NEC Lithium Ion ESS located at Howard Elementary: Resiliency and Utility Support

Sandia – Peer Review 2018

Project Partners

1. EWEB
2. Sandia National Laboratories
3. ODOE
4. CESA
5. WorleyParsons
6. NEC
7. Eugene School District 4J

Special Thanks
Funding from US DOE, Dr. Imre Gyuk Energy Storage Program Manager

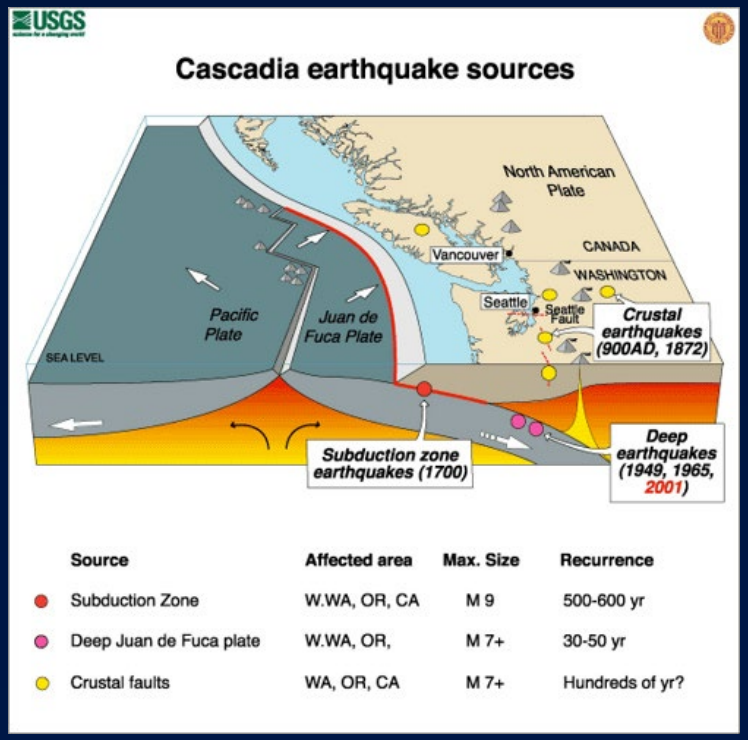
Grant Scope

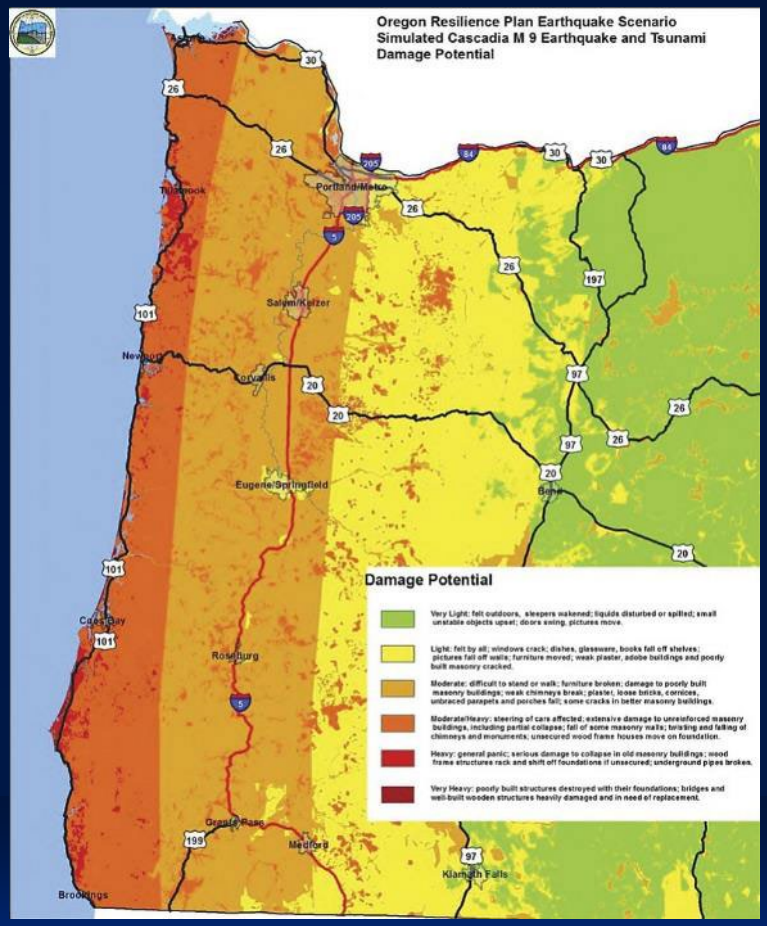
- Install energy storage system equal or larger than 500kW
- Project must run connected to the distribution grid for at least one year
- Provide detailed plan to provide measurement and verification of promised services
- Services (Use Cases) include:
  - Peak Demand Reduction / T&D Deferral
  - Energy Resiliency / Back-up Power
  - Voltage/VAR Support
  - Frequency Regulation
  - Renewable energy ramping, firming
  - Energy Arbitrage
  - Outage Mitigation
  - Reduction of Transmission Charges (reduction of utility co-incident peak)
  - Reduction of Transmission Charges (generation imbalance)
- Optimization study

EWEB

EWEB Resiliency

- Why? Cascadia Subduction Zone Earthquake





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EWEB Resiliency

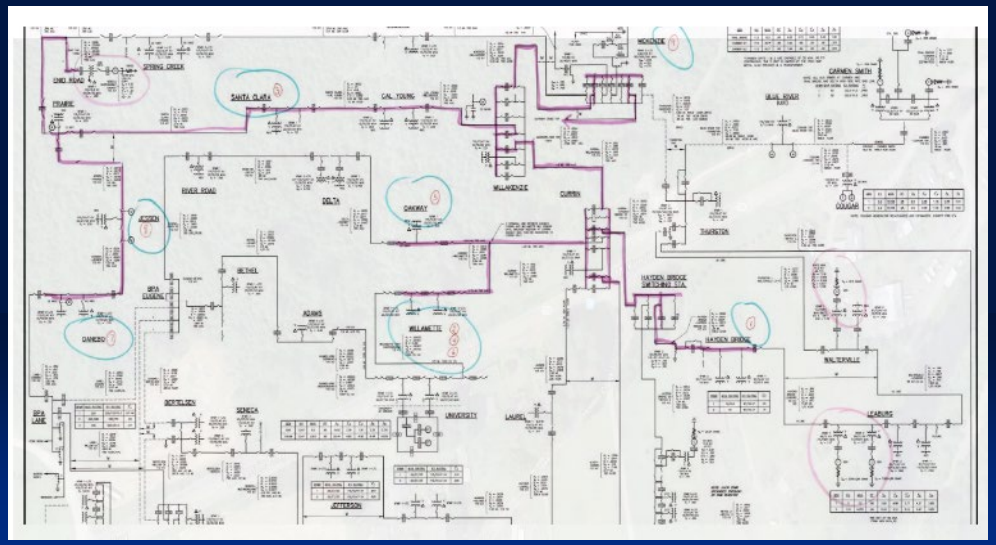
Electric

Modernize

Update and upgrade generation sites

Resilient Spine

Bolster generation paths to critical loads



EWEB Resiliency

Water

Emergency Water

Distributed water wells

Water Trailer

Second Source

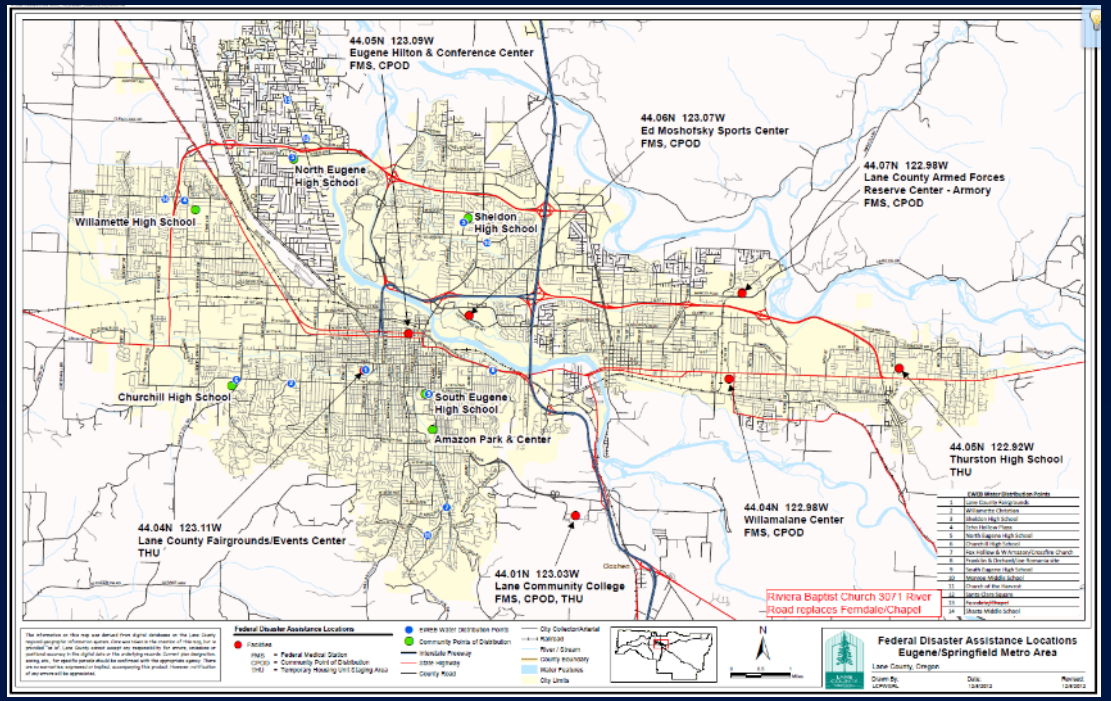
Secondary water supply

EWEB Resiliency

Disaster Recovery (Long and short term)

Distributed Sites

Local water supply and potential staging area



EWEB

BESS Usage

How does EWEB intend to use the BESS?

1. Resiliency

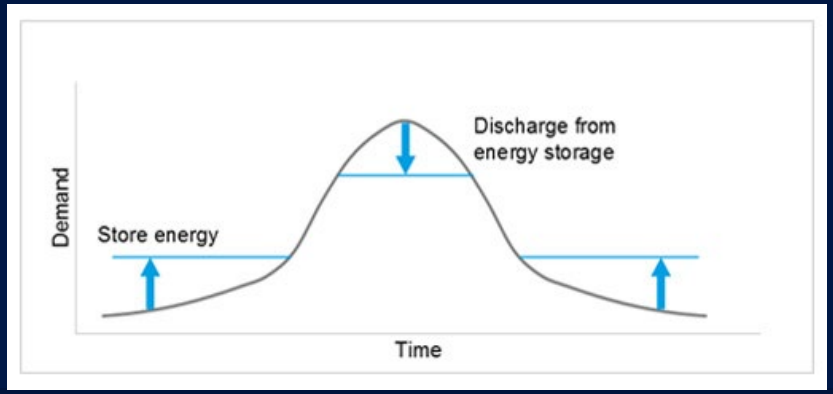
- Customer outage resiliency (short outages)
- Disaster resiliency
  - Community gathering site
  - Water distribution site
  - Staging area
- Aggregated generation (future)

EWEB

BESS Usage

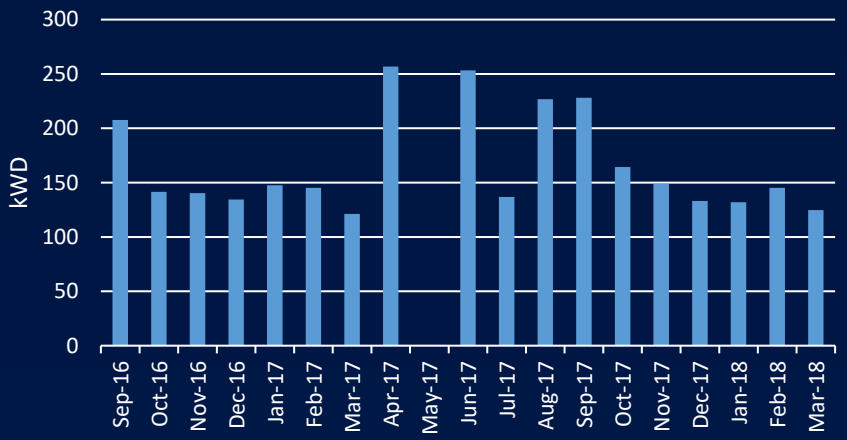
How does EWEB intend to use the BESS?

2. Research
   - Help National Labs with PNW economic analysis (use cases)
   - Develop EWEB interconnection standards for energy storage
3. Economics
   - Customer demand bill reduction
   - Utility BPA bill reduction



Project Site

- Howard Elementary
  - Grades K-5
  - 411 students
  - Building area = 88,000 ft^2
  - 500 kVA 12.47kV/480V XF



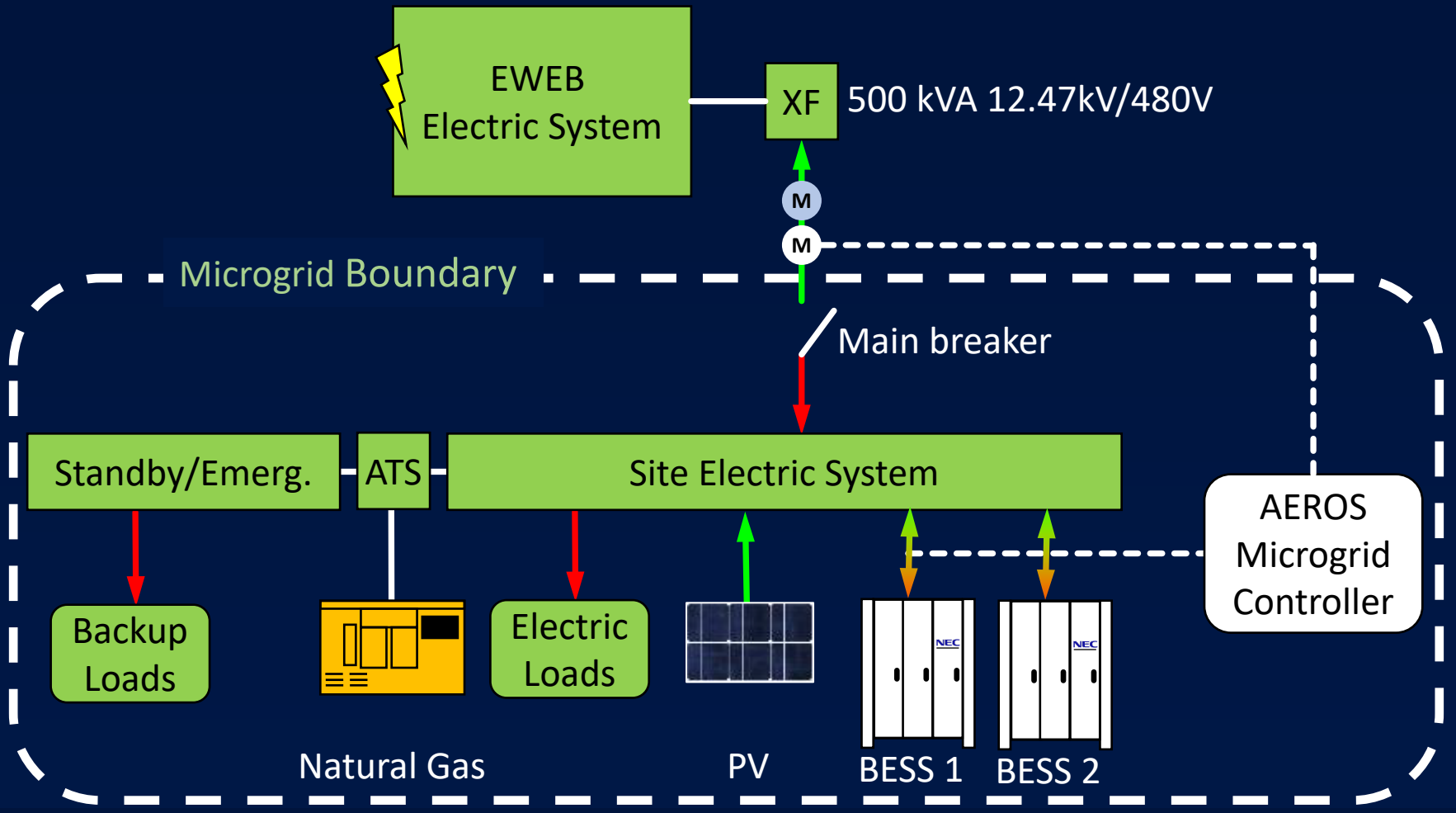
Howard Monthly Peak Demand

Originally built 1949

Re-built 2016

EWEB

Howard Elementary Microgrid



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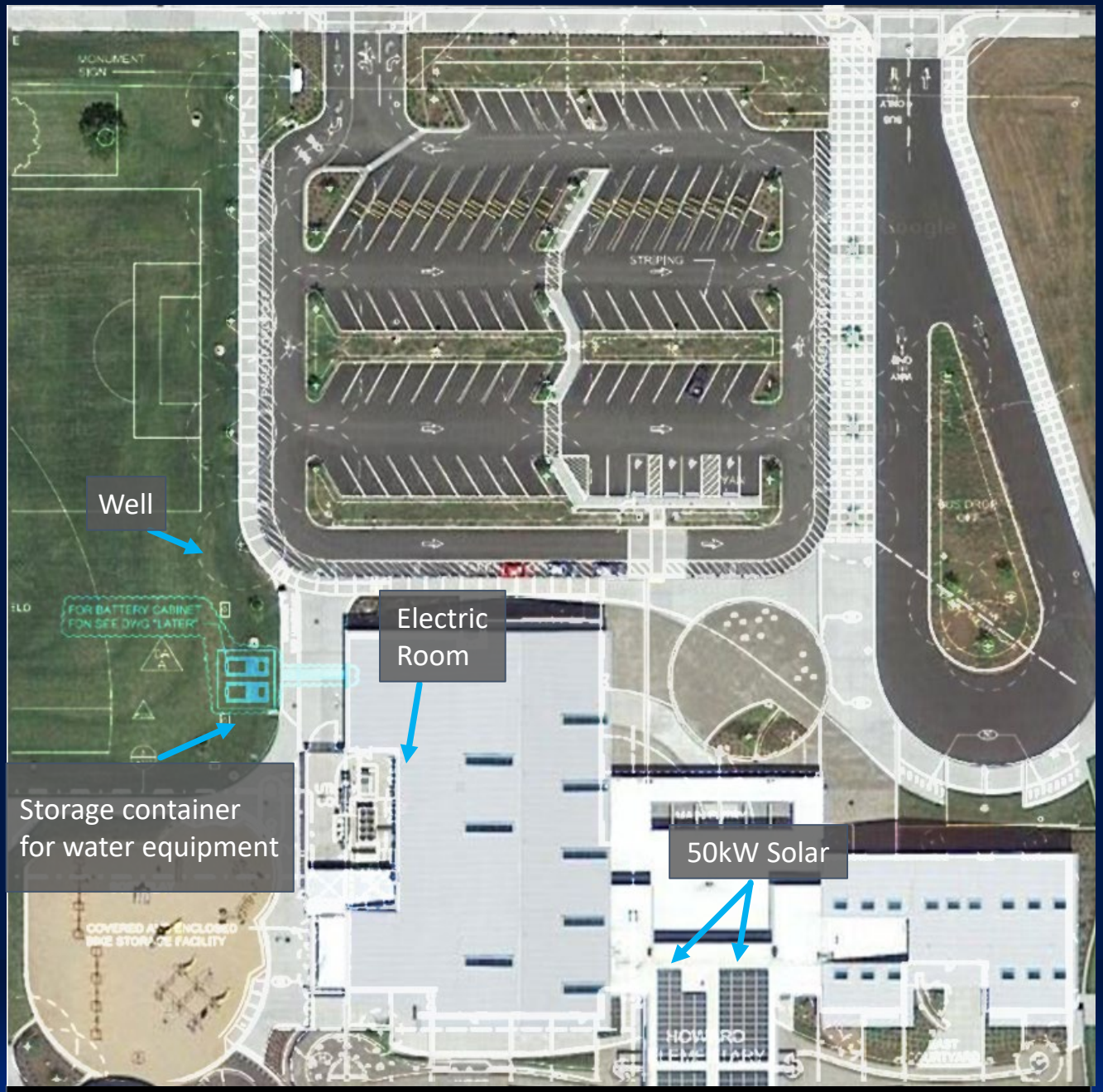
Howard Elementary – Bird’s Eye



Howard Elementary – Bird's Eye

BESS Specs

WSTECH BATD0280-ES-1-480-1

- 280kVA x 2
- 480Y/277V
- 337A max current output
- Efficiency 92-96% dep. on output

NEC DSS

- 280kW/510kWh x 2
- 6 bays
  - 85kWh per bay @ 720VDC
  - 14 batteries per bay @ 51.4V
- C/4 Continuous, 1C once/12hr
- NOVEC 1230 Agent
- Built-in AEROS Controller

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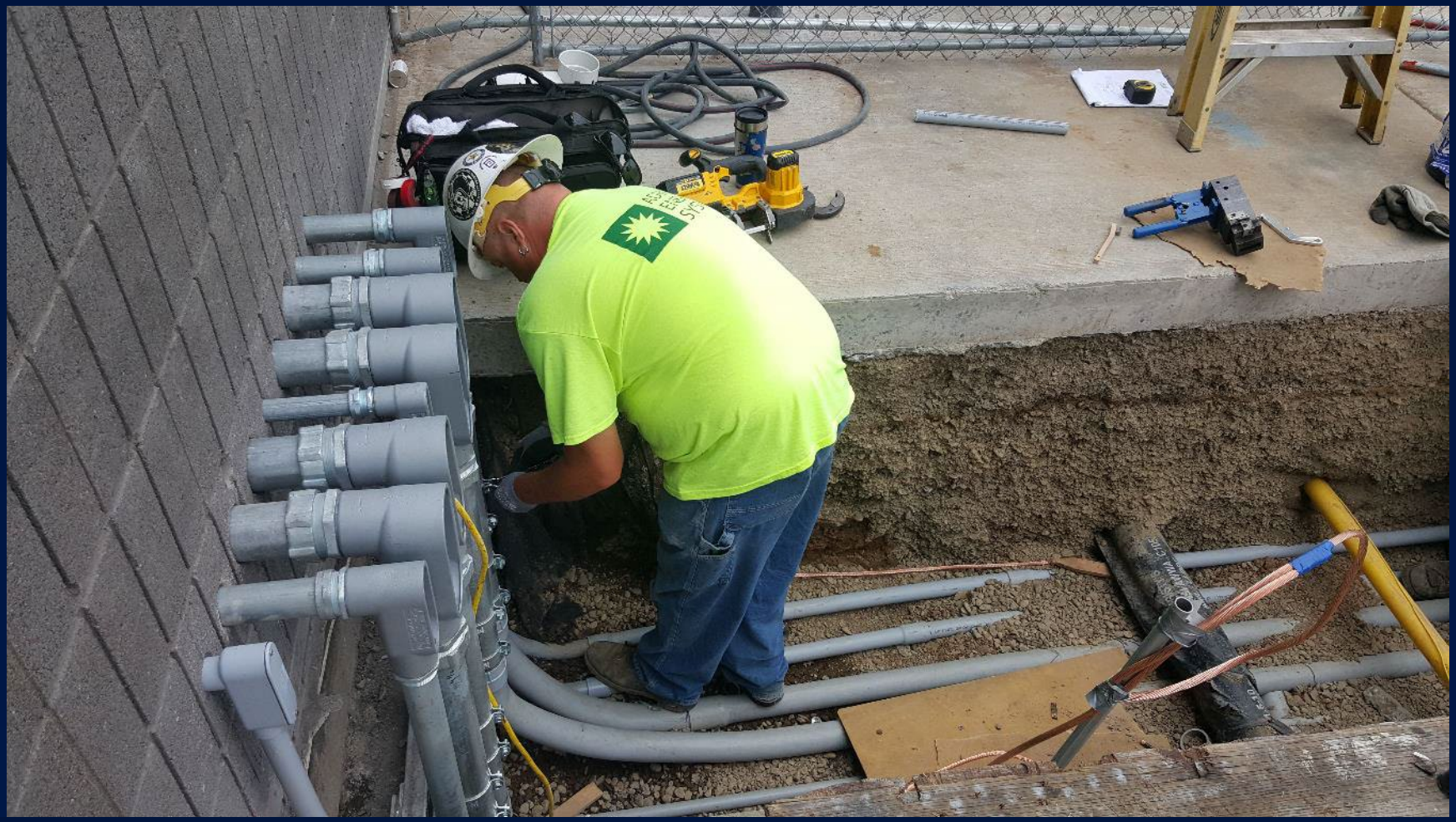
Construction Photos

Excavation for pad

Construction Photos

Building conduit runs and ground ring

Construction Photos



Extending conduit through sidewalk cut

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Construction Photos

Main BESS pad poured – 12” thick

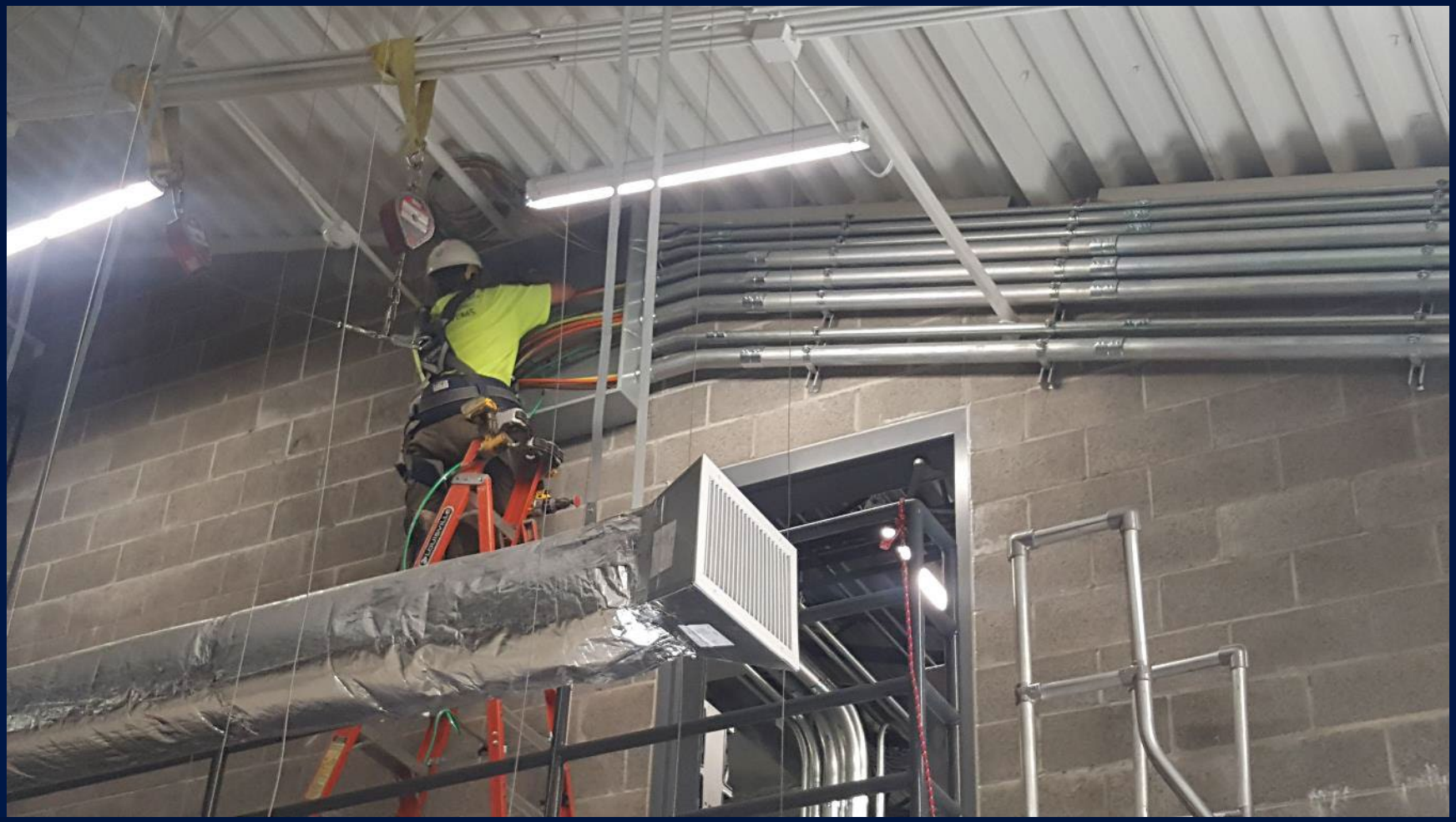
Construction Photos

Crane picking BESS and Inverters

DSS Weight = 17,371 # ea

Inverter Weight = 4,409 # ea

Construction Photos



Routing conduit through storage room to above the electric room

Construction Photos

Adding 2-400A breakers and adding wiring for Shark 200 meter

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Construction Photos

150’ well drilled – Pump to be installed and wired Q4 2018

Estimated 5HP pump and 80-100 GPM

Construction Photos

Finished install with fencing

Lessons Learned

1. Metering if behind the meter
2. BPA Meter since > 200kW
3. Long Duration Outage
   - UPS issues
4. Not self-starting
   - Requires UPSs to power controller and inverter
5. Unable to charge with solar while islanding
6. Consolidate battery and inverter

EWEB

End

EWEB