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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August 2, 2012

David Johansen, Director of Public Works
Town of Dennis
120 Theophilus Smith Road
Dennis, Massachusetts 02702

and

Eric T. McLean, P.E.
American Capital Energy
15 Tyngsboro Road, Suite 4A
North Chelmsford, Massachusetts 01863

RE: APPROVAL WITH CONDITIONS
Application for: BWP SW 36 Post-Closure Use-Major Solar Photovoltaic Array
Transmittal #: X250047

AT: Dennis Landfill
Theophilus Smith Road
Dennis, Massachusetts
Facility ID#: 39206, Regulated Object#: 172457

Dear Mr. Johansen and Mr. McLean:

The Massachusetts Department of Environmental Protection, Solid Waste Management Section (MassDEP), has completed its review of the referenced Post-Closure Use permit application (Application) for the Dennis landfill (Landfill). The Application was prepared and submitted on behalf of the Town of Dennis and American Capital Energy (Applicants) by Weston & Sampson Engineers, Incorporated (Weston or Engineer) of Peabody, Massachusetts.

MassDEP has determined that the Application is administratively and technically complete and hereby approves the Post-Closure Use of the Landfill for a 6.0 Megawatt (MW) solar photovoltaic (PV) array subject to the conditions specified herein.

I. SUBMITTALS

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* (Manual). The Application consists of the following:

A. The permit transmittal, application forms for Post-Closure Use - Major (BWP SW 36), narrative describing the proposed use, engineering calculations, seven engineering drawings and documents received by MassDEP on March 19, 2012.

B. Supplemental Application information prepared by the Engineer, consisting of response to MassDEP's May 2, 2012 comments, dated June 4, 2012 and received by MassDEP on June 7, 2012.

C. Supplemental Application information prepared by the Engineer, consisting of response to MassDEP's May 9, 2012 and June 18, 2012 comments, dated July 12, 2012 and received by MassDEP on July 16, 2012.

The Application is signed and stamped by Duane C. Himes, Massachusetts Professional Civil Engineer No. 32336.

II. SITE DESCRIPTION

The Dennis Sanitary Landfill is an unlined landfill located off Theophilus Smith Road on a Town owned parcel of land encompassing approximately 148 acres, in Dennis (the Site). The Landfill final cover system encompasses approximately 34 acres. The Site also contains the Town's solid waste transfer station, composting operation, and Department of Public Works Facility. These operations are located on the eastern portion of the Site. The active transfer station, composting operation and Department of Public Works Facility are not located on the Landfill's capping system.

The Landfill is abutted by Theophilus Smith Road and private undeveloped land to the south; to the west by a Massachusetts Highway Department salt/sand storage facility and private undeveloped land; by private undeveloped land (between the Site property and Route 6) to the north; and the Town of Dennis transfer station, other primarily undeveloped land owned by the Town, and private, undeveloped land to the east.

MassDEP approved a permit application for the construction of a 93 ton per day municipal solid waste handling facility on May 1, 1989. On April 13, 1990 MassDEP approved the operation of the handling facility. On May 1, 1998 MassDEP approved modifications to the transfer station including site layout and traffic flow. No increase capacity was requested for municipal solid waste however the Town requested to manage construction and demolition waste and difficult to manage waste at the transfer station for off-site recycling or disposal, whereas it had been previously disposed at the Landfill.

Existing Final Cover System Design: The Landfill was closed in two phases: Phase 1 (approximately 15 acres) and Phase 2 (approximately 19 acres). The PV array is proposed to be constructed on the final cover system for Phase 1 and Phase 2 of the Landfill.

On July 19, 1996 MassDEP approved the permit application for the Phase 1 Corrective Action Design (CAD). The final cover system was installed with a minimum top slope of 5% and side slopes no greater than 3:1. The Phase 1 final cover system was constructed during the 1996 construction seasons. The Phase 1 final cover system design consisted of the following components from bottom to top:

- 6 inch gas venting layer;
- 40 mil linear low density polyethylene (LLDPE) flexible membrane liner barrier layer;
- 15 inch sand drainage layer; and
- 12 inch loam vegetative support layer.

The Phase 1 approved closure design incorporated a passive gas venting system consisting of 19 gas vents. Four of the gas vents, originally installed during Phase 1 closure (GV-14, GV-16, GV-18 and GV-19), were removed during the Phase 2 closure. There are currently 15 gas vents associated with Phase 1 area including GV-15 and GV-17 which are located east of the storm water basin. Four-inch diameter slotted, schedule 80 PVC pipe gas vents were installed in 18 inch bore holes to the bottom of waste. Additionally, two settlement platforms were installed within the Phase 1 area. The gas vents within the Phase 1 area extend 5 feet above the landfill ground surface.

MassDEP approved the permit application for the Phase 2A CAD on September 9, 1997 and the Phase 2B CAD on April 9, 1998. The Phase 2 system was constructed during the 1998 construction season. The final cover system was installed with a minimum top slope of 5% and side slopes no greater than 3:1. The Phase 2 final cover system design consists of the following components from bottom to top:

- six inch gas venting layer;
- 40 mil linear low density polyethylene (LLDPE) flexible membrane liner barrier layer;
- 15 inch sand drainage layer; and
- 12 inch loam vegetative support layer.

The Phase 2 approved closure design incorporates a passive gas venting system consisting of 27 gas vents. Seven gas vents were installed along Massachusetts Highway Department property line to alleviate the gas migration concern in this area. Additionally, a landfill gas trench was installed along the Massachusetts Highway Department property line during Phase 2A waste relocation activities. An approximately 10 foot by 270 foot long trench was excavated to below the bottom of waste during the Phase 2B construction and backfilled with a low permeability sandy silt (average hydraulic conductivity $1.3x10^{-6}$ cm/sec) material to act as a barrier to landfill gas migration. Additionally, two settlement platforms were installed within the Phase 2 landfill area.

On January 5, 1999, MassDEP approved Phase 1B, Phase 2A and Phase 2B Landfill Final Closure Construction Certification Report prepared by SEA on behalf of the Town and submitted to MassDEP on November 25, 1998[1].

Note 1: Phase 1A landfill disruption activities were approved on November 30, 1995 to excavate approximately 5 acres of wood waste debris from an area along the eastern side of the landfill. These activities were completed by May 22, 1996.

A Comprehensive Site Assessment (CSA) was submitted to MassDEP in February 1996 and an addendum to the CSA was submitted on March 18, 2002 to address MassDEP's April 17, 1997 comment letter. Post closure environmental monitoring (groundwater and soil gas) is currently conducted by the Town in accordance with the plan included in the March 18, 2002 CSA addendum.

Existing Post-Closure Uses: On December 29, 1999 MassDEP approved a Post-Closure Use permit application for the construction of a Department of Public Works (DPW) facility on the site assigned parcel. The DPW facility is located approximately 900 feet from the Landfill edge of waste and consists of a 20,000 ft.^{2} building for office space and a maintenance garage area for vehicles. The area surrounding the DPW building includes a parking facility, a salt storage shed and a yard for storage of DPW materials. The Post-Closure Use permit application included a quantitative risk assessment that evaluated the risk to Town employees and residents who may access the DPW facility. The exposure pathway evaluated was the inhalation of landfill gas. In order to assess the potential impact of landfill gas to town employees and residents gas concentrations at the breathing zone were calculated using EPA's air dispersion model Screen 3. Screen 3 was used to determine the maximum one-hour breathing zone concentration in a horizontal distance from the discharge source at which the maximum breathing zone concentration occurs. The results of the Screen 3 model indicated that acceptable concentrations of 1-2-4 trimethylbenzene and hydrogen sulfide occur at horizontal distances of 36 meters and 45 meters respectively from the modeled gas vent. The contaminant concentrations were compared to AALs and NIOSH PELs. Gas concentrations reported by Screen 3 model are assumed to represent a worst-case scenario because they originate from those gas vents installed within the MSW portion of the Landfill. The December 29, 1999 MassDEP Post-Closure Use permit application approval for the DPW facility required that the facility be equipped with a landfill gas monitoring device.

On May 2, 2012 MassDEP provided comments regarding the previous air quality modeling associated with the Post-Closure Use permit application for the DPW facility and its implications for the proposed solar photovoltaic array Post-Closure use. MassDEP provided a comment that the previous air quality modeling associated with the Post-Closure Use permit application for the DPW facility concluded contaminant concentrations for 1-2-4 trimethyl benzene and hydrogen sulfide may exceed (under worst-case scenario) NIOSH PELs values on the Landfill. As a result, MassDEP would require the Applicants demonstrate that actual concentrations of contaminants in ambient air from the Landfill do not constitute a health and safety risk to the workers for the construction, operation and maintenance of the proposed post closure use.

In response to MassDEP's comment the Engineer stated that they would demonstrate that there is no significant risk posed, by actual emissions, by collecting ambient air samples in several SUMMA canisters located downwind of the landfill gas vents using EPA method TO-15 and one canister upwind of the vents (**refer to condition #7**).

Post-Closure Environmental Monitoring: Post-closure environmental monitoring (groundwater and soil gas monitoring) is currently conducted by the Town. The current post-closure monitoring plan is summarized in the CSA addendum report which was prepared by SEA Consultants, Inc. on behalf of the Town and submitted to MassDEP on March 18, 2002 in report dated March 2002 (" 2002 Plan"). However, MassDEP is currently reviewing a permit application (BWP SW 22, transmittal# X237455) to modify the current post closure environmental monitoring plan.

A pad mounted disconnect switch and pad mounted metering cabinet are proposed approximately 85 feet from the edge of waste. As part of the proposed Post-Closure Use the Engineer is proposing to install two soil-gas monitoring wells between the edge of waste and the two pads (**refer to condition #9**).

III. POST-CLOSURE USE PROPOSAL SUMMARY:

American Capital Energy (ACE or Developer), through an agreement with the Town of Dennis (Town) and Cape and Vineyard Electrical Cooperative, Incorporated (CVEC), proposes to develop 6.0 MW solar photovoltaic installation on the Landfill. Hereinafter, the Town of Dennis, American Capital Energy and all construction and maintenance personnel associated with the Town's Landfill shall be referred to as the "Applicants' Contractors". ACE in conjunction with the Town is proposing to construct and maintain a PV array on the capped Landfill, consisting of the following components:

- Construction of a permanent on Landfill access road and additional temporary access roads;
- Approximately 5,000 precast concrete ballasts (70 inches x 40 inches by 14 inches thick) will be placed within the topsoil support layer of the final cover system;
- Approximately 2,500 PV panel support racks (SunLink Groundmounted System) installed on the concrete ballasts;
- Approximately 23,000 PV modules (Yingli Solar Modules) will be placed on the PV panel support racks;
- Ten electrical equipment concrete pads will be installed on the final cover system. The electrical equipment concrete pad will support the electrical equipment, including inverters, transformers, switchboards and switchgear;
- Two pad mounted "Metering and Primary Switchgear with Relaying" are proposed to be located outside the limits of the final cover system on a fiberglass box pad,
- The photovoltaic panel support racks will be interconnected using above-ground and underground cables;
- The output from the PV array will be connected via underground cable conduits and overhead lines to the grid at two separate NSTAR interconnection points; and
- Four new utility poles will be installed outside the limits of the landfill final cover system.

Temporary access roads will be constructed, if needed, during construction to minimize impact to the Landfill's final cover systems. The temporary access roads will be constructed by placement of a woven filter fabric over the vegetative support layer, and the addition 18 inches

of compacted dense graded crushed stone. The temporary access roads will be removed within six months of completion of construction and the road areas will be restored to meet the specifications of the final cover system.

A permanent access road will be constructed by verifying the existing final cover system thickness, stripping off the vegetative support layer of the landfill final cover system (approximately 12 inches thick), placing a woven filter fabric, and adding approximately 21 inches of dense graded crushed stone or gravel above the existing sand drainage layer (approximately 15 inches thick). Dense graded crushed stone will be added to provide a 36 inch separation between the FML and/or the low permeability soil layer and the road surface.

Most of the array will be on areas of the Landfill with a slope of less than 5% (2.9 degrees) but the edges may expand into areas where there is up to a 15% (8.6 degrees**)** slope.

The solar array will utilize PV modules (3.25-foot by 5.42-foot) mounted on galvanized steel, aluminum, or stainless steel framed racks attached to the precast concrete ballast. The racking system will hold the panels at a fixed tilt of 20 degrees from horizontal. The PV array will use monocrystalline PV modules mounted on racks consisting of nine modules in a single row (panel layout 1 x 9) with two ballasts per rack. Each panel support rack or assembly will utilize a fully ballasted mounting system with no penetrations of the low permeability layer of the final cover systems. The modules and the associated racking will be approximately 3 feet (37 to 41 inches) high in the front (south edge) and 5 feet (60 to 63 inches) high in the rear. The rows of PV panels will be oriented east-west and the typical spacing between each row will vary from 5 feet to 8 feet (north-south measurement). The Landfill contours are not aligned with the east-west axis of the PV racks, therefore the rows will be at a slight cross-slope angle.

The existing elevation and grade of the Landfill will be minimally altered. The proposed design will impact limited portions of the topsoil layer of the final cover system. The impacts result from the installation of rack ballasts, installation of the inverter/transformer concrete pads, and installation of above and below grade electrical wiring.

The ballasts will be precast concrete slabs and will be brought into the Site via pickup trucks. The precast concrete ballasts will be placed by excavating the topsoil at the proposed ballast location, placing a geotextile fabric on the existing sand drainage layer, and then placing a layer of compacted crushed stone or gravel in preparation for the installation of the concrete ballasts. Crushed stone or gravel will be installed such that the concrete ballasts are level. Once this is accomplished, the vegetation and topsoil surrounding each ballast will be restored (**refer to condition #12**).

The support racks will house all wiring between the modules. The electrical transmission wiring will run within cable conduits above grade, mounted on the rack assemblies where applicable, or mounted on conduit supports (block assemblies) above grade to keep the cables off the ground surface. At permanent and temporary access road crossings, the electrical wiring will run below ground. The electrical wiring that will be placed below these roads will be placed in fiberglass reinforced epoxy (FRE) or equivalent cable conduits, at a minimum depth of 2 feet below the road surface.

At the southern end of the Landfill, the above grade electrical transmission wiring cable conduits will cross the existing perimeter stormwater swale on a truss support system and then transition to a below ground duct bank encased in sand. The below ground duct banks are located outside the limits of the final cover system and connect the switchgear to new utility poles and thence to interconnection points, which are existing utility poles. The switchgear will be mounted on a "fiberglass box pad" which extends 4 inches above grade and below grade as required to facilitate installing the in-feed and out-feed electrical conduits. These conduits run below grade will enter the box from the bottom.

Ten reinforced concrete electrical equipment pads for the inverters/transformers will be formed and cast on site. The area beneath the concrete electrical pad will be prepared by excavating the topsoil layer, placing layer of geotextile fabric above the existing sand drainage layer, and placement of an overlying, minimum thickness of 12 inches of crushed stone. The concrete pad will be formed and the concrete will be poured on top of the crushed stone layer. The Applicants' Contractors are required to protect the sand drainage layer and the FML during this construction (**refer to condition #12**).

There are no subsurface penetrations at the ten inverters/transformers concrete pads. Conduits will not enter the concrete pads from beneath the pad. Conduits will be mounted on aboveground supports except at subsurface road crossings. Conduits will run into the side of the inverters/transformers and other equipment with the use of flexible gas tight connections. All underground conduits will be sealed, have gas tight fittings and will include flexible connections at transition points. All electrical work will be designed for the most recent version of the Massachusetts Electrical Code (MEC) which includes and incorporates the requirements of the National Electric Code (NEC). The developer proposes to use PV modules and wires that will contain a latching type connector that requires a special tool to reopen. In addition all the wires are to be fastened to the back of the modules in the recessed spaces and under the mounting system to prevent any free or hanging portions of wires from being accessible. All other wiring besides homeruns string wiring are enclosed in conduit and therefore not readily accessible. Prior to construction, an electrical permit will be obtained from the local building department official, and the project will incorporate any additional electrical requirements stipulated by the building department official (**refer to condition # 16**).

Geotechnical Evaluation: The Application included a geotechnical evaluation for the installation of the array and supporting structures on the final cover systems.

The Application included an analysis of the foundations for the PV array that will bear directly on the final cover systems (HDPE, LLDPE and low permeability soil liner) and has considered the dead load, snow load and wind loading. The results of the geotechnical evaluation are as follows:

- The modules, panel support racks, and ballasts do not exceed the loading criteria for the Landfill.
- The electrical equipment concrete pad (inverters/transformers) does not exceed the recommended loading criteria for the Landfill.

- The PV array will not cause adverse Landfill settlement.
- The Engineer determined the potential vehicle loading on the proposed permanent and temporary access roads would not produce unacceptable loading stresses to the Landfill final cover systems.
- The PV array is stable on a slope up to 15%.
- The 4 inch FRE electrical cables conduit buried under the proposed permanent and temporary access roads, and the road base soil surrounding the conduit, will support the applied vehicle loads.

The anticipated maximum loading scenario (ballasts, racking system, and modules) on the Landfill surface will result in a bearing pressure of approximately 4 pounds per square inch (psi) which is less that the maximum 10 psi as recommended by the Geosynthetic Research Institute.

The estimated settlement resulting from the static loads increase of the PV array ballasts was 0.07 inches for the final cover systems. The Engineer has stated the FML of the final cover systems can undergo this distortion without impacting the integrity of the liner.

A block analysis was performed to evaluate the sliding stability of the ballasts. A maximum slope of 15% was evaluated. The Engineer determined the factor of safety for sliding of the PV ballasts and the underlying soils was approximately 3.17 on a 15% slope. The supporting compacted crushed stone or gravel will be placed level such that the concrete pad will not slide. Should the pads not be placed level, MassDEP will requiring sliding calculations be performed for this interface.

Storm Water: The Engineer performed calculations using Hydro CAD modeling software (TR-20) analysis for the 24-hour, 25 year storm and again under the 24-hour, 100 year storm. The PV array will modify run off characteristics of a limited portion of the Landfill by changing some of the landfill grass cover to impervious surfaces. The additional impervious surfaces (i.e. ballasts and electrical equipment concrete pads) represents less than 5% of the of the closed Landfill surface that is to be covered by the PV array. The capacity of various elements of the Landfill storm water conveyance systems were reviewed including, swales, stoned line ditches, storm water piping and detention basins. The Engineer concluded there should be adequate capacity to properly manage the post development at the Landfill: therefore there is no need to modify the existing storm water management system.

Post Closure and Post-Closure Use Operations and Maintenance: On March 18, 2002 MassDEP received a revised "Post Closure Operation and Maintenance Manual" for the Dennis landfill. The Town currently implements the Landfill's post closure monitoring and maintenance plan. The Town is to continue to perform all post closure environmental monitoring (groundwater and soil gas monitoring) for the Landfill. Operations and maintenance for the Landfill for the area where the PV array is located up to a distance of 10 feet away from the edge of the PV array is to be the responsibility of the project Developer: American Capital Energy. The Town is to maintain responsibility for the remainder of the Landfill outside the 10 foot buffer around the PV array.

There are no proposed changes to the post closure operation and maintenance plan for the area to be maintained by the Town and not used for the PV array. Currently, cover system inspections and mowing are conducted semiannually in accordance with March 2002 Post Closure Operation and Maintenance Plan (**refer to condition #15**).

A Post-Closure Use operation and maintenance plan for the area used for the PV array was submitted with the Application. The Developer proposes to provide: site security; electrical maintenance; module cleaning; and final cover system maintenance including but not limited to, mowing, undergrowth control, pest control, and erosion control. The Developer proposes to conduct periodic inspections to check the landfill final cover system for erosion and changes in vegetative growth. MassDEP is requiring that these inspections be performed monthly for the first year after construction of the PV array (**refer to condition #18**).

The Application included a Health and Safety Plan for operation and maintenance activities to be performed by employees at the Dennis landfill solar project for the operation and maintenance of the proposed PV array. The Application did not include a health and safety plan for the construction of the proposed PV array (**refer to condition #8**).

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 and not used for the PV array other than the mowing restrictions (**refer to condition #15**) and the addition of two soil-gas monitoring wells (**refer to condition #9**). MassDEP is requiring a Health and Safety Plan and personnel training for employees who access the areas of the Landfill (**refer to conditions #8 and #10**).

Site Security: The Landfill is fenced except for one location in the northeast portion of the landfill. The developer proposes to add additional fencing, off of the Landfill final cover system, at its discretion to complete the enclosure of the Landfill. There are two gated access points to the landfill with the main entrance being from the transfer station located off of Theophilus Smith Road and the secondary access located along Theophilus Smith Road (**refer to condition #19**).

Massachusetts Division of Fisheries & Wildlife Requirements: As requested by the Applicants, the Massachusetts Division of Fisheries & Wildlife ("DWF") reviewed a MESA Project Review Checklist and plans titled "Dennis Landfill Ground Mounted PV Array Habitat Figure", dated 5/11/2012, and other materials required for review pursuant to the Massachusetts Endangered Species Act ("MESA"). On May 24, 2012, DWF issued its determination that certain conditions regarding fencing and mowing are necessary to avoid a prohibited "take" of state endangered species (321 CMR 10.18(2)(a)). The conditions identified by DWF are included as requirements of this approval **(refer to condition #17).** In addition MassDEP has requested a copy of the submittal to DFW for MassDEP's files.

Decommissioning Plan: Decommissioning and site restoration will include dismantling and removal of all panels and supporting equipment, transformers, overhead cables and foundations and restoration of the roads, and modules sites to substantially the same physical condition that existed immediately before construction of the PV array (**refer to Condition #20**).

IV. PERMIT DECISION

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 Dennis Landfill for a Solar Photovoltaic Array subject to the conditions identified herein.

V. GENERAL PERMIT CONDITIONS:

1. Permit Limitations: The issuance of this approval is limited to the proposed Solar Photovoltaic Array at the Dennis landfill as detailed in the Application and does not relieve the Applicants' Contractors 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. Regulatory Compliance: The Applicants, Engineers 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".

3. 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 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.

4. Notification of Construction: The Applicants shall notify MassDEP in writing (e-mail is acceptable) when the post-closure use construction commences and is completed.

5. Certification Report: Within ninety (90) days of completing the installation of solar photovoltaic array, MassDEP shall be provided with a certification report. 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. At a minimum, the report shall include as built drawings depicting all pertinent site features, equipment used, etc.

6. Preconstruction Work: Prior to commencement of construction activities all landfill gas passive vents, 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.

7. Results of Ambient Air Monitoring: Prior to initiation of Post-Closure Use construction the Applicants shall submit a report that demonstrates that any landfill gas emissions do not constitute a health risk to the workers during construction, operation and maintenance of the Post-Closure Use.

8. Health and Safety: 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 copy of the site specific health and safety plan for the post-closure use CONSTRUCTION phase, shall be submitted to MassDEP (for its files) prior to the beginning of any construction work. The health and safety plan shall include as a minimum:

   - protocols for monitoring of landfill gas (i.e. methane, hydrogen sulfide, etc.) as needed; and
   - protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable.

9. Soil-Gas Monitoring Wells: The Applicants shall install the two proposed soil-gas monitoring wells prior to commencement of operation of the PV array. Soil-gas monitoring wells shall extend to the bottom of waste or the water table whichever is shallower. As built for the soil-gas monitoring wells shall be submitted with the Post-Closure Use certification report.

10. Personnel Training: The Applicants, Engineers and Applicant's Contractors shall instruct all 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) 946-2714 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 Landfill final cover system shall only operate on the designated permanent and temporary access roads, except for low-pressure construction equipment (with ground pressures of **7 psi** or less) in accordance with the remaining conditions of this permit. Low-pressure 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 excavation equipment is creating the potential for damage to the FML, 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 low ground pressure equipment used and the pressure rating of each vehicle shall be indicated in the certification report required in Condition #5.

13. Permanent and Temporary Roads and Low Ground Pressure Equipment: Low ground pressure 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 construct 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 15-inch sand drainage layer or the HDPE flexible membrane layer without written approval by MassDEP. The Engineer and Applicant's 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 necessary precautions shall be taken to protect the Landfill storm water control system, environmental monitoring network and the Landfill gas vents. All operators of vehicles entering the 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 cover system. If any damage occurs to the any Landfill components, the Engineer shall notify MassDEP within 24 hours and provide a written plan with a schedule for repairs.

16. Proposed Inverter/Transformer Pad (PowerStation) and Interconnection Equipment: The Applicants stated within the permit application that manufacturers "cut sheets" for the electrical equipment were included in Appendix B for informational purposes only and were only representative of equipment that is proposed. Final equipment selection may vary based on availability and other factors at the time of construction.

    If the Applicants or Applicants' Contractors propose to change the electrical equipment a copy of the final design for the inverter/transformer pad and any other electrical pads and protective switchgear (interconnection equipment) proposed on-site shall be submitted to

MassDEP for review and approval. The Applicant, Engineers and Applicants' Contractors are responsible to ensure that utilities/structures will not accumulate landfill gas during construction and operation. There shall be no penetrations (utility, conduits or other) at the base of any concrete pads or foundations. There shall be no penetration of any kind of the impermeable layer of the final cover system.

17. Massachusetts Division of Fisheries & Wildlife Requirements: Pursuant to the May 24, 2012, the Massachusetts Division of Fisheries & Wildlife ("DWF") determination that certain conditions are necessary to avoid a prohibited "take" of state endangered species (321 CMR 10.18(2)(a)), the following conditions must be met:

    a) A time-of-year restriction on vegetation management activities (e.g. mowing) shall occur once a year between November 1 and March 31 and shall be implemented in areas identified as "Approximate location of higher quality field edge habitat" and "Approximate location of lower quality field edge habitat" in the Plans submitted to DWF dated 5/11/2012.
    b) All fencing adjacent to the habitat areas shall be installed so that the bottom of the fence is approximately 8" above ground level".

    A copy of the 5/11/2012 Plans and related correspondence submitted to DFW shall be submitted to MassDEP within thirty days of this approval for MassDEP's file.

18. Post-closure Use Operation and Maintenance Plan: During the first year after completion of construction 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, and if no problems have been documented, inspections of the Landfill shall be performed on a quarterly basis and shall be submitted to MassDEP within **fourteen (14) days** of completion. Pursuant to 310 CMR 19.142(6) inspections shall be conducted by a third-party consulting Massachusetts Registered Professional Engineer, or other qualified solid waste professional. The Applicants, Engineers and Applicants' Contractors shall monitor the effectiveness of 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, settlement, security problems or other issues observed at the Landfill shall be reported to MassDEP and repaired immediately.

19. Site Security: The Applicants and Applicants' Contractors must continually monitor and evaluate the potential for unauthorized access and institute all appropriate measures to prevent unauthorized access during construction and operation of the Solar Photovoltaic Array.

20. Decommissioning Plan: If the proposed project is abandoned, during or after completion of construction, the Applicant shall submit a decommissioning plan. The decommissioning and site restoration plan should include, 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 site 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.

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: Review Procedures for 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. c. 111, § 150A and M.G.L. c. 30A not later than thirty (30) days following receipt of the final permit. 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 remain effective or become effective at the conclusion of the thirty (30) day period.

Notice of Appeal - Any aggrieved person intending to appeal a grant of a permit to the Superior Court shall first provide notice of intention to commence such action. Said notice of intention shall include the Department transmittal number X250047 and shall identify with particularity the issues and reason why it is believed the permit decision was not proper. Such notice shall be provided to the Office of General Counsel of the Department and the Regional Director for the regional office which processed the permit application at least five days prior to the filing of an appeal.

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

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

No allegation shall be made in any judicial appeal of a 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 a 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) 2847 or to Dan Connick (508) 946-2884, or write to the letterhead address.

Very truly yours,

Mark Dakers, Acting Chief
Solid Waste Management Section

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Terrence Hayes, Health Director, fax (508) 394-6289
Brian Florence, Building Commissioner fax (508) 394-6289
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Zoning Board of Appeals & Town Planner, Dan J. Fortier, fax (508) 394-8309

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