Renewable Energy Carver, LLC., and by Thomas E. Billups Massachusetts Registered Professional Civil Engineer No. 32836.

II. APPLICATION REVIEW AND DECISION PROCESS:

The Application was submitted and reviewed pursuant to the provisions of 310 CMR 19.029(2): Applicable Permit Procedures and 310 CMR 19.033: *Permit Procedure for an Application for a Permit Modification or Other Approval*. According to these review procedures, MassDEP's decision regarding the proposed activities shall be either: a "Provisional Decision" pursuant to 310 CMR 19.033(4)(a); or a non-provisional decision pursuant to 310 CMR 19.033(4)(b). MassDEP has determined that non-provisional decision is appropriate for this Application.

MassDEP has reviewed the Application pursuant to 310 CMR 19.000: *Solid Waste Regulations*, 310 CMR 19.143: *Post-Closure Use of Landfills* and MassDEP's *Landfill Technical Guidance Manual*, *May 1997* (the "Manual").

III. SITE DESCRIPTION:

The Landfill operated on a land parcel encompassing approximately 22 acres and is bounded to the north by residential properties, to the west by North Main Street, to the east by Muddy Pond and to the south by commercial property and a cranberry bog. The Landfill ceased solid waste disposal operations in 1974.

On October 30, 1997, the Town of Carver ("Town") entered into Administrative Consent Order with Penalty, ACOP-SE-97-3P-005, ("ACOP") with MassDEP. The ACOP required the Town to perform certain actions, including but not limited to, preparing conceptual closure plans for the Landfill, excavating and relocating lead contaminated soil, and operating and maintaining the groundwater recovery and treatment system located off Green Street. On October 15, 1998 MassDEP issued an approval of a Corrective Action Design for final closure of the Landfill. (BWP SW25, Transmittal No. W002862)

In order to fund closure of the Landfill, the Town entered into a contract with BATG Environmental, Inc. ("BATG") to close the Landfill. As part of the contract, BATG was permitted to use grading and shaping material that met MassDEP's policy entitled "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills", Policy #COMM-97-001the Landfill to reach final closure grades.

On August 30, 2002, the Town, BATG, and MassDEP executed an amendment to the ACOP, (ACOP-SE-97-3P-005-AMEND#1. The ACOP Amendment allowed the acceptance of grading and shaping material that met the criteria of policy COMM-97-001 and required submittal of a revised Corrective Action Design application detailing the revised Landfill final cover system. On March 27, 2003, MassDEP issued its approval of the revised Corrective Action Design. (BWP SW 25, Transmittal No. W032803).

Final Cover System Description

The approved final cover system was comprised of the following in accordance with 310 CMR 19.112:

- a prepared subgrade of compacted soil materials utilized at the Landfill pursuant to the requirements of MassDEP's policy COMM-97-001;
- an overlying gas venting layer consisting of a minimum thickness of six (6) inches of soil with a minimum saturated hydraulic conductivity of 1x10-3 centimeters per second (cm/sec);
- an overlying low permeability layer consisting of a forty (40) mil high-density polyethylene (HDPE) textured geomembrane, flexible membrane liner ("FML");
- an overlying drainage layer consisting of a HDPE geonet/geotextile fabric geocomposite with a 200 mil bi-planer geonet;
- an overlying drainage layer consisting of soil with a minimum thickness of twelve (12) inches and a minimum saturated hydraulic conductivity of 7x10-3 cm/sec with a perforated pipe subdrain system constructed within the drainage soil;
- an overlying layer of gravel of variable thickness on the Landfill top to contour the final surface; and
- an overlying vegetative support layer comprised of a minimum thickness of twelve (12) inches of soil capable of maintaining a healthy vegetative growth on the final cover and seeded with vegetative cover seed mix.

The HDPE geomembrane was approved to be constructed at a minimum slope of five per cent on the Landfill top and a maximum slope of 1-foot vertical rise to 3-foot horizontal run on the Landfill side slopes. In order to facilitate a potential future post closure use of the top area of the Landfill, the approved design included a layer of gravel of variable thickness above a minimum 12-inch thick sand drainage layer. Gravel was to approved be placed to create a final top slope of one per cent and overlain by a minimum 12-inch thick vegetative support layer.

Stormwater runoff controls were implemented to maintain the integrity of the final cover, prevent ponding of water on the areas of final cover, and control stormwater runoff to prevent off-site impacts. The stormwater control system included earthen diversion berms on the side slopes, side slope let-down channels, perimeter swales, and two retention basins.

Gases generated by waste decomposition within the Landfill are managed using a passive collection and venting system. Thirty-six vertical, 24-inch diameter, vent wells containing perforated, PVC pipes surrounded by stone were constructed. Gas vent wells on the Landfill sideslope passively vent to the atmosphere via solid 4-inch pipes passing through the Landfill final cover system. Gas vent wells constructed in the Landfill top area terminate below the final cover system and are interconnected with the sideslope vents via perforated PVC pipes. The passive collection system was designed to be retrofit to an active system should a change to an active system become desirable or become necessary to control odors or to eliminate any potential health risk associated with a future Landfill post closure use.

A gravel road was constructed around the entire perimeter of the Landfill to provide access to all areas for monitoring and maintenance. An additional gravel road was constructed on the eastern sideslope to provide access to the Landfill top area. A chain link fence was constructed around the

perimeter of the Landfill between the perimeter access road and the toe of slope to prevent un-authorized access to the Landfill final cover system area.

As part of its geotechnical evaluation, GZA completed 19 hand excavated test pits to assess the thickness of the Landfill final cover system soils and to assess the bearing capacity of the on-Landfill and off-Landfill soils where the PV array is proposed to be constructed. Test pits GZ-1 through GZ-8 were excavated on the top plateau of the Landfill. Test pits GZ-9 through GZ-12 and GZ-15 through GZ-19 were excavated on the Landfill side slopes. Test pits GZ-13 and GZ-14 were excavated in an on-property area located north of the Landfill and beyond the limits of the Landfill final cover system.

In its application narrative, GZA identified the locations of test pits GZ-10 and GZ-15, both on side slopes, as having less than the approved thickness of drainage sand. The Applicants should take particular note of the locations of these test pits and report any issues with proper drainage and side slope final cover system stability. (refer to Condition #17)

IV. POST-CLOSURE USE SOLAR ARRAY PROPOSAL SUMMARY:

The Town of Carver ("Town") is the owner of the Landfill and entered into a lease agreement the "Lease") with Southern Sky Renewable Energy Carver, LLC., dated August 12, 2014. Hereinafter, the Town and Southern Sky Renewable Energy Carver, LLC shall be referred to as the "Applicants". The Applicants and all construction and maintenance personnel associated with the solar photovoltaic installation on the Landfill shall be referred to as the "Applicants' Contractors".

The Applicants have proposed to develop a 1.7 MW DC solar photovoltaic ("PV") array installation on approximately 8 acres of the Landfill site (approximately 7.5 acres above the landfill final cover system and approximately ½ acre off the Landfill final cover system).

PV Array Design:

The PV array proposed to be constructed at the Landfill consists of the following components:

- As shown on the preliminary RBI Solar Drawings, a total of approximately 6,259 solar modules (320-watt).[1]
    - Approximately 708 modules will be located on the Landfill property but to the north of the limits of the Landfill final cover system;
    - Approximately 5,358 modules will be located above the Landfill final cover system in the top plateau area of the Landfill
    - Approximately 393 modules will be located along a bench area of the eastern Landfill side slope.
- two 750 kW inverters located off the Landfill final cover system on a single concrete pad;
- two 750 kW transformers located off the Landfill final cover system on individual concrete pads;
- two metering cabinets located off the Landfill final cover system on individual concrete pads;
- two load break disconnects located off the Landfill final cover system on individual concrete pads;

- new utility poles located off the Landfill final cover system;
- a new access road above the Landfill final cover system for post construction PV array maintenance,
- a new security fence surrounding the area of the array that is located off the Landfill final cover system.

Note 1: The Construction Engineering Group Electrical drawings indicate a total of 5,529 modules, but do not indicate the exact module distribution per area. Revised drawings with the final PV array layout will be prepared by RBI Solar and submitted to MassDEP prior to installation. (refer to Condition #2).

The ground mounted PV array is to be constructed on top plateau area of the Landfill and on an on-property but off-Landfill area located to the north of the Landfill final cover system limits covering a total area of approximately 8 acres. The PV array will utilize Canadian Solar Maxpower CS6X 320W PV modules (77 inches by 39 inches). The modules will be laid out in strings 3 modules high and 3 to 6 modules long (module layout 3x3, 3x4, 3x5 and 3x6)) and be oriented with east-west rows and with the modules facing south. Energy from the modules will be collected via electrical conduit to the load center with the two inverters and one transformer and transmitted into the Eversource distribution level network located on North Main Street. The Applicants anticipate that this system will be located at the northeast corner of the Site, but the location will be at the discretion of NSTAR. Accordingly, the Applicants have not submitted final design details for the electrical work and MassDEP has included Condition #2 in this permit approval requiring submittal of the additional electrical design information.

Modules located outside the limits of the Landfill final cover system will be mounted on driven steel H-pile posts supporting a panel support racking system. No engineering analysis of this standard design was submitted in the Application. (refer to Condition #20)

Modules located above the Landfill final cover system will be mounted on RBI Solar, Inc, galvanized steel racking system mounted on concrete blocks. Exterior module arrays will use 1.5 foot high by 2 foot wide by 15 foot long reinforced concrete blocks weighing approximately 4,100 pounds. Interior module arrays will use 1.5 foot high by 1.5 foot wide by 15 foot long reinforced concrete blocks weighing approximately 3,600 pounds. The ballast blocks will be placed on a 3-inch layer of crushed stone underlain by a layer of filter fabric laid directly on top of the topsoil landfill cap.

The racking system will hold the panels at a fixed tilt of 5 degrees from horizontal. The racks will be placed to avoid interference with access roads, the passive landfill gas collection extraction vents and all storm water control features. The existing elevation and grade of the Landfill will not be altered.

Electrical cables will be supported above the landfill final cover system in cables trays mounted to a support structure connected to Duro-Block (or equivalent) concrete blocks, resting on a gravel base. Where cables cross on-Landfill or off-landfill access roads, a "H20 Fibercrete Trench System" will be installed to provide adequate support for vehicle loading.

Underground conduit are proposed between the off-Landfill array and the inverter equipment pad, between each series of equipments pads, and the a new utility pole to be located outside the limits of the landfill final cover system. As shown on the application drawings, underground conduits are embedded in sand. All underground conduits are required to be encased in concrete or otherwise designed to prevent subsurface Landfill gas from entering the conduit. (refer to Conditions #2 and 3)

There are no passive gas vents located on the top plateau of the Landfill. The PV array has been configured to maintain a 10-foot radius around the side slope passive landfill gas vents to protect public health.

Seven reinforced concrete equipment pads of various sizes, will be constructed outside the limits of the Landfill final cover system near the Landfill entrance on the western side of the Landfill to support one transformer and two inverters. It is anticipated that the electrical equipment pads will be located in the northeast corner but the final location will be selected by NSTAR.

The equipment pads will have a 20mm low density polyethylene ("LDPE") geomembrane liner placed directly on the ground surface. A 3-inch sand cushion layer will be placed over geomembrane followed by approximately 12-inches of ¾-inch crushed stone. The pads will consist of a 12-inch reinforced concrete slab bearing directly on the crushed stone layer. Electrical conduits will be sealed and placed within the 12-inches of crushed stone layer. No grounding rods will penetrate the Landfill final cover system.

As a condition of this permit, all electrical work will be designed in accordance with the most recent versions of the Massachusetts Electrical Code and electrical permits will be secured from the local building official. (refer to Condition #2)

Bearing Capacity, Settlement, and Stability:
The Application included a geotechnical evaluation for the installation of the array and supporting structures.

The Application included an analysis of the foundations for the PV array that will bear directly on the final cover system and has considered the dead load, snow load and wind loading. The results of the geotechnical evaluation are as follows;

- The modules, ballasts, and footings do not exceed loading criteria for the Landfill.
- The solar array will not cause adverse landfill settlement.

The anticipated maximum loading scenario (ballasts, racking system and modules for the 6 panel wide by 3 panel high layout) on the Landfill surface will result in a maximum bearing pressure of 1,338 pounds or 44.6 pounds per square foot (psf) (approximately .031 psi). Considering wind and snow loading the maximum load was calculated as 36,000 pounds or approximately 600 psf (4.2 psi) per ballast block. Settlement analysis performed for the ballast blocks bearing on the final cover estimated the settlement as less than ½ inch.

Calculations completed by RBI solar indicate that the exterior array will have an overturning safety factor of 1.09, an uplift safety factor of 1.26, and a sliding safety factor of 8.68. The

interior arrays were calculated by RBI Solar to have an overturning safety factor of 1.13, an uplift safety factor of 1.28, and a sliding safety factor of 8.68.

GZA evaluated the proposed loading conditions due to materials delivery vehicles on the proposed new access road and the low ground pressure equipment off the access road above the final cover system geomembrane and horizontal landfill gas collection pipes. GZA determined resistances to puncturing of the membrane and crushing of the pipe are adequate.

Access Road:
A construction access road will be constructed along the northern and western perimeter of the Landfill with a design loading for the Town of Carver brush truck having an axle load of 10 kips and a wheel load of 5 kips. The road will be constructed with either a Mirafi HP370 geotextile or equivalent product overlain by 6 inches of compacted sand-gravel fill or a Tensar TX-140 geogrid or equivalent product overlain by 6 inches of compacted crushed stone.

As described in the Application and as a condition of this permit, during construction of the PV array, low ground pressure vehicles (<7psi) will be permitted to travel over the Landfill final cover surface. If necessary, a temporary road consisting of mats or woven fabric and a layer of gravel or crushed stone may be placed to facilitate equipment mobilization and protection of the final cover system. Throughout all stages of construction, the Landfill final cover system must continually be monitored for any signs of damage or stress. A final inspection of the Landfill surface must also be performed at the conclusion of the PV array construction project and any areas of concern must be repaired.

Storm Water:
The landfill's stormwater control system consists of rock-lined drainage swales underlain by a geotextile filter fabric, a perimeter swale lined with grass cover and/or rip rap erosion protection, and detention basins.

The potential stormwater impacts of the placement of solar panels over the landfill final cover system were evaluated using HydroCAD modeling of the pre-development and post-development runoff conditions for the 2-year, 10-year, 25-year, and 100-year storm events. The Engineer concluded that, because peak discharge rates do not increase for any storm event included in the analysis, the existing swales and other conveyance measures are considered to be adequate and no upgrades are necessary.

Site Security: An existing security fence surrounds the existing Landfill final cover area. As shown on the "Site Layout, Materials and Utilities Plan", prepared by Morse Engineering, a new chain link fence will be constructed around the area of the PV array located off the landfill final cover system in the northwest area of the site. As also shown on this plan, a chain link fence will be constructed around the electrical equipment pad that is to be located off the landfill final cover system.

Post Closure and Post-Closure Use Operations and Maintenance: There are no proposed changes to the post closure operation and maintenance plan for the area to be maintained by the Town of and not used for the PV array.

As a condition of this permit, MassDEP is requiring that, during the first year of operation of the PV array, inspections of the Landfill final cover system be performed on a monthly basis and thereafter quarterly, at a minimum. MassDEP is also requiring that inspections include the condition of the security fencing. (refer to Condition #17)

Health and Safety:
As stated in the Application, as a condition of this permit, MassDEP is requiring that a Solar Array Construction Period Health and Safety Plan and a Post Closure Operations and Maintenance Health and Safety Plan be submitted and that personnel training be provided for employees who access the solar array areas of the Landfill. (Refer to Condition 9)

Decommissioning Plan: The Lease between the Town ("Lessor") and Southern Sky Renewable Energy, LLC. ("Lessee") regards the installation and operation of a PV array at the North Carver Landfill. Section 6 of the Lease requires the Lessor to remove the PV system and restore the premises to their original condition by the "Removal and Restoration Date". Section 7 of the Lease requires the Lessee to maintain "Decommissioning Assurance" in an amount adequate to cover the cost of removal and restoration work required in section 7. (Note: The second paragraph of Section 7 refers to Section 5. MassDEP understands the correct reference to be to Section 6.) As condition of this permit, the Applicants are required to submit to MassDEP a detailed decommissioning and site restoration plan at the time of decommissioning. (refer to Condition #20)

Massachusetts Endangered Species Act: The Applicants submitted a Massachusetts Endangered Species Act ("MESA") Review Checklist to the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program ("NHESP"). The NHESP determined that the project as proposed will not result in a prohibited "take" of state-listed rare species.

V. PERMIT DECISION WITH CONDITIONS:

MassDEP, having determined the information in the Application is satisfactory and in accordance with its authority granted pursuant to M.G.L. c.111, s. 150A, and 310 CMR 19.000, hereby **APPROVES** the Post-Closure Use of the North Carver Landfill for a Solar Photovoltaic Array subject to the conditions identified herein.

1. Permit Limitations: The issuance of this approval is limited to the proposed Solar Photovoltaic Array at the Landfill as detailed in the Application and does not relieve the Applicants from the responsibility to comply with all other regulatory or permitting requirements. Post-Closure Use construction shall proceed in complete compliance with the approved plans, MassDEP's regulations and requirements, the Manual or as required by this Approval. This approval does not relieve the Town, as the owner of the Landfill, from its responsibility to comply with all post closure monitoring and maintenance requirements for the entire Landfill. There shall be no deviation from this Approval without prior consent from MassDEP. MassDEP shall be consulted prior to any deviation from the approved design. MassDEP may require a permit modification application for significant design modifications.

2. Pre-Construction submittals: Prior to construction, the Applicants shall submit the following to MassDEP for its review and approval at least 60 days prior to commencing construction activities, unless otherwise approved by MassDEP:

    a) All drawings prepared by RBI Solar, and designated "not for construction", shall be finalized and signed and sealed by a Massachusetts Registered Professional Engineer. The drawings should indicate the same total number of PV modules as indicated on Construction Engineering Group Drawing.

    b) The detail entitled "Typical Concrete Pad Section" shown on Construction Engineering Group Drawing PVE-5.2 shall be revised to place the 20 mil LDPE geomembrane at or above the existing ground surface to prevent the potential for landfill gas within the existing soils to migrate laterally under the proposed equipment pads (as described in section 2.4.3 of the GZA narrative). The revised detail shall demonstrate that any underground conduit extends into the ambient air prior to the edge of the geomembrane.

    c) The details entitled "Typical Trench Detail" and "Typical Ductbank Detail 2W4" Concrete Pad Section" shown on Construction Engineering Group "Drawing PVE-5.4 shall be revised such that the conduits are encased in concrete or otherwise modified to prevent the migration of subsurface landfill gas into the conduit. A narrative shall accompany the describing the revised details and stating the revised detail is adequate to prevent landfill gas accumulation in the conduits.

    d) The detail entitled "Partial Cable Tray Plan" shown on Construction Engineering Group "Drawing PVE-2.1" appears to indicate that five new utility poles will be constructed in the vicinity of the electrical equipment pads, outside the limits of the Landfill final cover system. An enlarged detail shall be provided with an accompanying narrative describing the purpose of each utility pole. The detail shall indicate the limits of the Landfill final cover system. The narrative shall state that the installation of the utility poles will be overseen by the Applicants to ensure that utility poles are not installed through the final cover system. The limits of the Landfill final cover system shall be verified in the field.

3. Enclosures and Combustible Gas Alarms: Any enclosures that that allow human entry shall have a landfill gas monitor that is fully operational at all times. The monitor shall be calibrated to a methane standard; have an audible and a lighted beacon. At a minimum, the alarm shall be set to sound when the concentration of explosive gases exceeds 10% of the Lower Explosive Limit (LEL).

4. Regulatory Compliance: The Applicants, Engineer and Applicants' Contractors shall fully comply with all applicable local, state and federal laws, regulations and policies, by-laws, ordinances and agreements. This includes but is not limited to, 310 CMR 19.142: *Post-Closure Requirements*, 310 CMR 19.143: *Post-Closure Use of Landfills*, and 310 CMR

19.043: *Standard Conditions*. Applicable federal regulations include, but are not limited to, 29 CFR Part 1910, OSHA standards governing employee health and safety in the workplace and all applicable local, state and federal electrical codes and permits, including National Electrical Code (NEC), 2011 Edition, Article 690-"Solar Photovoltaic (PV) Systems", as amended.

5. Inspection and Repair of Settlement Areas: Prior to construction of the PV array, any suspect settlement areas on the Landfill project area shall be surveyed to determine the lowest spot. The surrounding area should be then surveyed to find the "relief point" defined as the lowest surrounding area where ponded water would flow off the cap. The elevation difference is defined as the "pond value". Minor settlement shall be defined as less than a 12 inch pond value. Any Landfill project area that has undergone minor settlement shall be corrected by the placement of additional vegetative support soil to promote runoff and the area shall be reseeded. Any area repaired should be surveyed and the location marked on a plan with the pond value. Any future settlement should be recorded cumulatively. If/when the total settlement reaches 12-inches, the area will be considered to have suffered "major settlement" as defined below and appropriate repairs to eliminate ponding shall be performed.

   Major settlement is defined as a pond value of 12 inches or more. When this occurs, the final cover system must be repaired to prevent water from ponding above the low permeability layer. The Applicants may either:

   1. Strip off the final cover soils above the low permeability layer, inspect and repair the low permeability layer if/as necessary, place low permeability soil as necessary to promote runoff, replace final cover soils; or

   2. Expose the low permeability soil or geomembrane in a trench around the perimeter of the settled area. Fill the area with soil to form slopes promoting runoff. Cap the area with a new low permeability membrane, geosynthetic clay liner (GCL), or low permeability soil layer that ties into the existing low permeability layer at the identified perimeter. Place new drainage sand and vegetative support material over the new cap area.

   Any proposal to repair minor settlement may be done as routine maintenance, provided that the Applicants' report the settlement to MassDEP and state their intent to perform repairs and provides MassDEP with final survey results and a summary write up.

   Any proposal to do major settlement repair must be submitted within a Corrective Action Design (BWP SW 25) permit application, since disruption of the final cover system will take place and repair details must be submitted and approved. MassDEP has noted that Section 15 of the Lease addresses temporary removal of the PV system.

6. Notification of Construction: The Applicants shall notify MassDEP, Southeast regional office solid waste section chief, in writing (e-mail is acceptable) when the post-closure use construction commences and is completed.

7. Certification Report: Within ninety (90) days of completing the installation of the solar photovoltaic array, MassDEP shall be provided with a certification report for MassDEP's records. All construction work shall be completed under the supervision of a Massachusetts Registered Professional Engineer who shall have sufficient staff on-site to provide quality assurance/quality control (QA/QC) oversight for all construction work at the Landfill. The report shall be signed and stamped by a Massachusetts-registered professional engineer and include, at a minimum, written certification from the supervising engineer that the project was performed in accordance with MassDEP regulations, requirements and the approved Post Closure Use permit application. The report shall include a project narrative, as-built drawings depicting all pertinent site features and photographs representative of the construction processes and completed work. A list of equipment used on the Landfill, the Landfill area accessed by the vehicle, and the pressure rating of each vehicle shall be indicated in the certification report. Should the Applicants desire a formal review and written approval of the certification report, the Applicants must submit a formal BWP SW 43, landfill Closure Completion permit application.

8. Preconstruction Work: Prior to commencement of construction activities, all Landfill gas vents, Landfill soil-gas monitoring wells, groundwater monitoring wells and other existing above ground structures on the Landfill cap and appurtenances shall be flagged for visibility, and protective barriers shall be placed around such structures, as needed, to prevent damage by vehicles accessing the area.

9. Health and Safety: The Applicants, Engineers and Applicants' Contractors are responsible to ensure all necessary precautions are taken to protect the health and safety of workers and the general public during both the construction phase and during the operation and maintenance phase of the post-closure use.

   A site specific Solar Array Construction Period Health and Safety Plan shall be developed and submitted to MassDEP (for its files) prior to the beginning of any construction work. The Solar Array Construction Period Health and Safety Plan shall include as a minimum;
   - protocols for monitoring of landfill gas as needed,
   - protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable, and
   - training for all workers including town workers conducting construction activities at the Landfill regarding hazards associated with the landfill gas and the PV array, including electrical hazards.

   A site specific Post Closure Operations and Maintenance Health and Safety Plan for the post-closure use period, shall be developed and submitted to MassDEP (for its files) prior to the beginning of any construction work. The Post Closure Operations and Maintenance Health and Safety Plan shall include as a minimum;
   - protocols for monitoring of landfill gas as needed,
   - protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable, and

- training for all workers including town workers conducting maintenance activities at the Landfill regarding hazards associated with the landfill gas and the PV array, including electrical hazards.

10. Personnel Training: The Applicants, Engineers and Applicants' Contractors shall instruct all construction and maintenance personnel regarding the potential hazards associated with landfill gas and shall give on-the-job training involving in any activity authorized by this permit. Such instruction and on-the-job training shall teach personnel how to comply with the conditions of the permit to carry out the authorized activity in a manner that is not hazardous to public health, safety, welfare or the environment.

11. Landfill Gas Notification Requirements:
    a. As specified in solid waste management regulations at 310 CMR 19.132 (4) (g),

    "When, at any time, the concentration of explosive gases exceeds 10% of the lower explosive limit (LEL) in any building, structure, or underground utility conduits, excluding gas control, gas recovery and leachate collection system components, the owner/operator shall:

    1. *Take immediate action to protect human health and safety;*
    2. *Notify the Department within two hours of the findings; and*
    3. *undertake the actions specified under 310 CMR 19.150, Landfill Assessment and 310 CMR 19.151: Corrective Action, as required by the Department."*

    b. If at any time monitoring detects the presence of any combustible gases at or in excess of 10% of the lower explosive limit at any location within a building or within any utility conduits on site or off-site, the Town shall notify MassDEP's Bureau of Waste Site Cleanup-Emergency Response Section (508) 946-2850 within two (2) hours of the exceedance as per 310 CMR 40.0321(1) (a) of the regulations.

12. Vehicles Operating on the Landfill Final Cover System: Vehicles operating on the any access road located above the final cover system shall be limited to the following ground pressures based on soil thicknesses confirmed to exist thickness above the geomembrane liner:

Soil < 24 inches	no vehicles
Soil >/= 24 inches	<10 psi
Soil 24 to 36 inches	<20 psi

    Vehicles operating on the Landfill final cover system shall be low-pressure construction equipment, with fully loaded ground pressures of **7 psi** or less. Site specific engineering calculation must be submitted prior to operation of any equipment with a bearing pressure of greater than 20 psi on the access roads above the Landfill final cover system.

    Construction equipment operating off the access road shall limit turning on the vegetative support layer as much as possible. If MassDEP determines the use of any equipment is creating the potential for damage to the final cover system, the usage of such equipment shall immediately cease upon notification by MassDEP. All operators of the vehicles entering the

final cover system area shall be clearly instructed by the on-site engineer and/or the contractor of the requirements of this permit prior to arrival, to avoid damage to the Landfill final cover system components.

A list of equipment used on the Landfill, the Landfill area accessed by the vehicle, and the pressure rating of each vehicle shall be indicated in the certification report.

13. Permanent and Temporary Roads: Equipment shall not access the final cover system from permanent and temporary roads where the transition will result in excessive pressure and wear on the Landfill vegetative service. The on-site engineer may allow the construction of temporary ramps as necessary.

14. Integrity of the Final Cover System: All disturbances of the Landfill shall be limited to the proposed excavations and installations as depicted and described within the Application and approved plans. Excavations shall be limited to the topsoil layer. No excavations shall penetrate the sand drainage layer without written approval by MassDEP. The Engineer and Applicants' Contractors shall ensure that vehicles operating on the Landfill surface do not compromise the integrity of the Landfill final cover system.

15. Construction Precautions: All excavations and construction shall be supervised by a Massachusetts Registered Professional Engineer engaged by the Engineer. All necessary precautions shall be taken to protect the Landfill storm water control system, environmental monitoring network and the Landfill gas vents and other on site structures. All operators of vehicles entering the construction area should be clearly instructed by the on-site engineer and/or the Applicants' Contractor of the permit requirements to avoid damage to the Landfill components. The on-site engineer shall observe the extent of each excavation performed on the Landfill capping system. If any damage occurs to any Landfill components, the Engineer shall notify MassDEP within 24 hours and provide a written plan with a schedule for repairs.

16. Array Setbacks: The Applicant shall maintain a minimum 10 foot radius buffer between the closest edge of the PV array modules and all Landfill gas vents and a 10 foot radius buffer between the pad mounted electrical equipment and all Landfill gas vents.

17. Post-closure Use Operation and Maintenance Plan: During the first year of operation of the PV array, inspections of the Landfill final cover system shall be performed on a monthly basis. Monthly inspection reports shall be submitted to MassDEP within fourteen (14) days of completion. Following the first year of operation of the PV array, inspections of the Landfill shall be performed on a quarterly basis and shall be submitted to MassDEP within fourteen (14) days of completion. The Applicants, Engineer and Applicants' Contractors shall monitor the effectiveness of the site security system and the storm water management system which should include; swales, structures and any and all conveyance systems. MassDEP shall be consulted prior to any deviation from the approved storm water design. MassDEP may require a permit modification application for significant design modifications. Any erosion problems, settlement problems, security or other issues observed at the Landfill shall be reported to MassDEP and repaired immediately.

In its application narrative, GZA identified the locations of GZ-10 and GZ-15, both on side slopes, as having less than the approved thickness of drainage sand. The Applicants should take particular note of the locations of these test pits and report any issues with proper drainage and side slope final cover system stability.

18. Site Security: Pursuant to 310 CMR 19.130(23) the Town is required to provide sufficient fences or other barriers to prevent unauthorized access to the Landfill. The Town must continually monitor and evaluate the potential for unauthorized access and institute all appropriate measures to prevent unauthorized access during the closure and post-closure period.

19. Transfer – No transfer of this permit shall be permitted except in accordance with the requirements of 310 CMR 19.044. The form established by MassDEP for permit transfers is the BWP SW 49 application form. If at any time, the Applicant for this project does not include a municipal entity, the Applicant shall (or *MassDEP will require the Applicant to*) provide to MassDEP a financial assurance mechanism, in accordance with 310 CMR 19.051, for the costs of decommissioning and site restoration activities.

20. Decommissioning Plan – If the proposed Landfill Solar Photovoltaic Array project is abandoned, during or after completion of construction, the Applicants shall submit to MassDEP for review and prior approval a detailed decommissioning and site restoration plan, which includes, at a minimum: dismantling and removal of all panels and supporting equipment, transformers, overhead cables, foundations and buildings; and restoration of the roads to restore the Landfill to substantially the same physical condition that existed prior to post-closure use construction.

21. Entries and Inspections: In accordance with *310 CMR 19.043: Standard Conditions*, MassDEP and its agents and employees shall have the right to inspect the Landfill and any equipment, structure or land located thereon, take samples, recover materials or discharges, have access to and photocopy records, to perform tests and to otherwise monitor compliance with this permit and all environmental laws and regulations.

22. Reservation of Rights: MassDEP reserves the right to require additional assessment or action, as deemed necessary to protect and maintain an environment free from objectionable nuisance conditions, dangers or threats to public health, safety and the environment. MassDEP reserves all rights to suspend, modify or rescind this permit if it determines the solar array compromises the integrity of the final cover system and/or results in a threat to public health, safety or the environment.

    This approval pertains only to the Solid Waste Management aspects of the proposal does not negate the responsibility of the owners or operators to comply with any other local, state or federal laws, statutes and regulations or enforcement actions, including orders issued by another agency now or in the future. Nor does this approval limit the liability of the owners or otherwise legally responsible parties from any other applicable laws, statutes or regulations now or in the future.

MassDEP has noted that no engineering design calculations have been submitted for PV modules proposed to be located off and away from the Landfill final cover system and mounted on standard design driven H-pile post supported racking system. Pursuant to the paragraph above, the Applicants shall ensure that the proposed off-Landfill module support design meets all applicable building codes.

VI. REVIEW OF DECISION

Pursuant to 310 CMR 19.033(4)(b), if the Applicants are aggrieved by MassDEP's decision to issue this decision, they may within twenty-one days of the date of issuance file a written request that the decision be deemed provisional, and a written statement of the basis on which the Applicants believe they are aggrieved, together with any supporting materials. Upon timely filing of such a request, the decision shall be deemed a provisional decision with an effective date twenty-one days after MassDEP's receipt of the request. Such a request shall reopen the administrative record, and MassDEP may rescind, supplement, modify, or reaffirm its decision. If MassDEP reaffirms its decision, the decision shall become final decision on the effective date. Failure by the Applicants to exercise the right provided in 310 CMR 19.033(4)(b) shall constitute waiver of the Applicants' right to appeal.

VII. RIGHT TO APPEAL

Right to Appeal: This approval has been issued pursuant to M.G.L. Chapter 111, Section 150A, and 310 CMR 19.033: Permit Procedure for an Application for a Permit Modification or Other Approval, of the "*Solid Waste Management Regulations*". Pursuant to 310 CMR 19.033(5), any person aggrieved by the final permit decision, except as provided for under 310 CMR 19.033(4)(b), 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 no later than thirty days of issuance of the final permit decision to the Applicant. The standing of a person to file an appeal and the procedures for filing such an appeal shall be governed by the provisions of M.G.L. c. 30A. Unless the person requesting an appeal requests and is granted a stay of the terms and conditions of the permit by a court of competent jurisdiction, the permit decision shall be effective in accordance with the terms of 310 CMR 19.033(3).

Notice of Appeal: Any aggrieved person intending to appeal a final permit decision to the Superior Court shall first provide notice of intention to commence such action. Said notices of intention shall include MassDEP Transmittal No. X262842 and shall identify with particularity the issues and reason why it is believed the final permit 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 which processed the permit application, if applicable at least five days prior to filing of an appeal. The appropriate addresses to send such notices are:

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

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

No allegation shall be made in any judicial appeal of a final permit decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in 310 CMR 19.000, provided that a 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 environmental impact of the permitted activity.

Please direct any questions regarding this matter to me at (508) 946-2847 or Dan Connick (508) 946-2884 or write to the letterhead address.

Very truly yours,

Mark Dakers, Chief
Solid Waste Management Section
Bureau of Air and Waste

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