



***Solar PV for Affordable
Housing New Construction***

July 14, 2022

Summer Series of Webinars

Second Thursday of each month, from 1 - 2pm

June 9

**Solar 101 +
Financing and
Contracting**

Great for Developers

July 14

**Solar Design for
New Construction**

*Great for Architects
and Developers*

August 11

**Zoning &
Certifications**

*Great for Architects
and Developers*

LISC BOSTON

40  **MACDC**
Celebrating 40 years

Agenda

- 1. Summer Series & Introductions**
- 2. Key Stakeholders**
- 3. Planning for Solar Equipment**
- 4. Roof Materials & Warranties**
- 5. Structural & Racking Solutions**
- 6. Code and Equipment Locations**

Q&A Session (20 Minutes)

Please add all questions to the Q&A box, as we will have time at the end to address them

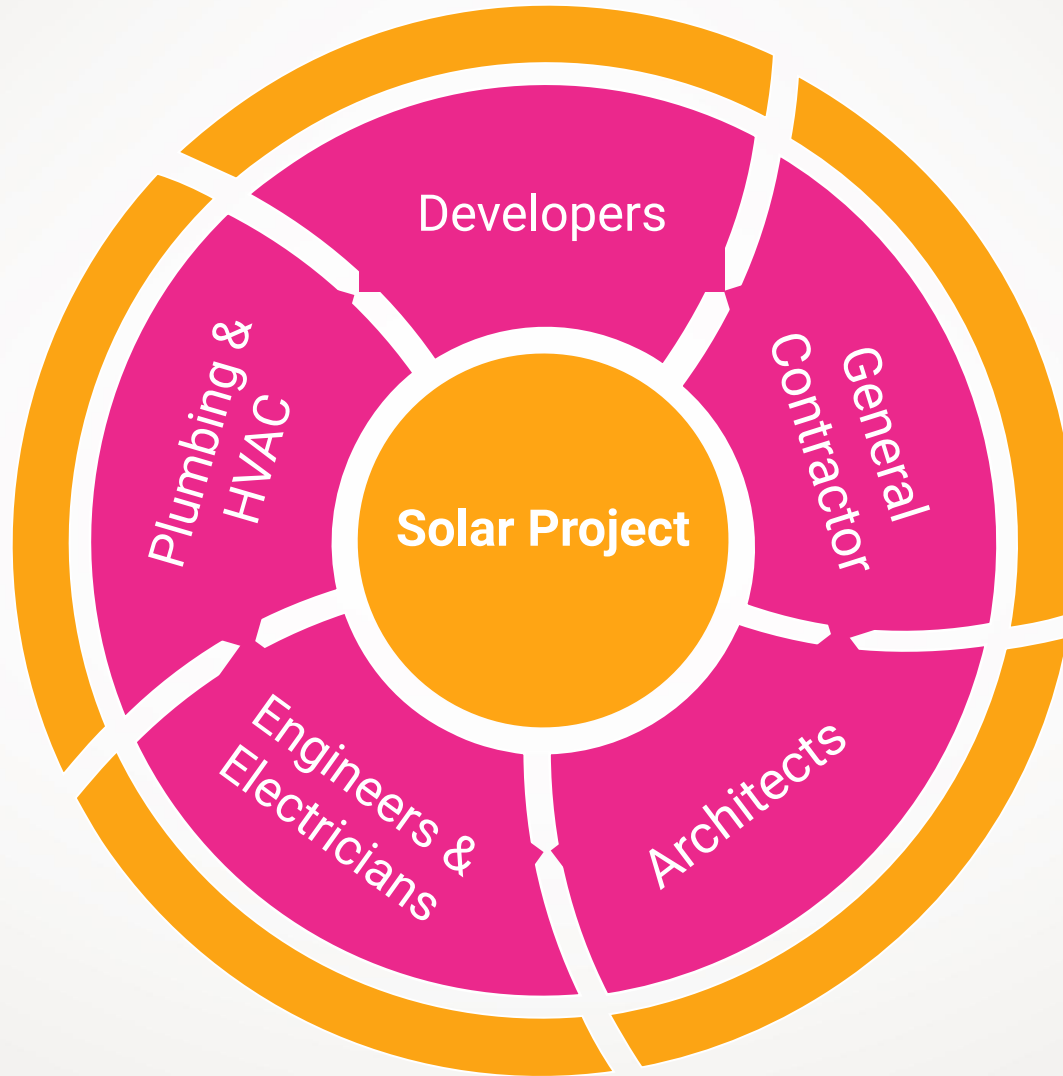
Who We Are

- **Mission:** To expand access to clean energy in underinvested communities
- **About:** Boston-based development company building projects in MA, NY
- **Focus:** Affordable Housing, Nonprofit, Small Commercial
- **Mechanics:** Aggregating solar projects for low-cost, high quality installations and impact financing



An aerial photograph of a white clock tower with a green dome, situated on a roof with solar panels. The tower has two clock faces and a balcony. The surrounding area includes a town with various buildings, trees, and a parking lot with several cars. The sky is blue with scattered white clouds.

Key Stakeholders



How & When to Engage with Us

No Cost Feasibility Analysis

- 50% + Construction Documents (CD's)

Design Phase I

- 70-100% CD's
- Interconnection submission

Design Phase II

- Solar site visit
- Solar permit set submission

Installation and Post Solar Construction

Planning for Solar Equipment



Planning Call for Design Phase I

Project Timeline

Roof Type/Manufacturer

Attachment Plan

Inverter Location

Conduit Run

Installation Staging

Output Allocation Plan

Internet Connectivity

Disconnect & SMART Meter

Tie in Strategy

Common Roof Equipment Obstructions

Plumbing:

- Vent pipes
- Roof drains

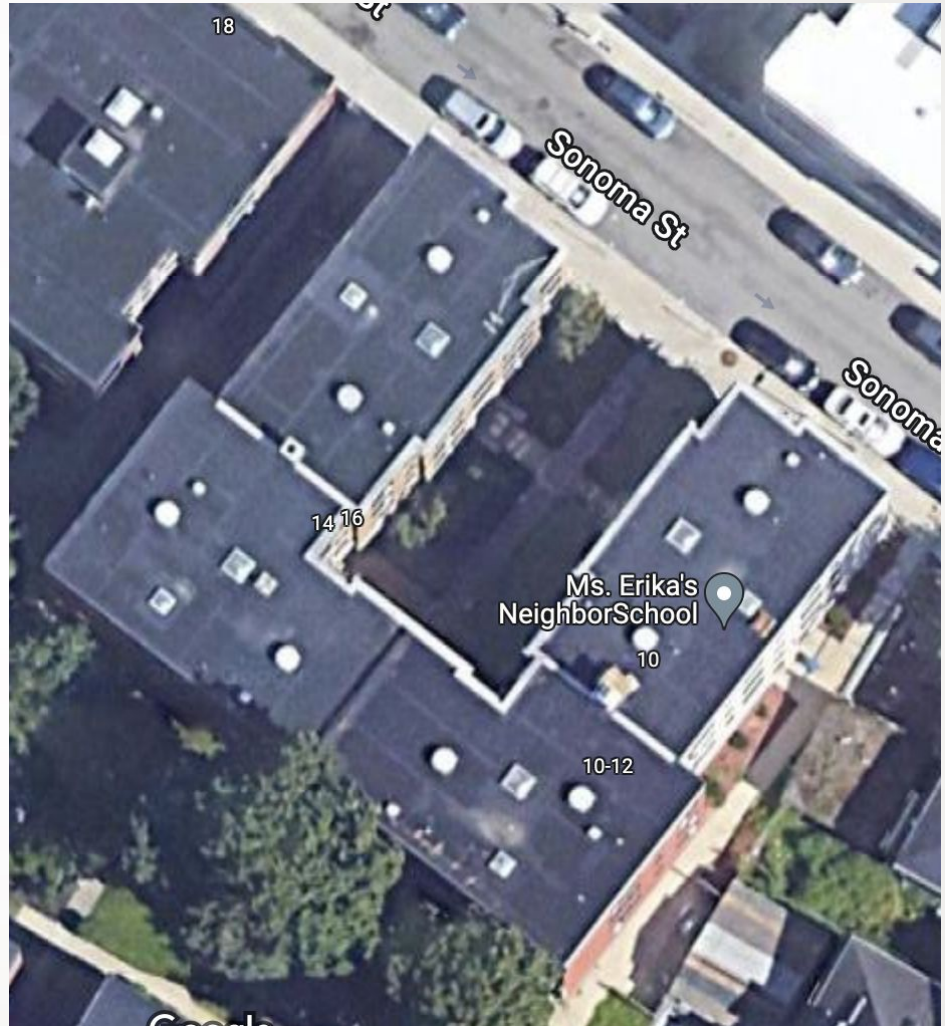
Communications:

- Cell antennas
- Fire department comms
- Starry internet

HVAC (flat roofs only):

- Equipment placement
- Walkway pads
- Gas lines

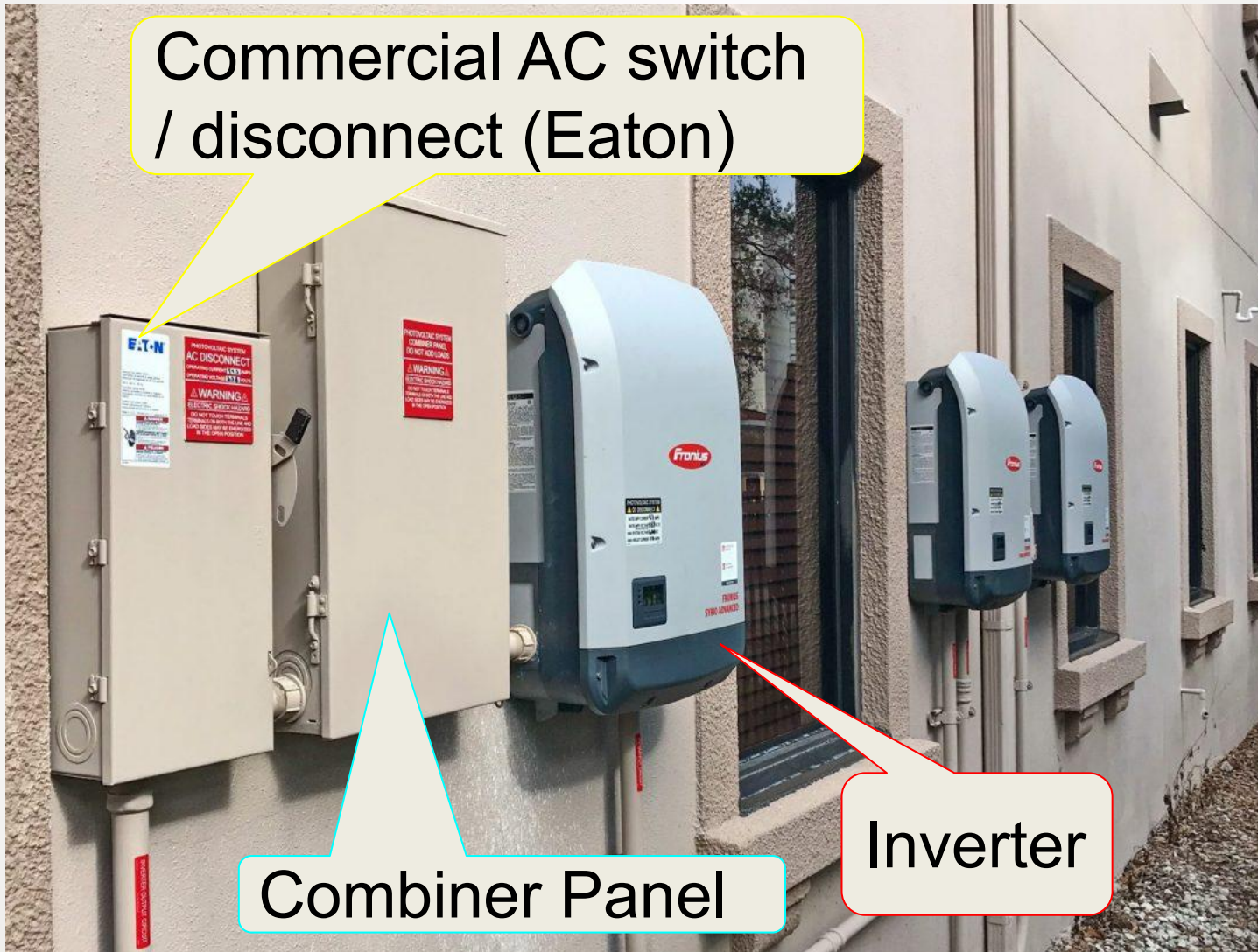
- ★ Any equipment located on the roof surface is a potential obstruction for solar arrays



Planning for Solar Equipment

- **Inverters:** Can go on the roof, internally, or external at ground level. Ideally should be in a relatively shaded spot.
- **Internal Conduit:** Request GC to add a 4" metal conduit from the roof in as straight a shot as possible to the electric room.
 - Internal conduit should be included by the GC's scope of work during the design phase
- **External Conduit:** Solar installer will run the metal conduit at time of installation
- **Tie in:** separate breaker will likely be needed for solar and should be coordinated with the electrical subcontractor

Commercial Equip Example

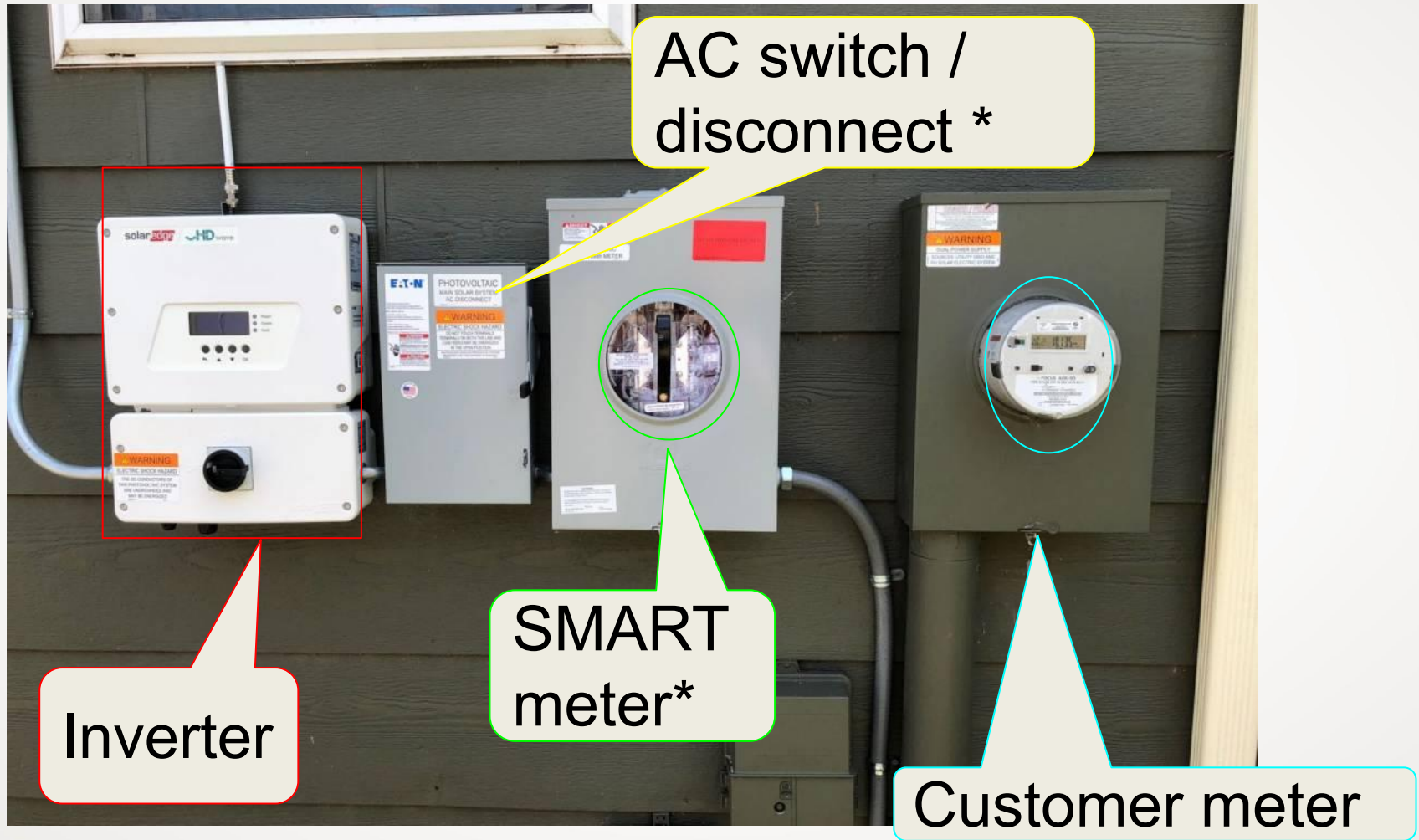


*Note: this is not an MA example, so it is missing the additional utility SMART meter required.

Planning for Solar Equipment

- **SMART Meter & Disconnect:**
 - Interior Placement: If the building has an underground service drop and the meter bank is interior, the utility will typically require “meter grouping” with the SMART meter inside and two disconnects (one outside and one inside)
 - Exterior Placement: If the building has an overhead drop and external meters, then the disconnect and SMART meter must be outside, near the meter bank (typically outside the electric room)

MA Resi Equipment Example



*NOTE: SMART Meter and Disconnect must be on the exterior of the building where utility can easily locate.

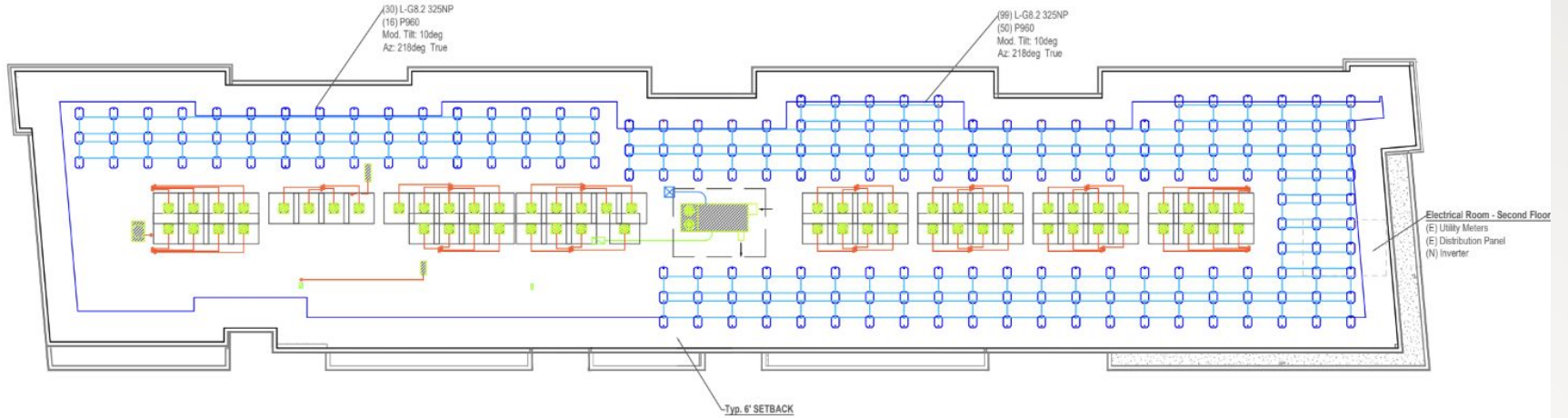
Roof Materials & Warranty



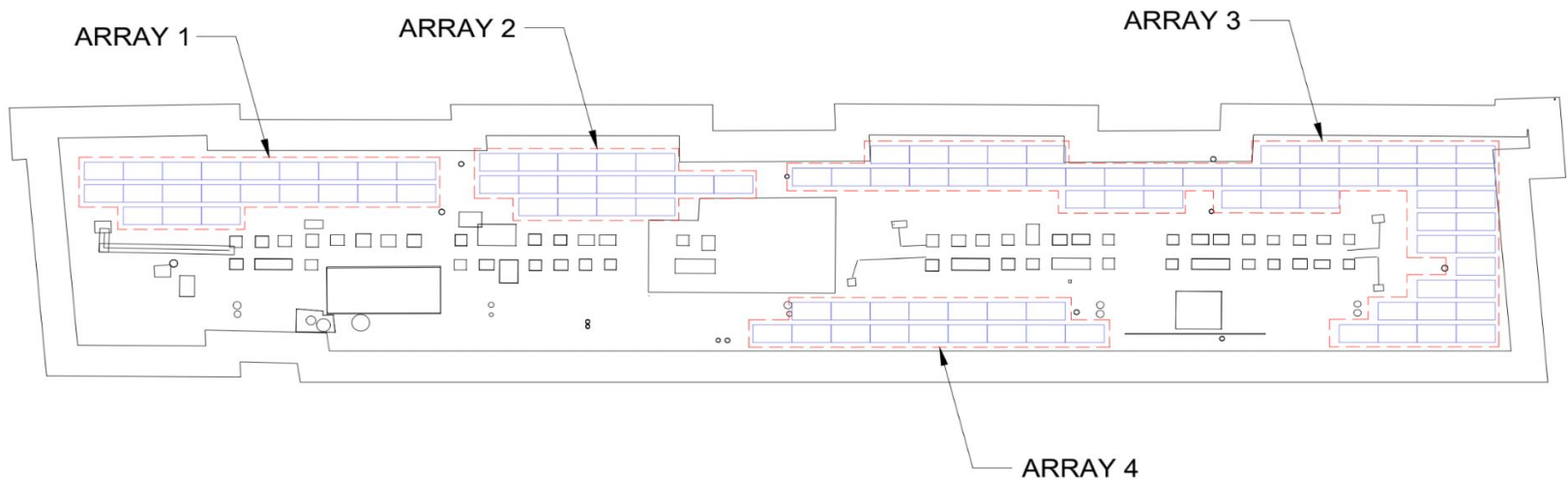
Roofing Material Considerations

- For flat roofs, clients are increasingly required to use white material for reflectivity, which often means TPO.
 - Requires manufacturer certified technician to flash each attachment if needed
 - Up to \$250 per penetration
 - Added design phases and coordination
- White EPDM is preferred for solar flat roof installations

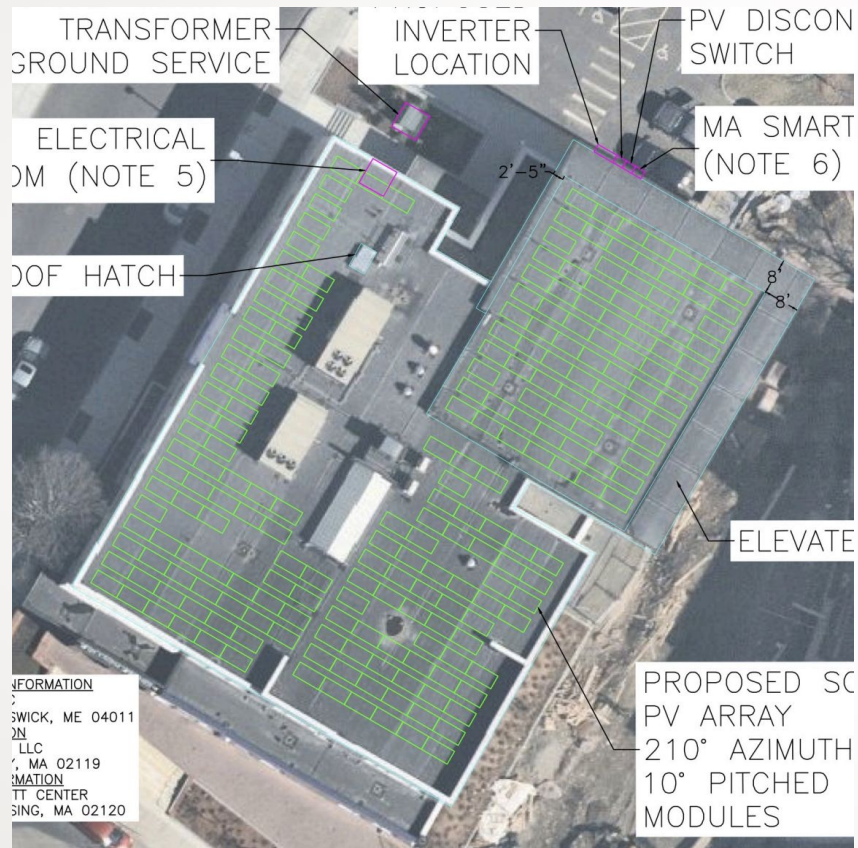
Design Phase I



Design Phase II



The Dewitt Center - Madison Park Development Corporation



Roof Warranty Process

- Resonant Energy works with clients to ensure that each installation we do **does not impact existing manufacturers' warranties** for roofs.
- This may require paying the roofing contractor for pre- / post- solar installation inspections
 - Inspection costs are covered as part of the solar installation

Structural / Racking Solutions



Solar Structural Planning

- **Flat Roofs:** 10 lbs/sf of dead load capacity should be allocated for solar pv.
 - *if you are going for a super dense racking set up for solar, should plan for 15 lbs conservatively*
- **Sloped Roofs:** 5 lbs/sq ft. of dead load capacity should be allocated for solar pv.

Common Racking Solutions

Most Common

Racking Design Choice	Roof Type	Weight	Recommendation	Additional Notes
Ballast Mounted	Flat	6-9 lbs/sf.	10 lbs/sf.	No penetrations - easy / cost effective solar install. Heaviest solution.
Mechanical Attachments	Sloped Flat	2-3 lbs/sf.	Sloped: 5 lbs/sf Flat: 7-10 lbs/sf	

Note: Sometimes designs can be both where it's mostly ballasted, but requires a few penetrations to meet wind loading requirements.

Special Racking Solutions

Racking Design Choice	Roof Type	Weight	Recommendation	Additional Notes
Wavelet Racking (Ballast)	Flat	7-10 lbs/sf.	15 lbs/sf	Heaviest solution due to density.



★ City of Boston E+ 273 Highland St to achieve maximum energy density

Code Req's & Equipment Location



Solar Setback Code Requirements

Flat Roof:

- 4' from edge of the roof
 - For buildings greater than 250 ft in width, an 8' or 4' access path must be inserted every 150' (Fire Lane).
- ★ Setback requirements can vary based on township. Collaborating with local inspectors is encouraged when in doubt.

Sloped Roof:

- Depends on use of building - multifamily buildings typically need a 3ft path from each eave to ridge, and up to a 3ft path along the ridge
- Snow Guards: Additional setbacks from the eaves are also recommended to make space over walkways and entryways

Solar Fall Protection Planning

Fall Protection During Construction:

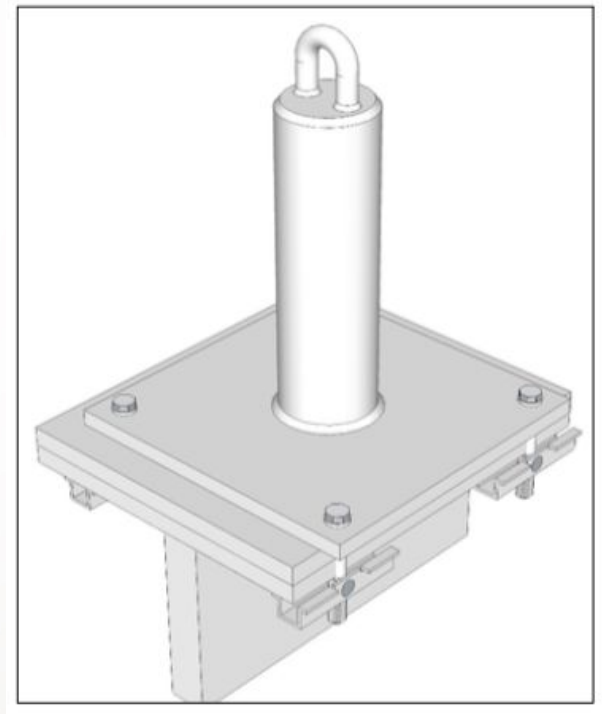
- **Flat Roofs:** Weighted Rails
- **Sloped Roofs:** Temp anchors
- *No advanced planning needed here typically*

Fall Protection for Ongoing O&M:

- A parapet wall > 39" in height
- Tie-Backs / Roof Anchors to Clip Into (See Image)
 - A: Requires blocking - must be planned early.
 - B: Can upgrade to "davits" with stronger attachment to cover window washing
- A permanent metal rail along the roof's edge

OR

- 10' from roof's edge (very uncommon)



Example Tie-Back for fall protection

A wide-angle photograph of a rooftop solar panel installation. The panels are dark blue and arranged in neat rows, held up by white concrete blocks and black spacers. In the background, a city skyline is visible under a bright blue sky with scattered white clouds. The buildings vary in height and style, including a prominent tall, thin skyscraper and a large, modern glass building. The foreground shows a brick wall on the right side of the roof.

Thank You!