



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

Western Regional Office • 436 Dwight Street, Springfield MA 01103 • 413-784-1100

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City of Easthampton  
50 Payson Ave.  
Easthampton, MA 01027  
Attention: Mayor Michael Tautznik

August 9, 2011

RE: Easthampton-DSWM-11-087-001  
Oliver St. Landfill  
Post Closure Use – Solar Power  
**Permit Approval**  
BWPSW36  
Transmittal #X238328

Dear Mayor Tautznik:

The Massachusetts Department of Environmental Protection (the MassDEP) is issuing this permit approval to the City of Easthampton (the City) for the post closure use of the City's capped landfill located off Oliver Street (the landfill), as a solar power farm (solar farm). On May 12, 2011 the MassDEP received from the City the BWPSW36 Major Post Closure Use permit application, under transmittal #X238328 (the application). The application was completed on behalf of the City by Tighe & Bond, Inc. (T&B), and the engineering drawings of the application were signed and stamped by James E. Trant, Massachusetts-registered Professional Engineer (P.E.) #28556; the application form was signed by Mayor Michael Tautznik. The application consists of the completed transmittal form, application form, text describing the proposed use, additional information received on August 4, 2011, engineering calculations, and twelve engineering drawings.

### Summary of Proposal

The application proposes the construction and maintenance of a 2.3 megawatt (MW) photovoltaic solar farm on approximately 11 acres of the capped landfill, as follows:

- Three permanent access roads will be built on the landfill cap for vehicle access for construction and maintenance activities;
- A total of 962 pre-cast concrete foundation footings will be placed on/within the vegetative support layer of the cap;
- 481 photovoltaic panel racks (Flex Rack) will be installed on the foundation footings;
- 9,620 Yingli Solar Panels will be installed on the panel racks;
- A concrete pad will be installed on the vegetative support layer of the cap, within the center of the landfill, which will hold electrical equipment, including combiner boxes, inverters, switchboxes,

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- transformers, and a switchgear box, where electrical power from the solar panels will be conveyed;
- The photovoltaic panel racks will be connected to the electrical equipment pad via above-ground electrical cables, strung on the panel racks and also on aluminum ladder-type racks between the panel racks;
- The switchgear box of the electrical equipment pad will convey electrical power off the landfill via an electrical cable buried in a conduit ductbank beneath the permanent access road, for transmission of electricity to the WMECO utility grid at a new utility pole to be installed on the east side of Oliver Street, at the former landfill entrance.

A permanent access road will be constructed from the former landfill entrance on Oliver Street, through the center of the landfill, to the City-owned property just north of the landfill. The road will be constructed by stripping off the organics of the vegetative support layer of the landfill cap, placement of a woven geotextile, addition of 12.5 inches of processed gravel, with 6 inches of dense graded crushed stone over the gravel. One 12-inch high by 18-inch wide, concrete duct bank will be installed within the processed gravel layer of the permanent road from the Oliver Street entrance to the electrical equipment pad, with two 4-inch diameter PVC conduits within the duct bank; one conduit will carry the electrical transmission line from the electrical equipment pad to the utility pole on Oliver Street, the other conduit will be a spare. Two additional two-inch PVC conduits will be installed within the processed gravel layer of the permanent access road, to carry communications wiring (and a spare). A construction entry pad will be installed off the landfill cap, at the entrance of the permanent access road at Oliver Street, consisting of a 6-inch thick, crushed stone pad, 16-feet wide by 30-feet long, to avoid dirt tracking onto Oliver Street during construction.

Two permanent access roads will be constructed extending southward from the permanent access road, located just west of the existing rip-rap stormwater drainage swales. The access roads will be constructed by placement of a woven geotextile over the vegetative support layer, and addition of 18 inches of compacted gravel. The access roads will be used for delivery of materials, including photovoltaic panels, panel racks, and precast footings, and will be removed by the end of construction activities.

The concrete foundations (footings) for the photovoltaic racks will be pre-cast off-site, and will be 3 feet wide, 1 foot thick, and 11 feet long. T&B proposes to use either crushed stone or crushed, coated asphalt, brick and concrete (ABC) material, as fill beneath each footing, to provide a planar surface for the footings, at a maximum slope of 6 degrees from horizontal, in the North-South direction. T&B proposes two alternative methods for placement of the crushed stone/ABC fill: (A) Placement of crushed fill only under each footing, extending out a minimum of 6 inches beyond the footing edge; or (B) Placement of a geotextile fabric strip and crushed fill along the entire length of each panel rack line extending out a minimum of 6 inches beyond the footing edge. Excavations to level each footing would only extend a maximum of 6 inches into the vegetative support layer. The photovoltaic racks will be bolted to the footings. The electrical wiring on the photovoltaic racks will be encased in a wire mesh, and the electrical transmission wiring from the racks to the electrical equipment pad will be run within conduit pipe or Armored Cable on aluminum-ladder type cable trays on the landfill surface. All photovoltaic rack assemblies and above-ground wiring will be kept at least 10 feet from any landfill gas vents.

The concrete electrical equipment pad will be constructed in the center of the landfill, just off the permanent access road, and will be 36-feet wide by 52-feet long by 1.0 to 1.5-feet thick. A minimum of 6 inches of crushed stone will be placed beneath the pad for leveling purposes, and the concrete pad will be poured in place, using a concrete pumper truck operating from the access road. Four disconnecting contactor boxes, four inverters, one Metering Cabinet, two stepup transformers, one stepdown transformer, one switchgear box and ancillary equipment will be placed on the concrete pad. The electrical lines from the transformers and switchgear will run from the base of these boxes down through the concrete pad and the crushed stone below, due to electrical code requirements, however none of these electrical lines will

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penetrate the vegetative support layer. Specifications included in the application show that the electrical equipment, including the inverters and transformers, will be metal boxes with no opportunity for worker entry. A 6-foot chain link fence will be installed around the electrical equipment pad, by anchoring of fence posts within the concrete at the pad perimeter. MassDEP notes that the existing, chain-link fence only surrounds the western and northern perimeter of the landfill, and does not extend around the southern and eastern perimeter of the landfill or the proposed solar farm. MassDEP understands that the City will install a locking gate at the fence at the northeast corner of the landfill.

Only low-ground pressure equipment (7 PSI or less) will operate off the access roads, and will be operated to minimize turning during operations and to minimize repeated travel over the same areas. If use of the equipment is determined to be detrimental to the cap vegetative support layer surface, a geotextile and a 6-inch layer of crushed stone will be placed on the vegetative support layer surface. Field personnel from T&B will be on-site during all construction activities on the cap, to monitor for potential damage to the cap.

T&B performed geotechnical analyses for the loading on the foundations, settling and stability of the foundations, and for loading and settlement on the access roads on the cap. At MassDEP's request, T&B provided additional documentation that the potential vehicle tire loading on the access roads would not produce unacceptable loading stresses. T&B concluded that all analyses, for the foundations and the roads, showed minimal loading and settlement, and no stresses or settlement which would damage the impermeable layer of the landfill cap. T&B performed updated stormwater analyses for changes to stormwater runoff from the proposed work; T&B concluded that there will only be small changes in stormwater runoff, and the existing stormwater control system can handle the flows. T&B states that the proposed construction and operation of the solar farm will not alter the conclusions of the previous Qualitative Risk Assessment for the landfill (completed as part of the Comprehensive Site Assessment); i.e. that there are no significant risks to human health and the environment posed by the landfill, or by the presence of the solar farm on the landfill.

There are no proposed changes to the existing, long-term monitoring program for the landfill. The landfill will continue to be inspected semi-annually and mowed annually, by the City. If erosion is observed, the surface will be stabilized. The landfill perimeter is partially surrounded by chain-link fence and a gate will be installed at the permanent access road entrance from the City property along the northern landfill perimeter. Decommissioning of the solar farm, if required in the future, would consist of removal of all structures, including foundations, and restoration of the landfill cap to its original condition. The access roads would remain to provide future landfill access for the City.

T&B states that construction of the solar farm will begin in August, 2011, and will be completed by February of 2011.

### **MassDEP Determinations**

Personnel of MassDEP have reviewed the Post-Closure Use permit application for the Oliver Street Landfill in accordance with MGL c. 111 s. 150A, MGL c. 30A, 310 CMR 19.000, and MassDEP's publication Landfill Technical Guidance Manual (the LAC), revised in May, 1997. MassDEP has determined that the application is approved in accordance with MGL c. 111, s. 150A and MGL c. 30A, subject to the conditions outlined below.

1. As proposed, a third-party, qualified engineering consultant (the on-site engineer) shall be present on-site at all times when any construction work is taking place on the cap. The on-site engineer shall have sufficient staff on-site to provide quality assurance/quality control (QA/QC) oversight for all

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construction work at the site, and shall submit monthly construction progress reports to the MassDEP and the City, which shall summarize the work performed during the month. At the end of construction work, the third-party engineering consultant shall submit a completion report, signed and sealed by a Massachusetts-registered P.E., certifying that the work was completed in accordance with the application and the conditions of this permit.

2. The City and their contractor(s) are responsible to ensure that all necessary precautions are taken to protect the health and safety of workers and the general public during both construction and maintenance of the solar farm. A copy of the site-specific Health & Safety Plan for the construction and maintenance of the solar farm shall be submitted to the MassDEP prior to the beginning of any construction work, which shall include protocols for monitoring of landfill gas as needed, and protocols for modifying work practices if landfill gas is detected at levels deemed unsuitable.
3. All disturbance of the landfill cap shall be limited to the proposed excavations and installations within and on top of the vegetative support layer of the cap, i.e. - no excavations or other penetrations shall be performed into the sand drainage layer of the cap without separate written approval from the MassDEP. All concrete footings on the cap shall extend only a maximum of 6 inches into the vegetative support layer of the cap, unless otherwise approved by the MassDEP. There shall be no penetrations (utility, conduit or other) at the base of any concrete footings or foundations. There shall be no penetrations of any kind of the impermeable layer of the cap.
4. The City and their contractor(s) are responsible to ensure that the inverter and transformer boxes on the landfill cap area will not accumulate landfill gas within the boxes during the construction and operation of the solar farm. Any landfill gas levels exceeding 10% of the Lower Explosive Limit (% LEL) within any electrical equipment box shall trigger the requirements of 310 CMR 19.132(4)(g), for notification and action. The additional requirements for the enclosures include the following:
  - A. The maximum areal size of the electrical equipment concrete pad shall not exceed 52 feet long by 36 feet wide;
  - B. Each inverter/transformer box shall be ventilated as proposed, and the floor of each box shall be solid, with no openings for landfill gas to enter at the floor level, except for the transformer and switchgear box penetrations as proposed;
  - C. There shall be no utility, conduit or any other penetrations through the base of the boxes or the base of the concrete pad, except for the transformer and switchgear box penetrations as proposed, i.e. - all other utility penetrations shall enter only through the side of the boxes, not the bottom, and these penetrations shall be fully sealed (both outside and within each conduit). The transformer and switchgear box penetrations shall be fully sealed against landfill gas entry, and the conduit/wiring from these boxes shall not extend down into the vegetative support layer of the cap.;
  - D. The inverter/transformer boxes shall not include a heater; and
  - E. As part of the site-specific H&S Plan, a written protocol shall be prepared and submitted for the maintenance of the inverters/transformers, and for regular calibration and maintenance of landfill gas monitors used by workers on the site.
5. All necessary precautions shall be taken to ensure that the proposed construction and maintenance work associated with the solar farm shall not in any way damage the impermeable layer of the landfill cap, leachate collection/conveyance pipes, landfill stormwater control structures, landfill monitoring wells, or landfill gas venting wells. If any damage occurs to any of the above-listed landfill components, the City shall notify MassDEP immediately (within 24 hours maximum), a written plan for repair of the components shall be submitted to MassDEP within 48 hours, and any repair

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work shall be completed on the schedule determined by MassDEP.

6. Prior to the commencement of construction activities, the entire landfill shall be mowed, and all landfill gas vents, landfill gas monitoring wells, groundwater monitoring wells, and other existing, above-ground structures of 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 cap area, including the landfill gas monitoring wells located north of the landfill.
7. Vehicle and equipment storage on the City-owned property located along the northern landfill perimeter shall not interfere with any additional landfill gas monitoring or landfill gas remedial measures which MassDEP may require the City to perform in that area in the future.
8. Vehicles operating on the landfill cap shall only operate on the designated access roads, except for low-pressure construction equipment (with ground pressures of 7 PSI or less) which may operate off the access roads, in accordance with the remaining conditions of this permit. All operators of vehicles entering the cap 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 cap components. Excavations into the vegetative support layer of the cap shall not be performed using a toothed excavation bucket, and the on-site engineer shall observe the full extent of each such excavation. Low-pressure construction equipment operating off the access roads shall limit turning by tracks on the vegetative support layer as much as possible. If MassDEP determines that the use of excavation equipment is creating the potential for damage to the impermeable cap layer, the usage of such equipment shall cease immediately upon notification by MassDEP, and all remaining excavation work on the cap shall be performed by hand digging.
9. MassDEP specifically reserves the right to restrict or prohibit heavy vehicular loads from the permanent and temporary access roads on the landfill cap, either as a weight restriction or a usage restriction, should inspections or other information reveal the potential for damage to the cap beneath the roads from heavy vehicle loads. MassDEP also specifically reserves the right to impose, at any time deemed necessary by MassDEP, additional requirements for construction of the access roads on the cap, including the addition of a geogrid to the base of the access roads.
10. Prior to the start of construction, the City shall submit to MassDEP a written protocol for the use of concrete pumpers on the cap, including restriction of use only to the access roads, and a restriction on the use of outriggers or stabilizers unless specifically approved by MassDEP. The protocol shall also include procedures for the use of outriggers or stabilizers by the tracked excavators working anywhere on the cap (i.e. either no use of outriggers/stabilizers for concrete pumpers or excavators on the cap, or sufficiently large pads placed beneath outriggers/stabilizers to avoid damage to the cap).
11. As proposed in the Technical Addendum dated June 28, 2011, the concrete ductbank proposed to be installed beneath the access road shall be installed at the edge (shoulder) of the road, to avoid heavy truck traffic over the ductbank itself.
12. Coated (painted or stained) asphalt, brick & concrete (ABC) rubble shall **not** be used as proposed; however clean ABC rubble, crushed to 2" diameter or less, or crushed stone may be used for this purpose. Compaction of the crushed stone or clean ABC must not damage the geomembrane of the cap, and crushed stone or ABC shall not be compacted more than 6 inches into the vegetative support layer.

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13. The City and their contractor(s) are responsible to ensure that the proposed work complies with all applicable local, state and federal electrical codes and permits, including the National Electrical Code (NEC), 2011 Edition, Article 690 –“Solar Photovoltaic (PV) Systems”. MassDEP notes that Article 690.31(a) – “Wiring Systems” of the NEC states that “Where PV source output circuits operating at maximum system voltage greater than 30 volts are installed in readily accessible locations, circuit conductors shall be installed in a raceway”. As noted previously, the existing fence at the landfill does not surround the eastern and southern perimeter of the landfill, therefore the proposed solar farm array would not be fully fenced. The City and their contractor(s) are also responsible to ensure that the proposed work complies with all other applicable local, state and federal regulations.
14. In accordance with 310 CMR 19.130(23) the City shall provide sufficient fencing and other barriers to prevent access to the facility except at designated points of entry and all points of entry shall be equipped with locking gates that are secured when the operator is not onsite.
15. Following completion of the Solar Farm installation, inspections of the landfill cap shall be performed on a quarterly basis, and quarterly inspection reports shall be submitted to MassDEP. Environmental monitoring shall continue to be performed at the landfill as outlined in existing correspondence to the City from MassDEP, and mowing of the landfill shall continue on a minimum of an annual basis. Any erosion problems, settlement problems, or other issues observed on the landfill cap shall be reported to MassDEP and repaired immediately.
16. This post-closure use permit shall be valid for a period of 30 years from the date of this permit, provided that MassDEP may amend the term of the permit in accordance with an approved modification pursuant to either 310 CMR 19.039 or 19.040. If the City intends to operate the Solar Farm after the expiration of this permit, the City is required to submit a request for a renewal of the permit at least 90 days prior to the expiration of the permit.
17. MassDEP and its agents and employees shall have the right to enter upon the landfill at all reasonable times, 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. This right of entry and inspection shall be in addition to MassDEP’s access authorities and rights under applicable federal and states laws and regulations, as well as any permits or other agreements between the Permittee and MassDEP.
18. MasDEP reserves the right to require additional or increased monitoring or maintenance activities in the event that the post-closure use is or may be having a detrimental effect on the landfill cap or appurtenances. MassDEP reserves all rights to suspend, modify or rescind this permit, should the conditions of this permit not be met, should the Solar Farm create nuisance conditions or threats to public health, safety or the environment, or should MassDEP otherwise determine that continued post-closure use is negatively impacting the landfill cap or appurtenances.

Pursuant to 310 CMR 19.037(5), any person aggrieved by the issuance or denial of this permit decision, except as provided for under 310 CMR 19.037(4)(b), may file an appeal for judicial review of said decision in accordance with the provisions of M.G.L. c. 111, s. 150A and c. 30A not later than thirty [30] days following the receipt of the final permit. The standing of a person to file an appeal and the procedures for filing such appeal shall be governed by the provisions of M.G.L. c. 30 A. 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 30 day period.

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Any aggrieved person intending to appeal the decision to the superior court shall provide notice to MassDEP of said intention to commence such action. Said Notice of Intention shall include the MassDEP File Number (11-087-001) and shall identify with particularity the issues and reason(s) why it is believed the approval decision was not proper. Such notice shall be provided to the Office of General Counsel of MassDEP and the Regional Director for the regional office which made the decision. The appropriate addresses to which to send such notices are:

General Counsel  
Department of Environmental Protection  
One Winter Street-Third floor  
Boston, 02108

Regional Director  
Department of Environmental Protection  
436 Dwight Street - Fifth Floor  
Springfield, MA 01103

No allegation shall be made in any judicial appeal of this decision unless the matter complained of was raised at the appropriate point in the administrative review procedures established in those regulations, provided that matter may be raised upon 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 public health or environmental impact of the permitted activity. This approval pertains only to the Solid Waste Management aspects of the proposal and does not negate the responsibilities of the owners or operators to comply with any other local, state or federal laws and regulations now or in the future.

If you have any questions about this matter, please contact Larry Hanson of this office at 413-755-2287.

Sincerely,

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

Daniel Hall  
Section Chief, Solid Waste Management

cc: Easthampton Health Dept. - Dennis LaCourse  
Easthampton Planning Dept. - Stuart Beckley, City Planner  
Easthampton DPW - Joe Pipczynski, Supt.  
Easthampton City Engineer - Jim Gracia, P.E.  
Easthampton Electrical Inspector - Ronald Bednarz  
Borrego Power - Scott Seargeant  
Tighe & Bond - Brian Huntley, P.E., Amy McDonough