1. Agenda

   Documents: LB AGENDA DECEMBER 2015.PDF

2. Meeting Minutes

   Documents: LB AGENDA OCTOBER 2015.PDF

3. Meeting Materials- Oat Nuts

   Documents: SHEARMANLOTS.PDF

4. Meeting Materials- Solar Farm

   Documents: LAND BANK MEMO.PDF, REVISION DOC.PDF, SCITUATE LANDFILL CASE STUDY.PDF, SOLAR INDUSTRY ARTICLE.PDF

Gregory A. Mitchell
Director, Economic Development Department

Land Bank Commission

Agenda
December 16, 2015
5 PM
City Hall
389 Congress Street ~ City Council Chambers
(Second Floor)

I. Agenda Items

A. Welcome- Public Comment (5 min.)

B. Approval of Minutes- October 2015 (5 min.)

C. Old Business
- Update on offer to purchase/accept lot (213/C010) next to Stroudwater Dam (5min.)
- Update on Land Donation to Oat Nuts Park and a New possible Land Donation within Oak Nuts Park (10 min)

D. New Business
- Meri Lowry- Update from Parks Commission (5 min.)
- Solar Farm- Ocean Avenue

Gregory A. Mitchell
Director, Economic Development Department

Land Bank Commission

Agenda
October 8, 2015
5 PM
City Hall
389 Congress Street ~ Room 24
(Basement)

I. Agenda Items

A. Welcome- Public Comment (5 min.)

B. Approval of Minutes (5 min.)

C. Old Business
- Update on offer to purchase/accept lot (213/C010) next to Stroudwater Dam (5min.)
- Status of Recommendation to Tax Acquired Property Committee (10 min)
- Update on Land Donation to Oat Nuts Park (5 min)

D. New Business
- Meri Lowry- Update from Parks Commission (5 min.)
- Review and Update of Land Bank Commission Priorities List (45 min.)


394 E011
394 E067
394 E012
394 E066
Oatnuts Park
SUMMIT ST
TALBOT ST
JUNIPER ST
68
233
223
213
220
216
210
204
199
1
32
29
19
11

To: Members of the Land Bank Commission
From: Troy Moon, Environmental Programs and Open Space Manager
RE: Solar Proposal for Ocean Avenue Landfill
Date: 12/11/2015

The City of Portland has long maintained a goal of generating renewable energy as part of its commitment to reducing our community's carbon footprint. This goal has been outlined in a number of documents going back almost ten years. In 2007, the Mayor's Sustainable Portland Task Force, chaired by Councilor Jill Duson and Councilor Nathan Smith, included the statement that:

> energy conservation and local generation of environmentally acceptable alternative energy sources need to be promoted to and for individuals, organizations, and the City. (page 10)

The City's Municipal Climate Action Plan from 2008 isued under the auspices of then City Manager Joseph Gray states:

> The City should explore cost effective small-scale energy generation demonstration projects on City facilities. Such projects, including wind and solar power, offer credible opportunities to show how the City of Portland can play a part in reducing dependence on carbon emitting energy sources. Community support for locally produced energy is growing and the City should be open to using City land in private/public partnerships that reduce overall carbon emissions and potentially benefit the Portland taxpayer. (page 9)

During the period since adoption of these documents the City of Portland has taken measures to reduce energy use through a comprehensive efficiency program in partnership with energy services provider Ameresco. We have also explored options for wind power but have found the local wind resource to be unfavorable.

In recent years, the cost of solar panels has fallen considerably. So, in order to explore current possibilities, the City of Portland issued an RFP for solar power generation. We received a response from ReVision Energy who proposed to install solar arrays on four (4) buildings as well as on the cap of the closed and capped Ocean Avenue Landfill. If implemented as proposed, these projects would generate approximately 1.4 MWs (AC) of clean, renewable energy:

- PATHS 168 KW (AC) 256,795 KWh/year
- King MS 244 KW (AC) 317,010/KWh/year
- Jetport 240 KW (AC) 349,789 KWh/year
- Library Storage 72 KW (AC) 97,180 KWh/year
- Landfill 648 KW (AC) 1,244,475 KWh/year

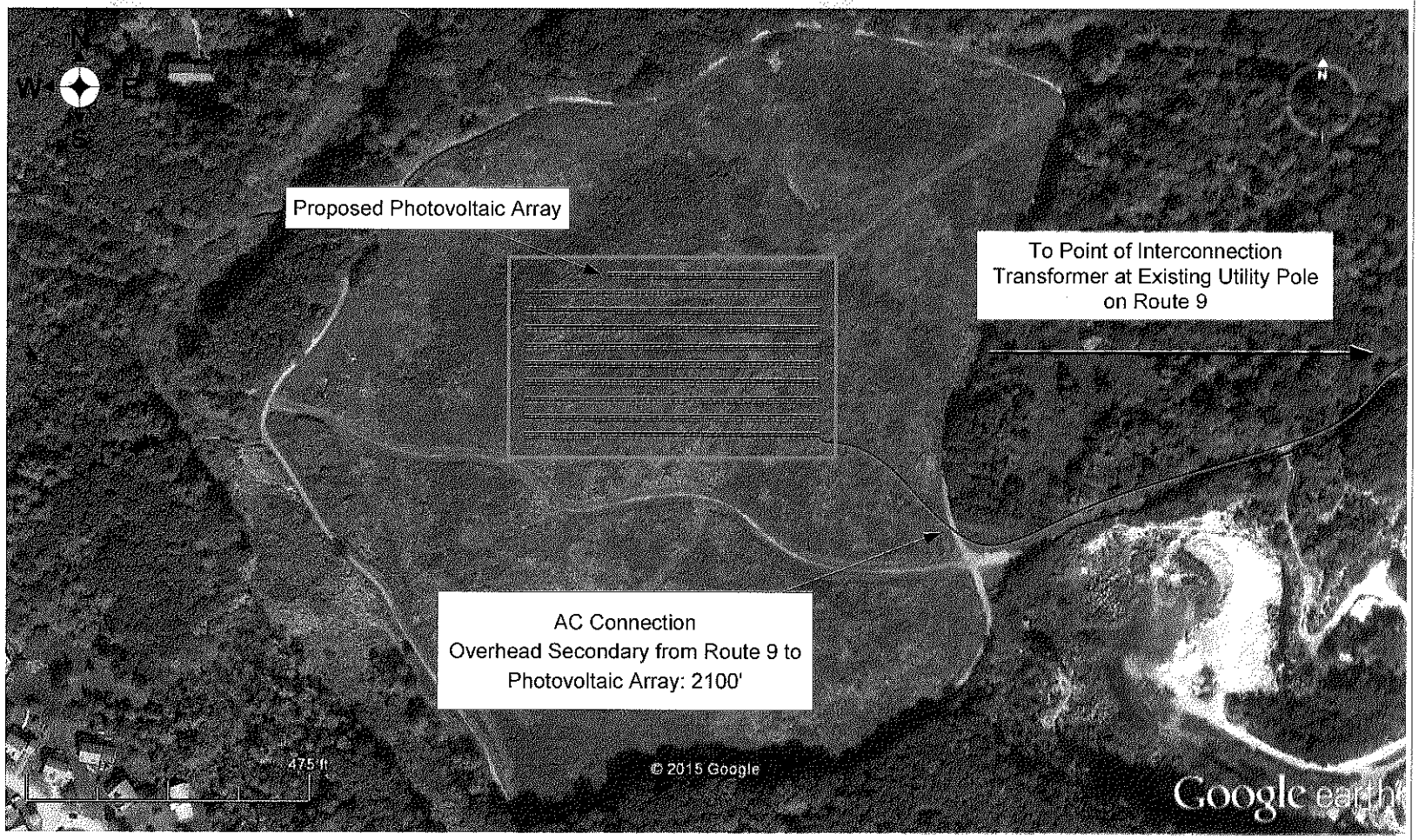
- Combined totals 1,372 KW (AC) 2,265,249 KWh/year

Since the City (including schools) consumes approximately 35,600,000 KWh of electricity each year, the proposed project has the potential to generate a little more than 6% of our annual consumption.

Cities around the country are looking at closed landfills as ideal sites on which to place solar panels. They are usually elevated, are required by regulators to be free of trees and other deep rooted vegetation, and already have an ongoing maintenance plan. In Massachusetts alone about 70 landfills are currently generating solar power. Your package includes some background information from the EPA about a successful project in Massachusetts as well as a media article about landfill solar.

The Ocean Avenue proposal represents an important opportunity for the City of Portland to advance into a solar future. The top of the landfill offers an elevated, flat area well away from trees. This condition offers excellent exposure to sunlight throughout the day and in all seasons. Currently, the members of the public use the perimeter road around the capped landfill for recreational purposes. We do not encourage people to walk or ride bicycles on the cap itself as these activities may disturb the soils and vegetation holding it in place. Therefore, placement of solar panels as shown on the attached site map will not disrupt recreational uses currently taking place on the site. The solar panels will also not increase mowing frequency for the majority of the site except. Per DEP requirements, City crews must maintain the entire landfill cap in order to prevent growth of woody or deep rooted plants that could penetrate the soil. To comply, we conduct an annual mowing in the fall, after the departure of migratory birds. We also take necessary actions to prevent the growth and spread of invasive plants on the cap, particularly Japanese Knotweed.

City staff believes the deployment of solar arrays on the landfill allows the City to make important strides toward sustainability goals while not unduly impacting existing recreational uses of this solid waste facility or negatively impacting wildlife who may inhabit the area between mowings. We look forward to discussing the proposal with you and answering any questions you may have.



Total DC System Size: 903.96 kW_{DC}

2,916 Modules in Portrait, 10 Rows Total
9 Rows of 150, 1 Row of 108, Columns of 2 High

Module Type: ReneSola 310W JC310M-24/Ab
Module Dimensions: 77.01" x 39.06" x 1.57"

First Year kWh Production: 1,244,475 kWh

Degradation Percentage: 0.5% per year

Total AC System Size:
(27) 24kW Inverters, 648 kW_{AC}

Inverter Type and Specifications:
SMA STP 24000TL-US-10
Max AC Power per Inverter: 24 kWAC
Max AC Output Current per Inverter: 29A
Nominal AC Voltage: 480 / 277 V WYE

Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph

Array Tilt: 35° Array Azimuth: 180°
Ground Slope: -3% Grade (-2°) to the North

Array Dimensions: 500'-0" x 283'-7"
Array Perimeter: 550'-0" x 350'-0" (Fencing)
Inter-row Spacing: 20'-2"

142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kW_{DC} Photovoltaic Array

Drawing Name:

Site Map

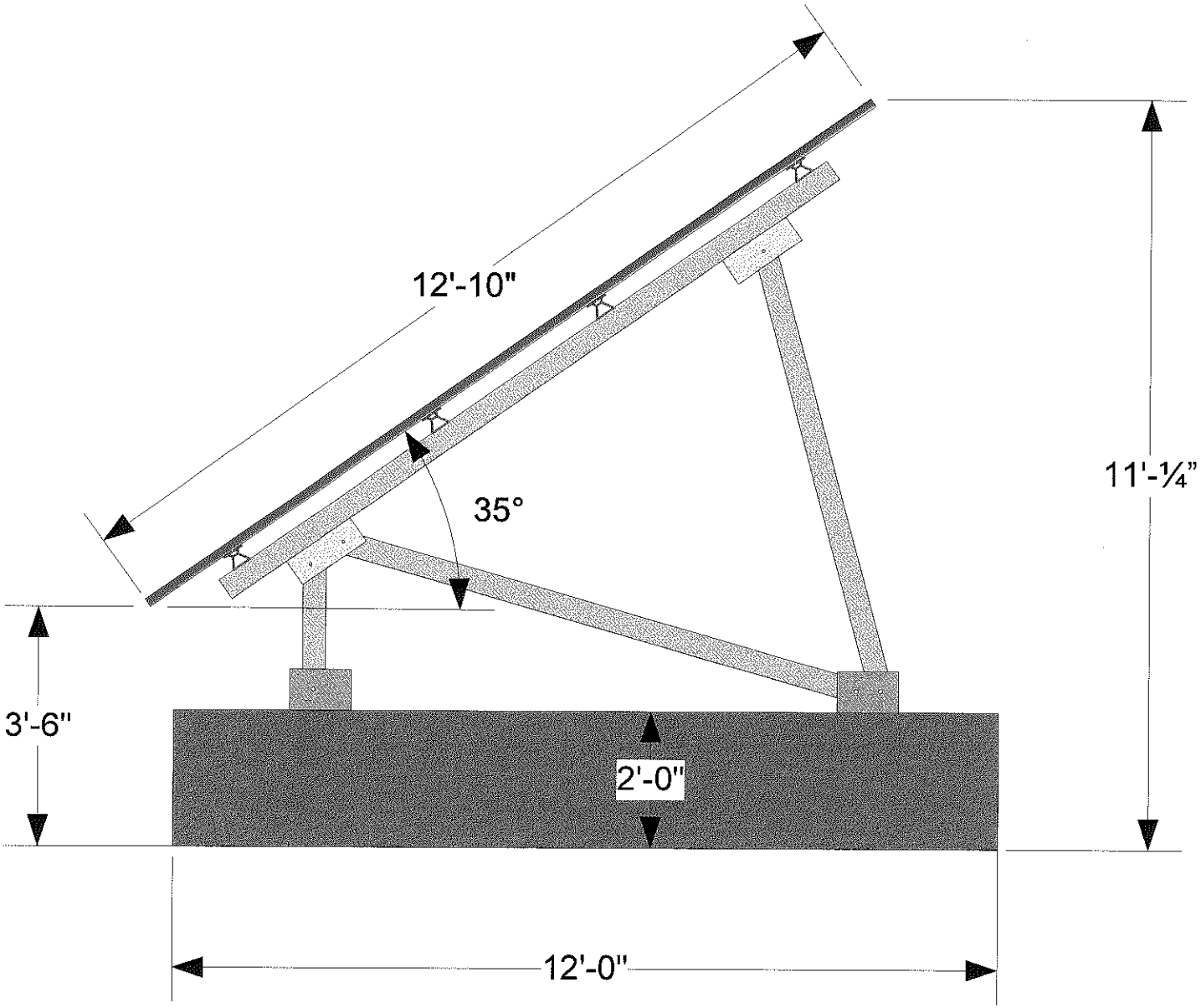
Page:	1 of 4
Drawn By:	L. Brostek
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction

Professional Engineer Stamp of Approval:

Dimensions of Photovoltaic Array, Ground Mount Racking System, Side View:



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kW$_{DC}$ Photovoltaic Array

Drawing Name:

Ground Mount Profile:
Ballasted Block Racking System

Page:	2 of 4
Drawn By:	L. Brostek
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction

2,916 Modules in Portrait, 10 Rows Total
9 Rows of 150, 1 Row of 108, Columns of 2 High

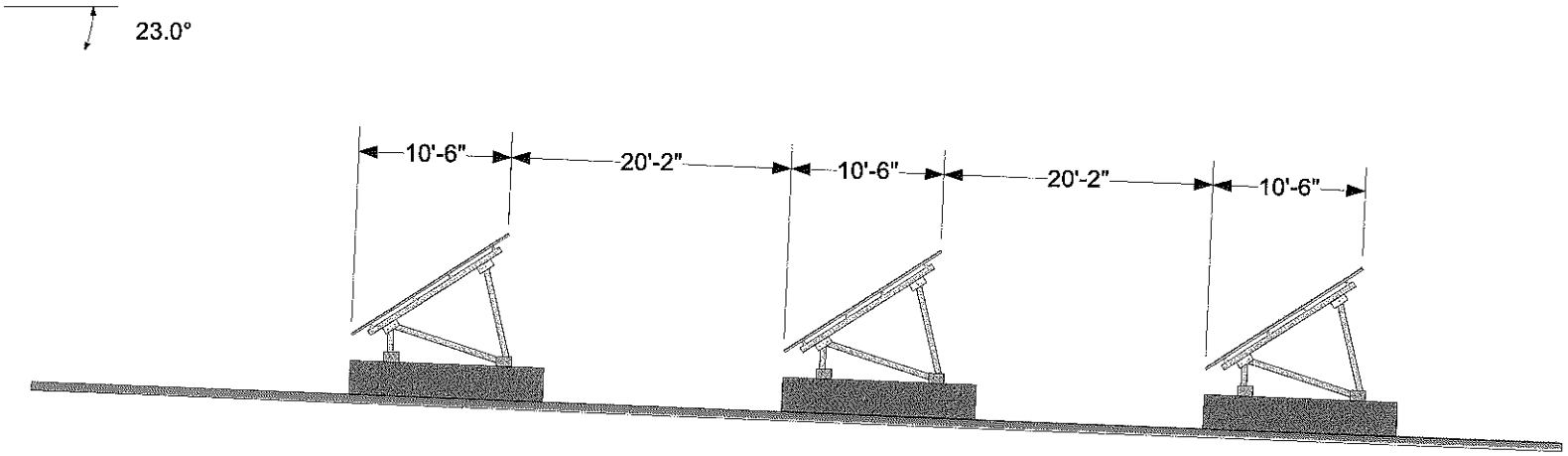
Module Type: ReneSola 310W JC310M-24/Ab
Module Dimensions: 77.01" x 39.06" x 1.57"

Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph
Array Tilt: 35° Array Azimuth: 180° (True)
Concrete Ballasted Blocks
Leading Edge, 3'-6" from ground

Professional Engineer Stamp of Approval:

Inter-row Spacing Requirement (Shadow Distance):

To eliminate shading during peak sun hours, distance between rows shall be a minimum of **20'-2"** from the top of the front panel to the bottom of the back panel. Shading calculations are based on the sun's position and altitude angle over Portland, ME on Winter Solstice (21 December).



Ground Slope = -3% (-2°)

142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kWdc Photovoltaic Array

Drawing Name:

Inter-Row Spacing Requirements

Page:	3 of 4
Drawn By:	L. Brostek
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction

Module Type: ReneSola 310W JC310M-24/Ab
Module Dimensions: 77.01" x 39.06" x 1.57"

Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph

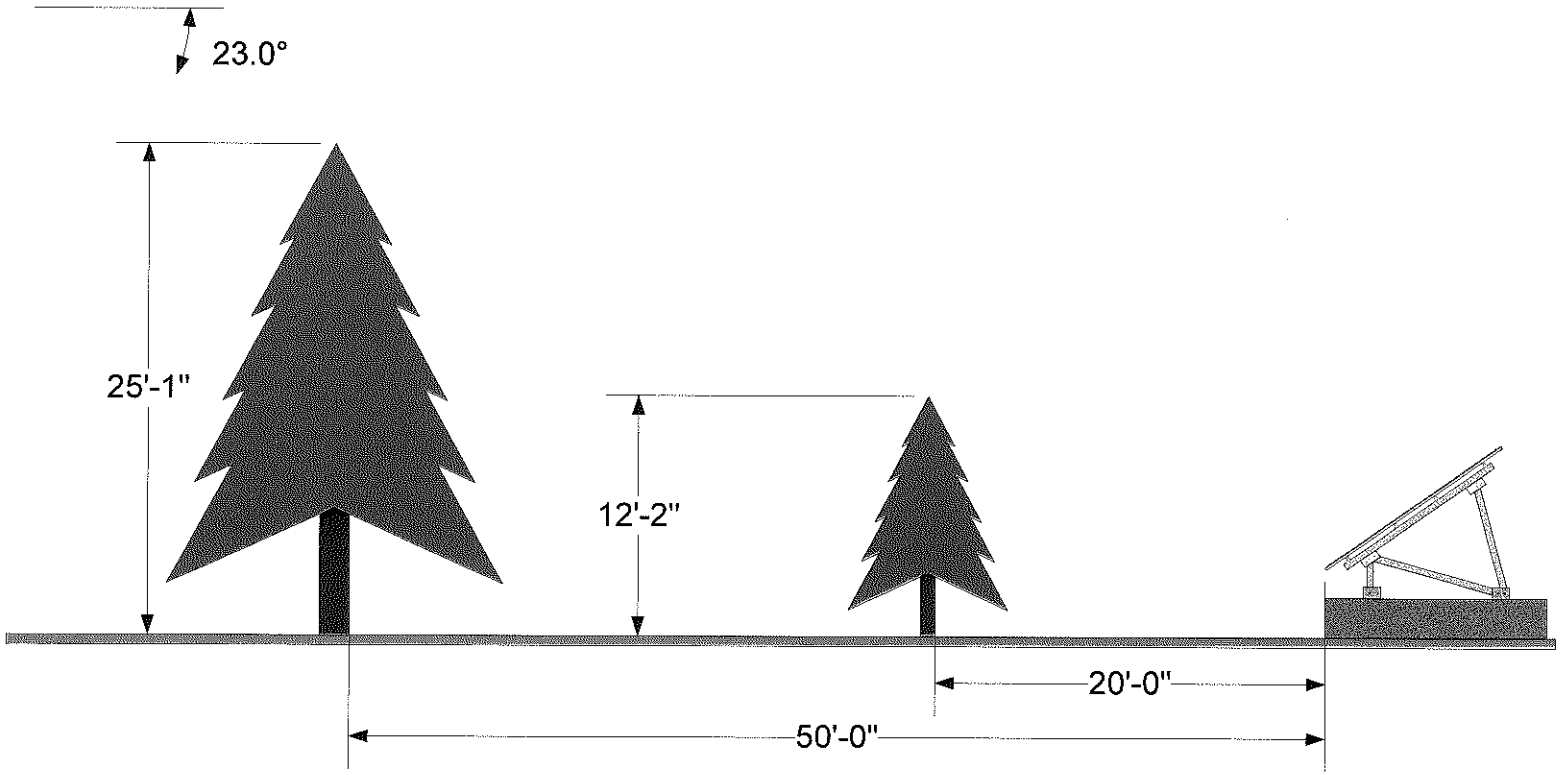
Array Tilt: 35° Array Azimuth: 180°
Ground Slope: -3% Grade (-2°) to the North

Array Dimensions: 500'-0" x 283'-7"
Inter-row Spacing: 20'-2"

Professional Engineer Stamp of Approval:

Irradiance Spacing (Shade-free Zone):

Keeping the solar array shade-free optimizes annual energy production. Shade elimination requires a zone that extends from the East, South, and West edges of the array that is free of any obstacles (buildings, vegetation, or other) that would cast a shadow. This irradiance spacing varies with height and distance as shown.



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kWdc Photovoltaic Array

Drawing Name:

Irradiance Shading

Page:	4 of 4
Drawn By:	L. Brostek
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction

Module Type: ReneSola 310W JC310M-24/Ab
Module Dimensions: 77.01" x 39.06" x 1.57"

Racking System: Ground Mount, Ballasted Block
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Array Tilt: 35° Array Azimuth: 180°
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Inter-row Spacing: 20'-2"

Professional Engineer Stamp of Approval:

United States Environmental Protection Agency

An Old New England Town Lights the Way with Solar

April 2014

The U.S. Environmental Protection Agency (EPA) recognizes the overall benefit of siting renewable energy projects on contaminated properties. Through the RE-Powering America's Land Initiative, EPA is encouraging renewable energy development on current and formerly contaminated lands, landfills, and mine sites. This case study highlights a successful renewable energy project on a closed landfill, including information on how key challenges were addressed.

Scituate Landfill solar installation (August 2013). Courtesy of Google Earth

Finding Treasure in a Trash Site

In 2010, representatives in the town of Scituate, MA, sought to find a productive use for its defunct town landfill. After considering recreational uses such as baseball fields, the town decided a solar photovoltaic (PV) installation would be the most viable and cost-effective use of the site, turning a cost center into a source of revenue.

After issuing a request for proposal (RFP) and conducting multiple interviews with respondents, Scituate representatives selected Brightfields Development, LLC (Brightfields), a Wellesley, MA, developer. Brightfields worked with the town, National Grid (utility), and others to tackle challenges and ensure the installation met a multitude of stakeholder objectives, such as cost savings for the town and alignment with the community's environmental interests. The Scituate Landfill is now home to a 3-megawatt (MW) PV installation that, in combination with a nearby wind turbine, provides Scituate with 100% of its municipal power needs from renewable sources.

SCITUATE SOLAR LANDFILL AT-A-GLANCE

- Scituate, MA (www.scituatema.gov)
- Former 29-acre municipal landfill
- Capped and covered with soil layer
- 3 MW solar PV installation on 12.5 acres (panels cover 6.1 acres)
- 10,560 polysilicon panels
- Expected $200,000 annual savings for town from net metering; T&D plus energy value
- Project will produce 3.825 million kilowatt-hours per year
- Land lease to developer: $1/year
- PPA price: 8.4 cents/kWh plus escalators; developer retained the SRECs
- All project labor was local

Property History

Turning a Cost Center into Revenue

Scituate is tucked into the southeastern tip of the greater Boston area, about 23 miles from the city and bordered on the east by the Atlantic Ocean. Incorporated in 1636, the Plymouth County town is now home to 18,000 people and is primarily residential.

> *"The most important issue was finding a developer with the experience, credibility, permitting expertise, and ability to obtain financing. We didn't select the lowest cost provider, but we did select the one we felt had the best chance of seeing the installation through to completion."*
>
> *—Al Bangert, Scituate Department of Public Works*

Scituate's town-owned landfill operated from 1976 until 1999, accepting a combination of municipal solid waste, construction debris, and residuals from a nearby wastewater treatment facility. In 2000, the municipal landfill was capped and a trash transfer station was constructed on the west portion of the property.

Once the site was capped and confirmed compliant with Massachusetts Department of Environmental Protection (MassDEP) standards, the town began investigating ways to return the land to productive use. The site was deemed inappropriate for

An Old New England Town Lights the Way with Solar

recreational uses, but had several characteristics that made solar a good technical fit, including being a relatively flat, unshaded site that sloped southward and was out of the view of residential neighborhoods.

Nonetheless, town officials were initially hesitant to pursue a solar project because they believed the cost would be too high. However, the volunteer committee evaluating options felt it important to at least investigate solar because it aligned with the town's commitments to the environment and renewable energy. The RFP response prices were more competitive than expected, with proffered Power Purchase Agreement (PPA) prices in line with those of the town's wind turbine. To ensure the selection of a sufficiently experienced and credible developer that would see the project to fruition, the town pared down RFP responses based on qualitative factors before reviewing price estimates. The town eventually selected Brightfields. Brightfields offered the town an 8.4 cent/kWh PPA price through Main Street Power, with Brightfields retaining the solar renewable energy credits (SRECs). Brightfields is also affiliated with Renova Partners, a national brownfields investment and development company.

In addition to selecting a qualified developer with relevant experience, Scituate officials also benefitted from MassDEP's support. Local officials indicate the state agency was proactive in supporting the required post-closure permits, and responded quickly to draft documents and inquiries with thorough and helpful feedback. The project sponsors submitted an application and supporting engineering documents in May 2011 to MassDEP for a "Post-Closure Use Permit" (which is required for any closed landfill that is being re-purposed for other uses). MassDEP issued the necessary permit in September 2011.

Scituate Landfill solar under construction. Courtesy Brightfields Development LLC

Moving Ahead and Tackling Roadblocks

The development team did a full site evaluation to understand and document the existing site conditions. Brightfields and the town together worked out an allocation of potential liabilities associated with the site. As part of its contract with Brightfields, the town acknowledges that it retains responsibility for the landfill and operation of its gas extraction system. Brightfields will be responsible for any issues that may have been caused during the installation, and remains responsible for issues resulting from operations and maintenance of the solar array.

> *"Renewable energy on brownfields is such a perfect fit. It takes land with few or no options for constructive or economic reuse and turns it into a long-term environmental and economic win."*
>
> *—John Hanselman, Brightfields Development LLC*

While site conditions and liability were addressed in the full site evaluation and lease agreement, the installation encountered roadblocks, beginning with connectivity issues to the grid. The initial evaluation indicated the project would be a fairly simple interconnection to a three-phase distribution line adjacent to the site. However, the circuit to which the solar array would connect already hosted the town's wind turbine at the nearby wastewater treatment site. National Grid was concerned about the capacity of the existing 10 MW 13.8-kilovolt (kV) distribution line to manage up to 5 MW of variable power without risk to circuit integrity. Utility officials initially estimated upgrades of as much as $900,000 would be needed to accommodate the solar PV system.

An Old New England Town Lights the Way with Solar

> *"The town initially pursued this installation for the revenue it would generate, but the bigger payout turned out to be the reputation it garnered and the positive perspective in the community of doing the right thing for the environment."*
>
> *—Al Bangert, Scituate Department of Public Works*

Rather than cancel or revise the project, Brightfields worked with National Grid to research the concern and see whether it could be addressed in other ways. Using studies from the U.S. Department of Energy's National Renewable Energy Laboratory and other data, Brightfields and National Grid conducted extensive modeling and analysis. By modeling the two production cycles, the team determined the wind and solar would actually complement one another in terms of time of energy generation, and that the anticipated impact on the area grid was not a major factor. Good communication and collaboration between the utility and the developer resulted in the interconnection being completed with minimal upgrades.

The second roadblock Brightfields faced was financing, primarily because of the way in which Massachusetts' SREC market had evolved. In Massachusetts, as in most other states with Renewable Portfolio Standards (RPS) requirements, utilities purchase SRECs to meet state-mandated RPS solar carve-out requirements. Brightfields based its original financials for the Scituate project in part on the assumption that SRECs generated by the project would be worth at least $285, in accordance with the floor price set by the state's Department of Energy Resources Solar Credit Clearinghouse Auction. However, a secondary market evolved for the Massachusetts SRECs, with utilities choosing to buy SRECs only one year forward. As a result, SREC prices were driven substantially lower than expected. This changed the financial assumptions of the Scituate project and forced Brightfields to seek a new financial partner.

Brightfields worked with the town to secure project extensions on its contractual deadlines while it sought new financing. To help town leadership assure residents it was holding the developers accountable to see the project through, while simultaneously reconfirming Brightfields' commitment to the project, Brightfields and its financial partner Syncarpha Capital submitted a $109,500 security deposit from which liquidated damages were subtracted for each day the project remained incomplete past the initial June 15, 2013 deadline. The town also maintained the option to cancel the entire contract if the project remained incomplete as of the new December 15, 2013 deadline.

Brightfields and Syncarpha were eventually able to close a financial deal with MS Solar Solutions and proceed with the installation. Representatives of both Brightfields and the town agree the long-term project economics made overcoming individual financial hurdles possible.

Success

In September 2013, Scituate officials joined Brightfields and its partners to proudly flip the switch on the town's landfill solar installation. The developer also partnered with town officials and school personnel to develop and implement a solar curriculum for K-12 students in the town. See next page for key takeaways from project participants.

For More Information

For more information about the RE-Powering America Initiative and tips on developing renewable energy on contaminated lands, visit EPA's website.

Key Takeaways from Project Participants

- *While costs are an important consideration, towns should also evaluate a developer's ability to deliver a finished project and overall areas of expertise. Scituate officials evaluated credibility, experience, permitting expertise, and financing abilities before considering price. Towns and developers should both consider the long term, which includes ensuring the underlying economics of a project make sense and that the selected developer can withstand changes in the market.*
- *Contracts should include clear and consistent deadlines, including milestones along the project development process. Not only does this set expectations early on and hold all parties accountable at appropriate phases in the project, it provides a means for regular communication and the chance to address roadblocks as soon as possible.*
- *Having a good understanding of site conditions is critical to the success of a project. Especially when considering a renewable energy project on a brownfield site or landfill, developers should gather as much information about the site as possible, including collecting information about the site's history and conducting site assessments as appropriate. Issues discovered during the assessment are not necessarily deal-breakers, but knowing the site and partnering with the town to determine liability ahead of time can reduce headaches, expense, and environmental issues.*
- *Support from state and local agencies can be crucial. Scituate notes that MassDEP was supportive of the landfill solar project, which saved the town and the developer both time and money. In particular, MassDEP offered clear and consistent permitting guidance, and was responsive to questions and permit submittals.*
- *Communicate with the community during all phases of the project. Though the Scituate community already had a demonstrated commitment to environmental and sustainability issues, the town made no assumptions about whether the community would support the solar project. Scituate officials engaged residents through town meetings and various public relations activities from the earliest phases of the project. The town was transparent about challenges as well as benefits.*
- *Communication among the developer, the town, and other stakeholders is also crucial. Scituate officials, Brightfields, MassDEP, and other stakeholders such as National Grid maintained regular communication and insisted on transparency about progress and concerns. This facilitated the partnership approach that helped the project overcome technical and financial hurdles.*

Solar Industry

Solar Power Loves Garbage

Vol. 1 | Issue 15 | May 23, 2013

Nora Caley, Wednesday 22 May 2013 - 00:03:50

When people think of renewable energy and buried waste, they think of Massachusetts. Or at least they might, as the state has been active lately in helping municipalities build solar farms on landfills.

According to the Massachusetts Department of Environmental Protection (MassDEP), there are currently 39 solar-on-landfill projects permitted by the agency that will produce a total of more than 78 MW of energy. (There are also two wind projects generating 3.6 MW of energy.) Some of the projects are complete, and several are under construction.

Other states, such as California and New York, have built solar projects on landfills, but Massachusetts has been especially enthusiastic over the past few years. In 2010, the state approved what was reportedly the first post-closure use permit for solar for the 2 MW Greenfield Solar Field on a landfill in Greenfield, Mass.

{OPENADS=zone=72&float=right}

MassDEP even offers a 46-page "Guide to Developing Solar Photovoltaics at Massachusetts Landfills." According to the guidebook, municipalities are looking for ways to generate revenue, the state has a robust solar renewable energy credits market, and the investor-owned utilities allow net metering. Also according to the guide, the commonwealth has more than 490 landfills, 466 of which are now inactive or closed.

Industry experts say some of those landfills are prime real estate for solar projects, but there are challenges. One challenge is the slope of the land.

"Greenfield had a large expanse of 23 acres of relatively level land, and that's somewhat unusual," says David Andrews, senior geoenvironmental engineer for TRC, the engineering firm that performed geotechnical services for the project. He explains that most landfills have steep slopes because building pyramid-like mounds enables the landfill to maximize its space, making many landfills unsuitable for ground-mounted solar panels.

Another challenge is the structures cannot permeate the top layer of soil and the membrane that keeps water out. "Essentially, it's more like putting a solar array on the roof than on the ground," Andrews says. "You can't do things that would make the roof leak. On a landfill, you can't drive loaded semis if there isn't a prepared road, and you use lightweight equipment."

According to the permit application, the Greenfield project included excavating six inches of the vegetative support layer and pouring concrete footings for the PV racks, which were bolted onto the footings. The transmission wiring was buried at the base of the vegetative support layer.

That project was completed in June 2012. TRC also received approval for a 2 MW solar farm on 11 acres of the Pittsfield Municipal Landfill. The company does plan to work on more of these projects.

"The potential is enormous," Andrews says.

Justin Gravatt, project development manager for Gemma Power Systems, agrees that landfills present a great opportunity for solar projects. "It is land that is usually elevated and free of trees," he says. "And it's usually a maintenance expense for the town, but putting a solar plant on the landfill generates revenue."

Maintenance includes mowing the grass and making sure trees do not grow on the land, so that roots do not penetrate the top layer. The solar panels cannot penetrate the soil either.

"It has to be a ballasted system," Gravatt says.

Gemma Power Systems, an EPC contractor that is a subsidiary of Argan Inc., built a 5.7 MW solar energy facility on a closed, capped landfill in Canton, Mass. The 12.5-acre project was completed in August 2012. The company is currently building the 6 MW Ravenbrook Landfill Solar Project on a landfill in Carver, Mass. That project is scheduled for completion this summer.

Gravatt says another advantage of building solar on landfills is that there is usually no public pushback. "Generally, the residents have very little resistance to putting a solar farm on a landfill versus a farmer's field," he says. "If you propose solar on a farm, people will say you are taking away from agricultural productivity and ruining the bucolic nature of the area, and it's not aesthetically pleasing."

Nora Caley is a freelance writer based in Denver.

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