

# Yeoman Creek Solar Project

Waukegan, Illinois

**US EPA**  
**Illinois EPA**  
**Yeoman Creek Remediation Group**  
**BQ Energy**  
**TRC**  
**groSolar**

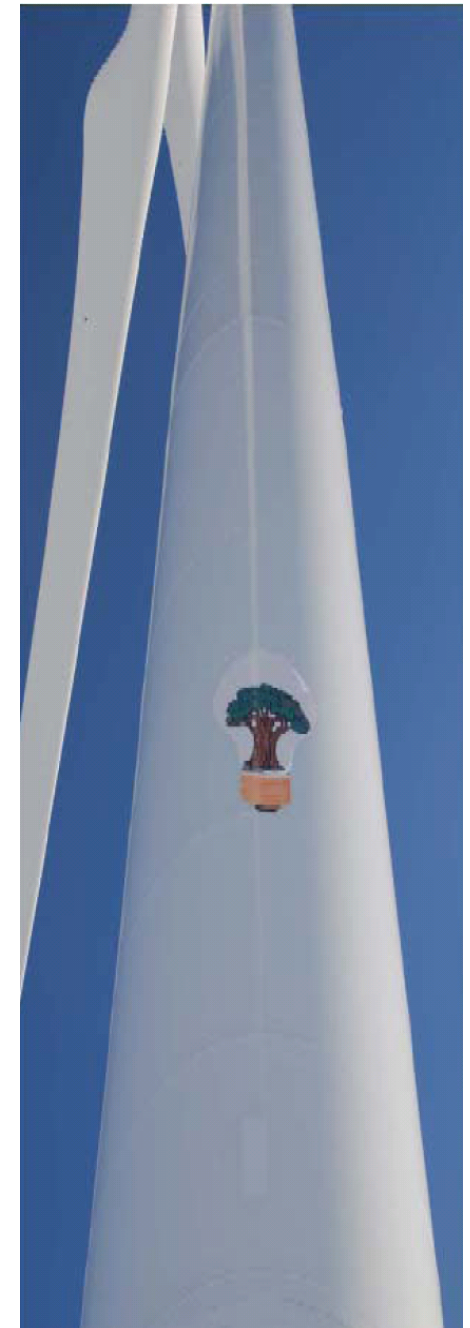
Chicago, Illinois  
July 2017





# **BQ Energy Company Profile**

- **World-wide experience in project development and a leader in developing renewable energy on brownfields and landfills since 2002.**
- **Have developed medium-sized wind energy projects (5-20 MW) and utility scale solar PV (1-20 MW).**
- **We Develop, Build, Own & Operate Projects in many different locations.**
- **Sell power to owners, third parties, or transmission market.**
- **Case Study - Former Bethlehem Steel Plant in Lackawanna, NY.**



## Samples of Our Experience



### Sullivan's Ledge (2014)

2 MW PV Facility in New Bedford MA  
built on an EPA Superfund Site

### Steel Winds (2006 & 2012)

35 MW Wind facility located on an  
abandoned steel mill in Lackawanna, NY.  
Numerous energy and environmental awards



### Steel Sun (2016)

4 MW photovoltaic project adjacent  
to Steel Winds

### PatterSUN(2014)

1 MW photovoltaic facility on a  
landfill property in Putnam County, NY



### Annapolis MD (2017)

12 MW PV Facility in municipal landfill.  
Largest landfill solar project in the US





# Topics to be addressed

- Due Diligence
- Planning (e.g., Work Plan, Cap Protection Plan)
- Zoning
- Building
- Post-closure use permits
- Issuing “comfort” letters





## Yeoman Creek Site Overall Site View



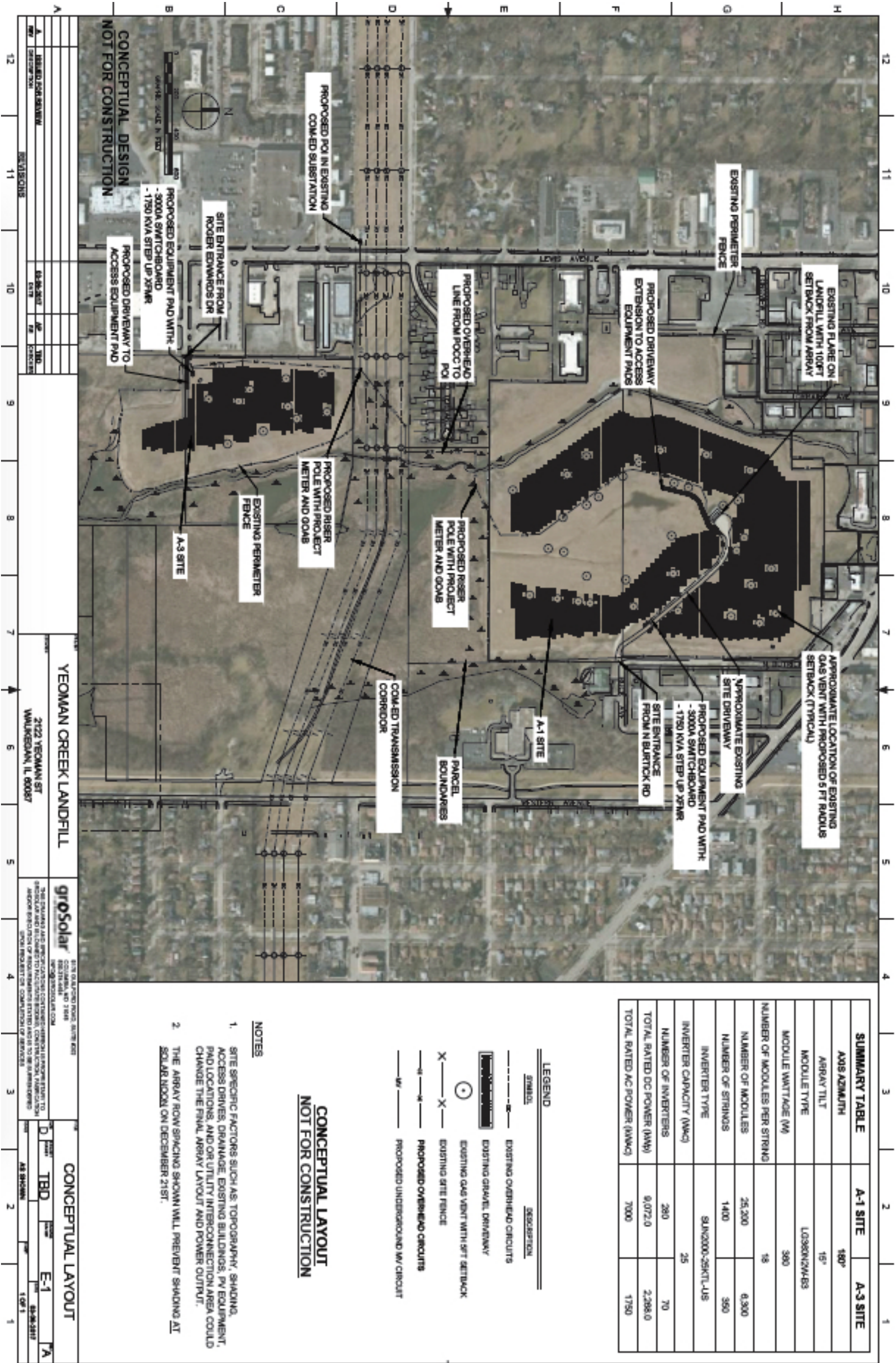
Schools Site  
A-1

Parks Site  
A-3





Project Layout





# Roles and Responsibilities

## BQ Energy & Team

- Design all Solar Related Equipment
- All Solar Construction
- Follow Approved Work Plan
- All Financing of Solar Project
- All Operating Matters on Solar
- All Reports to Group/Land Owners related to Solar Project for Review and subsequent submittal to Agencies
- Obtain Approvals from EPA, IEPA, Waukegan, others
- Surface Maintenance around Solar Array

## YCRG & Land Owners

- All Existing Agency Reporting Requirements
- Review and Approve/Disapprove all Solar Project Plans prior to submittal to Agencies





## Key Milestones

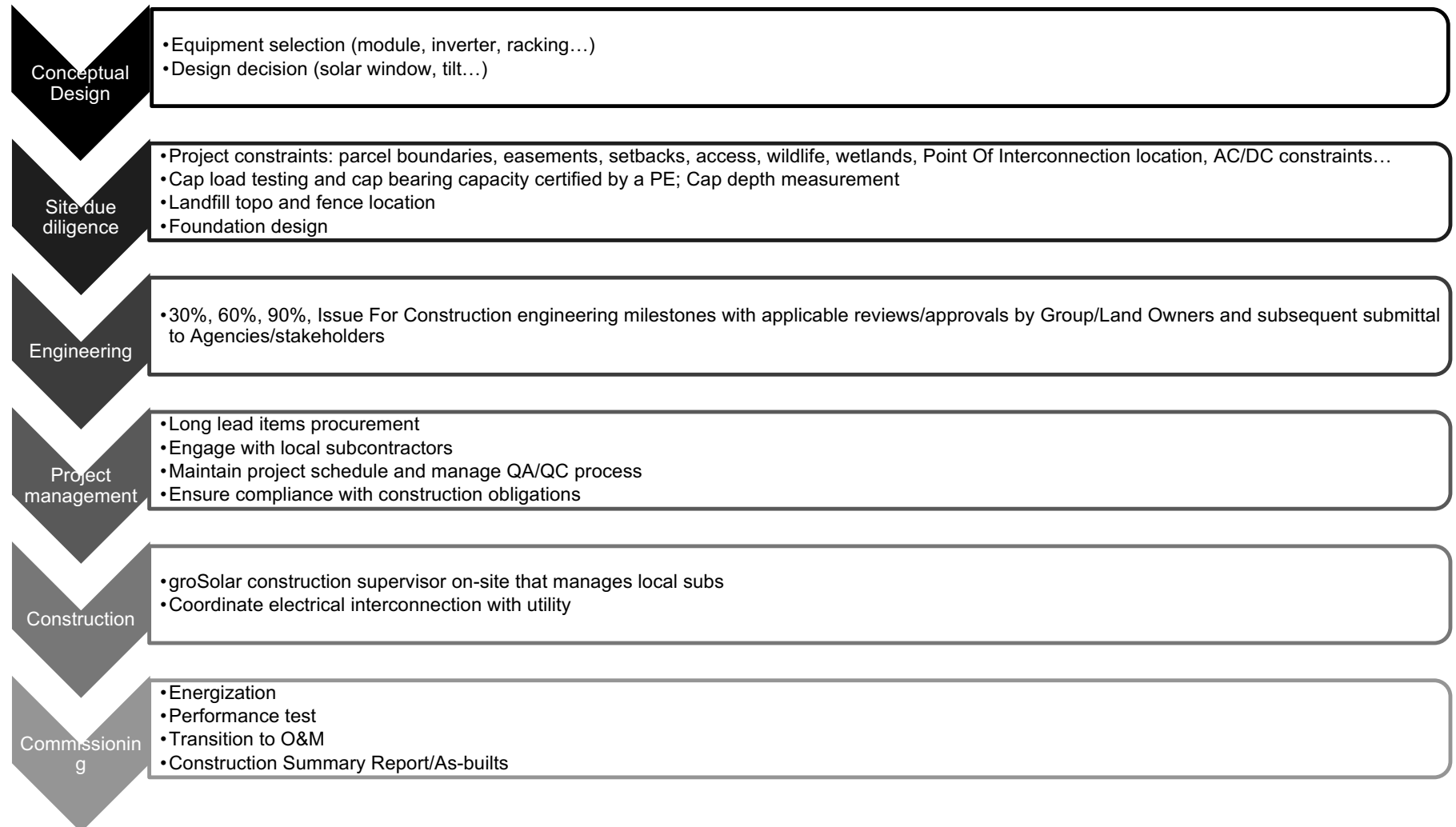
<b>Legal</b>		<b><u>BQ Energy with ?</u></b>
	Site Control	Phillips Lytle
	LOI's	
<b>Engineering</b>	Leases	
		groSolar
	Permit Level Drawings	
<b>Permit Filings</b>	Equipment Specifications	
		TRC/Phillips Lytle
	EPA	
	IEPA	
<b>Electricity Sales</b>	Waukegan	
		McCauley Lyman
<b>Renewable Energy Credit Sales</b>		McCauley Lyman
<b>Project Financing</b>		TBD
<b>Construction</b>		groSolar
<b>Operations</b>		groSolar





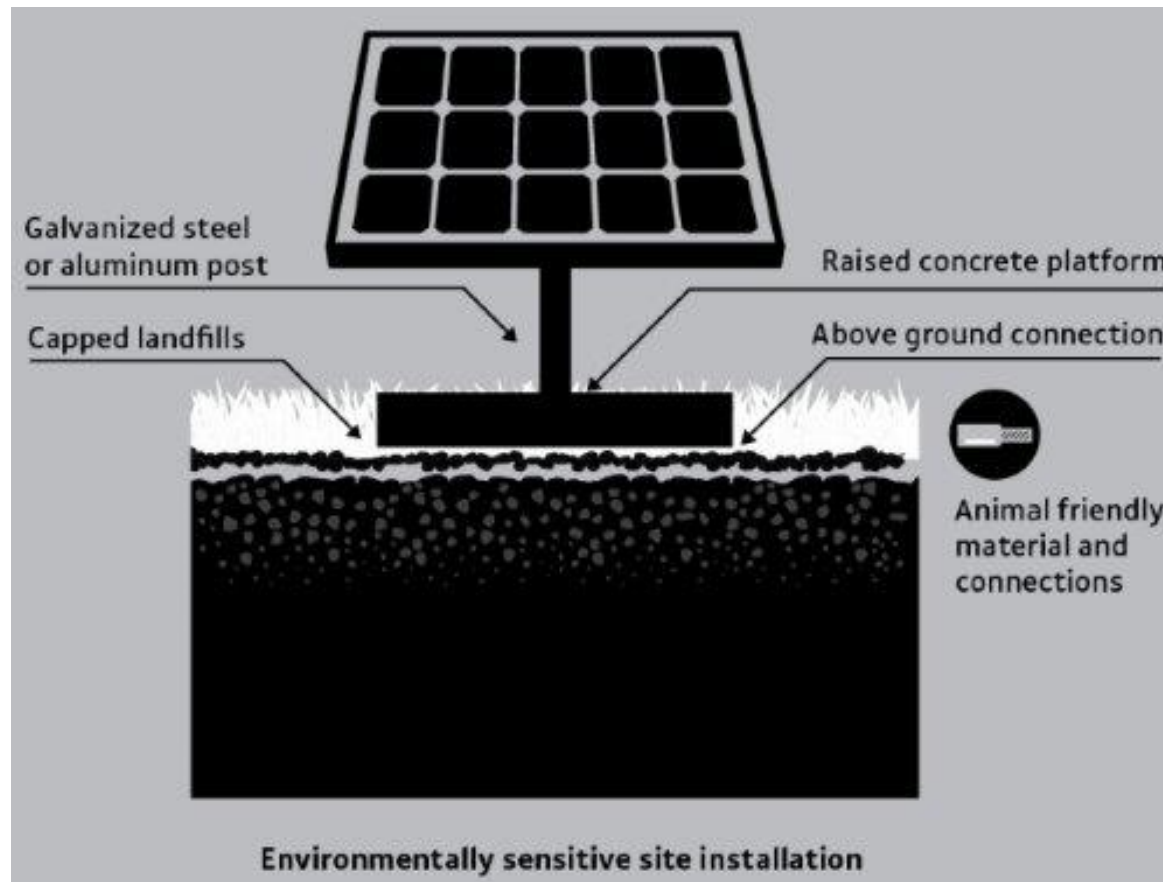


# Typical Landfill EPC Process





# Ballasted Foundation Schematic



# Ballast Foundations (1/2)





## Ballast Foundations (2/2)



# Hartford Landfill, VT



- Municipal solid waste
- 748kWp / 500kWAC
- 315Wp CS6X Canadian Solar
- 22.7kWAC Fronius Symo
- 20° tilt RBI Solar





# Stafford Hill Landfill, VT



- Municipal solid waste
- 2,510kWp
- 325Wp OPT-325-72-4-100 Suniva
- 15° tilt Patriot



# Clifton Park Landfill, NY



- Municipal solid waste
- 996.5kWp / 744kWAC
- 320Wp JAP6 72-320 JA Solar
- 24kWAC Fronius Symo
- 25° tilt Solar Flexrack





# Clean Harbors Landfill



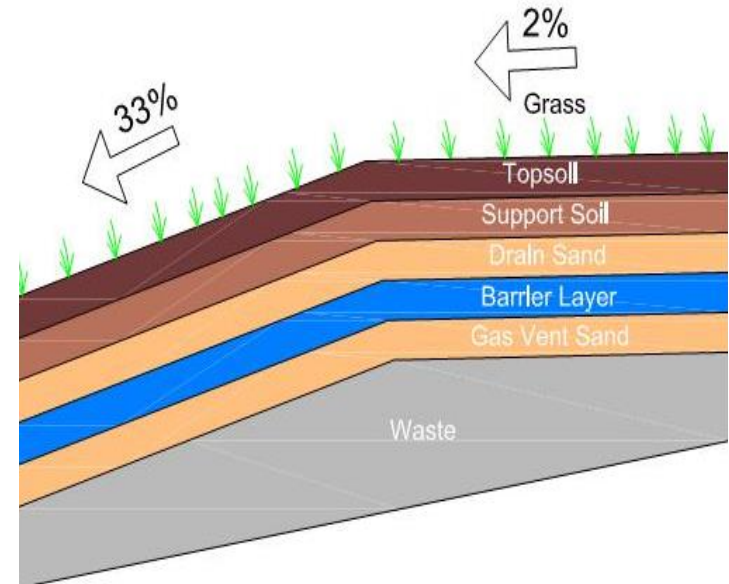
- Hazardous Waste
- 1,506kWp / 1,250kWac
- 230Wp Astroenergy
- 600V bipolar Advanced Energy central inverter
- 20° tilt



## It Can Be Done

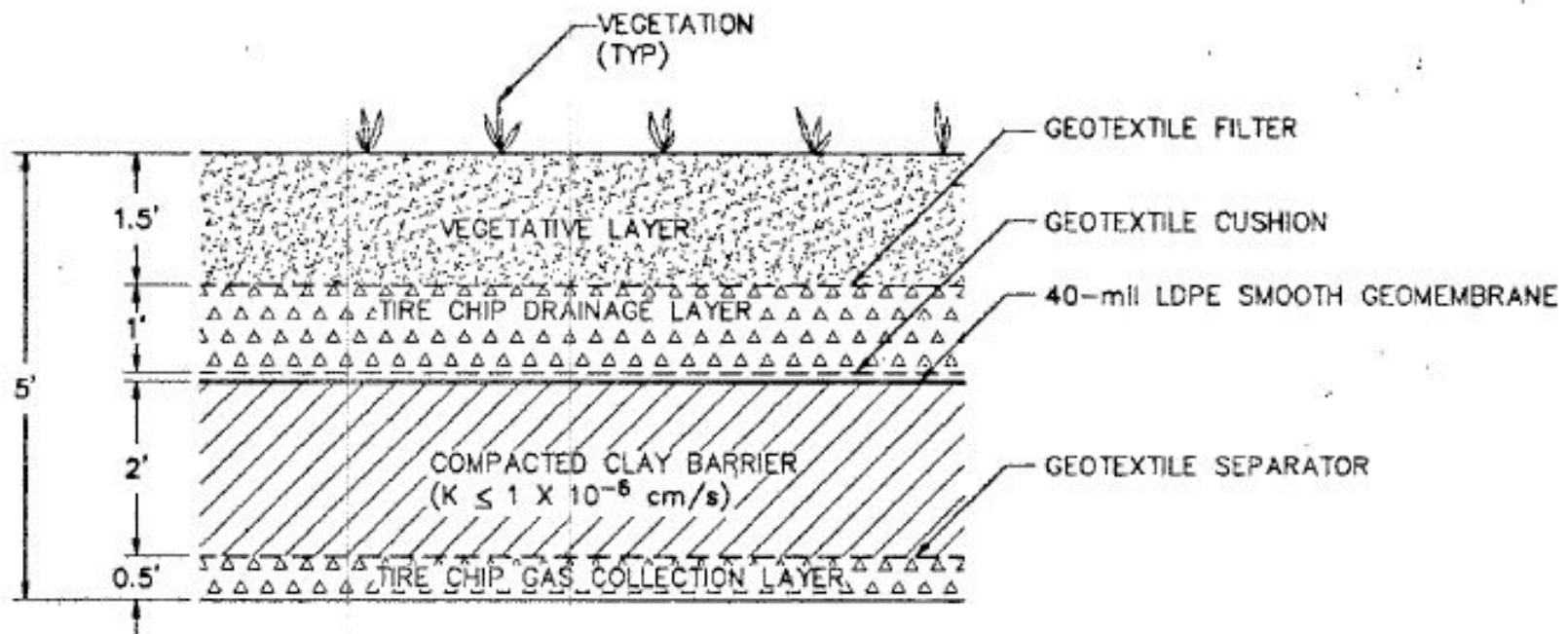
When discussing landfill final cover settlement under solar arrays, it is our opinion that two points must be stressed:

1. Contrary to popular opinion, solar arrays have very lightly loaded foundations relative to the strength of the landfill cap and cause very little, if any, settlement; and
2. Every array foundation must be designed for the specific geotechnical characteristics of the particular landfill final cover system, so as not to cause damage to the final cover's function.





# Landfill Cap Construction

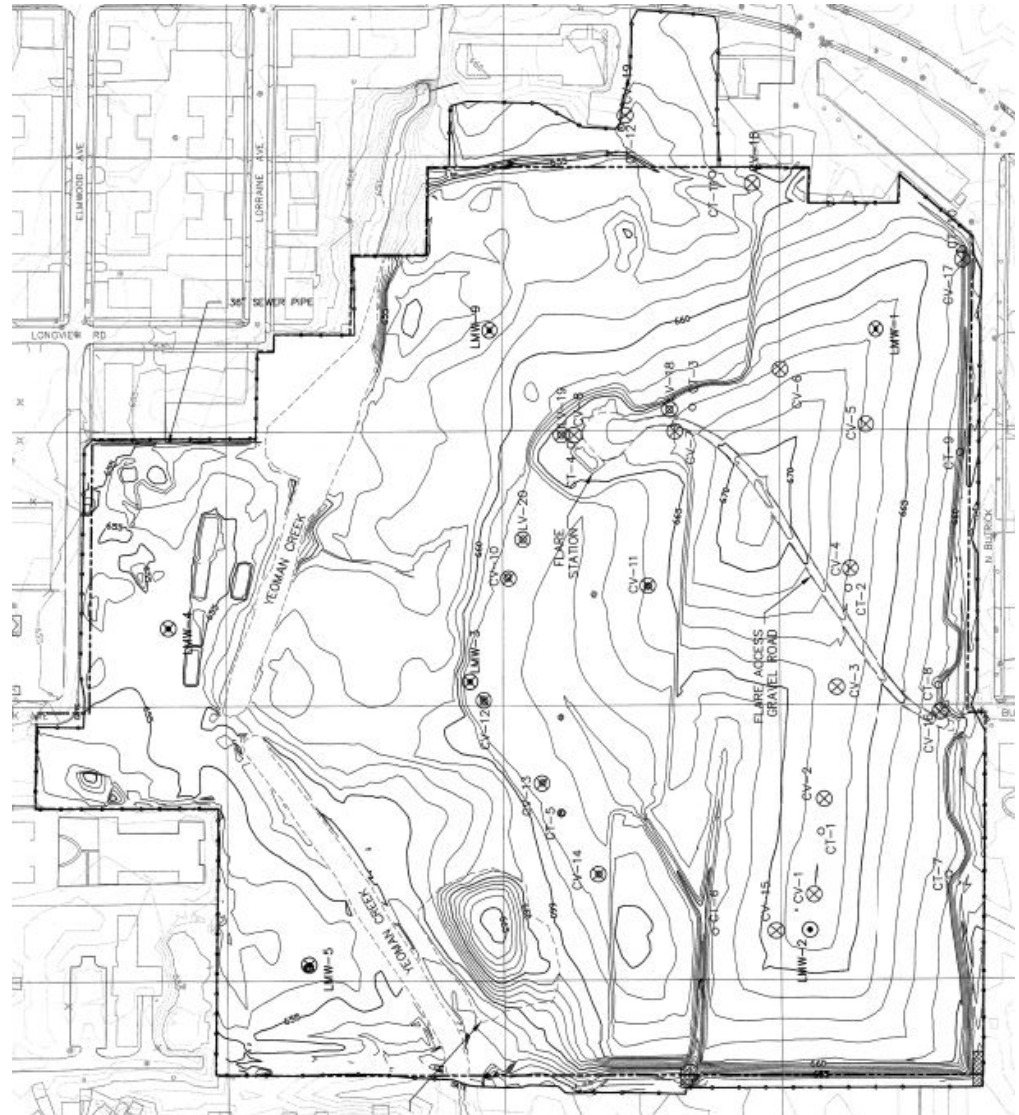


**1**  
**14** **DETAIL**  
**TYPE I FINAL COVER SYSTEM**  
SCALE: 1" = 2'  
XREF: 0864XD17.DWG



# Landfill Cap Topography

## Current Surface Topography





# Work Plan Process

***A collaborative and iterative process amongst all stakeholders – some land use and natural resources permitting is concurrent with this process***

- Geotechnical engineering – slope stability, bearing capacity, and grounding determination, etc.
- Preliminary design criteria for use in racking and array layout
- Ensure existing stormwater drainage features can accommodate array
- Landfill Cap Protection Plan to Group/Land Owners for review and finalize for Agency review/approval
- Provide preliminary landfill post-closure plan modification or permit revision
- Construction w/cap protection plan implementation



# Typical Landfill Cap Protection Plan Outline

Plan codifies design and construction activities for coordination amongst stakeholders



- ✓ Cap bearing capacity for array installation, including conduit burial
- ✓ Suitable landfill slopes
- ✓ Settlement and Stability
- ✓ Temporary and permanent roads
- ✓ Construction impacts and mitigation measures
- ✓ Stormwater management impacts and mitigation
- ✓ Cap/surface restoration plan
- ✓ Compliance with Consent Decree / Comfort Letter
- ✓ Post construction monitoring and maintenance





# Existing Restrictive Covenants

Activity and Use Limitations (AULs) run with land and include all owners, lessees and occupants.

1. Use Restriction (Is Use Consistent w/ Remedy) – **Solar PV array is consistent with use of land/restrictions**
2. Provide access for remedial & monitoring work – **Cover in PPA/Lease, array design and setbacks**
3. Allow long term operation & maintenance of remedies – **Landfill Cap Protection Plan implementation, construction monitoring**
4. Agency Access (to assess compliance with Consent Decree) – **Existing Access/ICs provide for Agency Access, will be incorporated in PPA/Lease**
5. Prohibits installation of potable well (City Ordinance No. 10-0-58) – **Not part of solar PV development (municipal source available for work)**

***Not expected to create any undue friction in proposed development.***



# Maintenance Considerations

- Landfill Cover
  - ❑ Vegetation, Erosion Prevention, Settlement
- Landfill Monitoring
  - ❑ Groundwater, Landfill Gas
- Stormwater Management
  - ❑ Swales, drainage basins
- Access
  - ❑ Roads, equipment setbacks





# Comfort Letters from EPA/IEPA

- Developer requests **Comfort Letter**, which will support obtaining project financing
- Qualifies under ***Revised Enforcement Guidance Regarding the Treatment of Tenants Under the CERCLA Bona Fide Prospective Purchaser*** (Rev. August 2015)
- Will conduct '**All Appropriate Inquiry**' to support request
- Exercising appropriate care with respect to existing hazardous substances on the site by taking reasonable steps to stop any continuing releases and prevent future releases of hazardous substances will be managed through the use of the **Landfill Cap Protection Plan**



# QUESTIONS????

