

ENERGY GRANT UPGRADES & RENOVATIONS

WALTHAM ELEMENTARY SCHOOL DISTRICT 185

December 14, 2011

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StudioGC architecture+BIM



Project Update to the School Board

- Submitted Budget for Energy Grant
= \$ 349,380.00
- Actual Energy Grant Portion
= \$ 174,690.00
- Project Documents are more than 60% Complete

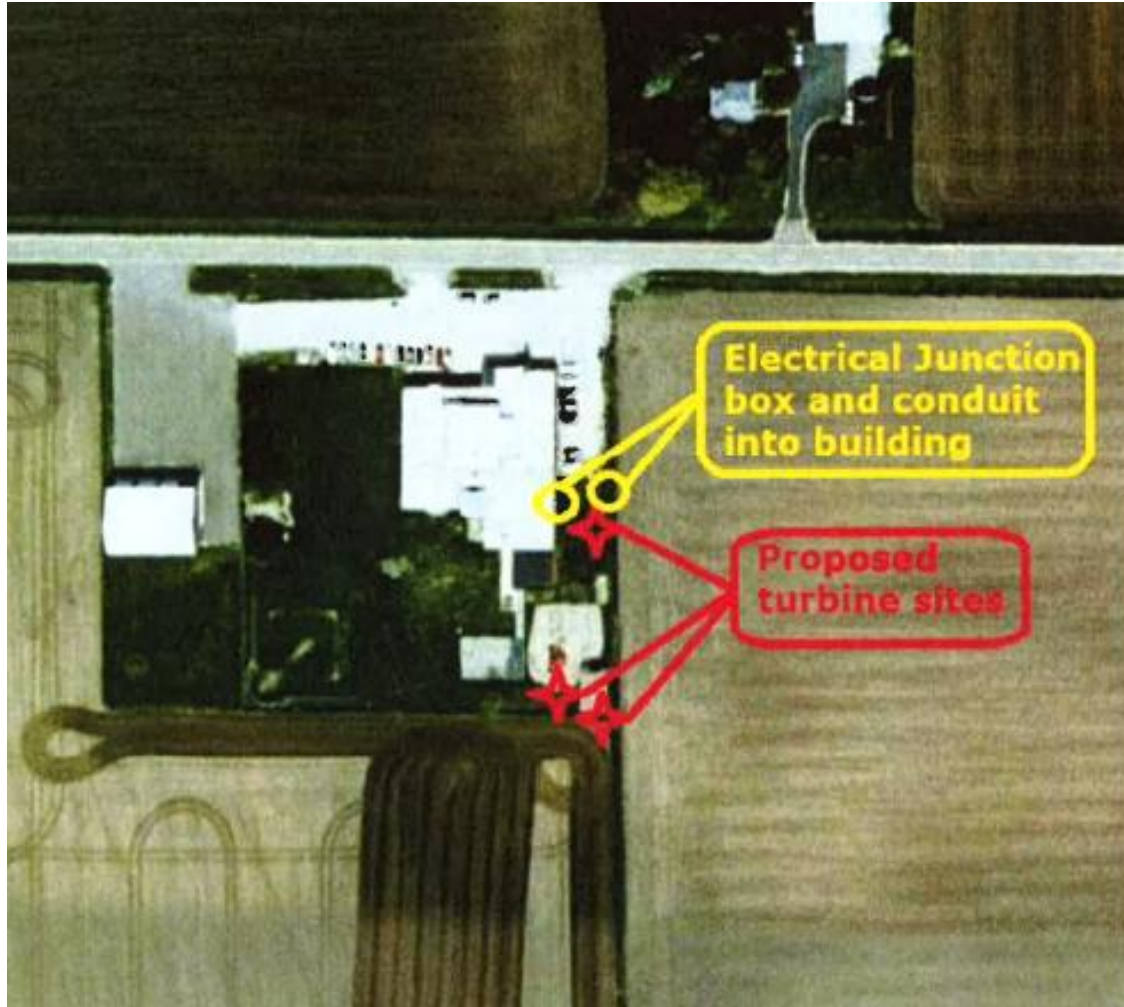
Three Areas of Work:

- Wind Turbines at North School
- Solar Panels at North School
- Unit Vent Replacement with A/C at South

Wind Turbines

Site Plan Image

WALTHAM NORTH ELEMENTARY SCHOOL – WIND TURBINES



Turbine Images

WALTHAM NORTH ELEMENTARY SCHOOL – WIND TURBINES



Turbine Images

WALTHAM NORTH ELEMENTARY SCHOOL – WIND TURBINES



Solar Panels

Solar Panels

WALTHAM NORTH ELEMENTARY SCHOOL – SOLAR PANELS

240 WATT

MULTI-PURPOSE MODULE

NEC 2008 Compliant



NU-U240F1



The NU-U240F1 offers

Improved Frame Technology

Solar Panels

WALTHAM NORTH ELEMENTARY SCHOOL – SOLAR PANELS

System Owner

String Inverter System



- Entire system is affected by one module
- Susceptible to soiling, shading, and module defects

Enphase Energy System



- All modules operate independently
- Resilient to environmental factors
- 3-25% increase in energy production

Reliability

- 3-10 year warranty
- Susceptible to problems with vents and fans
- Keen for outage alerts with entire system
- Limited detection and repairing of problems

25 Year Enphase Warranty

- 25-year warranty
- Completely enclosed no moving parts
- Keen for outage alerts with individual modules
- Automatic detection and reporting of problems

Welcome

to the next phase of solar



Installer

String Inverter System

- Limited by DC wiring design and size
- Requires DC conductors, combiners and disconnects
- Separate installation of inverter unit

Enphase Energy System

- Flexible placement and sizing of systems
- All system wiring is AC
- Inverters installed directly on module racking

Safety

- Requires handling of high voltage DC wires
- Power not 100% by DC arc faults
- System does not de-energize during daytime
- Not compliant with 2011 NEC arc-fault circuit protection requirement

- All wiring is standard AC
- No risk of DC arc faults
- System automatically de-energizes when utility power is removed
- Compliant with 2011 NEC

"The Enphase system is, in some ways, the most important technology breakthrough solar has ever seen."

Dan Kammen, UC Berkeley
Director of Renewable and Appropriate Energy Lab



enphase.com

enphase.com


WALTHAM NORTH ELEMENTARY SCHOOL – SOLAR PANELS

ENPHASE MICROINVERTER SYSTEM



System Overview

Enphase Energy uses Silicon Valley innovations to rethink the way solar power is delivered. We offer a fully-integrated system that combines microinverter technology with advanced powerline networking and web-based software to create a smarter and more efficient solar array.



- 1 Enphase Microinverter
- 2 Envoy Communications Gateway
- 3 Enlighten Software

2 Envoy Communications Gateway



Networking for Solar

The Envoy Communications Gateway connects the solar array to the internet. The Envoy uses advanced powerline communications technology to monitor with each microinverter, without additional wiring or wireless configuration.

Features

- Plug & Play setup
- Communicates over existing electrical wires
- Monitors each microinverter in the array

1 Enphase Microinverter



Distributed Power Conversion

Each Enphase Microinverter is connected to a single solar module and uses digital electronics to precisely perform DC-to-AC power conversion. This increases the overall energy output of the solar array by 5-25%.

Features

- Highly efficient conversion at all power levels
- Integrated monitoring & powerline communications
- Innovative cabling for fast and easy installation

3 Enlighten Software



Web-Based Management

The Enlighten Software is a web-based monitoring and analytics service. It continuously monitors each part of the solar array, and notifies system owners and installers of any performance issues.

Features

- Multiple viewing modes and mobile device support
- Automatically identifies and diagnoses issues
- Included at no additional cost

WALTHAM NORTH ELEMENTARY SCHOOL – SOLAR PANELS

[e] ENPHASE MICROINVERTER M215



The Enphase Energy Microinverter System improves energy harvest, increases reliability, and dramatically simplifies design, installation and management of solar power systems. The Enphase System includes the microinverter, the Envoy Communications Gateway, and Enlighten, Enphase's monitoring and analysis software.

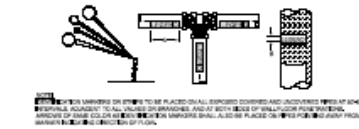
- PRODUCTIVE** [- Maximum energy production
- Resilient to dust, debris and shading
- Performance monitoring per module
- RELIABLE** [- System availability greater than 99.8%
- No single point of system failure
- SMART** [- Quick & simple design, installation and management
- 24/7 monitoring and analysis
- SAFE** [- Low voltage DC
- Reduced fire risk



Unit Vent Replacement & A/C

Unit Ventilators

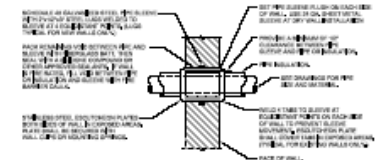
WALTHAM SOUTH ELEMENTARY SCHOOL – UNIT VENTILATORS



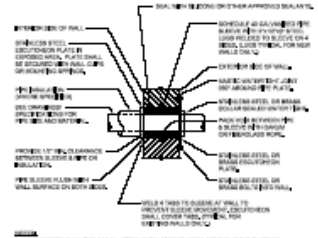
IDENTIFICATION MARKERS SHALL BE PLACED ON ALL EXPOSED CONDUIT AND CONDENSATION PIPES OF 1/2" OR LARGER. ADJUST TO ALL VIEWS OF BRANCHES AND AT BOTH ENDS OF UNIT VENTILATOR PIPING. THE NUMBER OF MARKS SHALL BE AS SHOWN IN THE FOLLOWING TABLE. MARKS SHALL BE PLACED ON THE SAME SIDE OF THE PIPE IN THE SAME DIRECTION OF FLOW.

PIPE SIZE (NOMINAL)	MARKS PER LINEAR FOOT	MARKS PER LINEAR FOOT
1/2" TO 1 1/4"	1	1
1 1/2" TO 2"	2	2
2" TO 2 1/2"	3	3
2 1/2" TO 3"	4	4
3" TO 3 1/2"	5	5
3 1/2" TO 4"	6	6
4" TO 4 1/2"	7	7
4 1/2" TO 5"	8	8
5" TO 5 1/2"	9	9
5 1/2" TO 6"	10	10

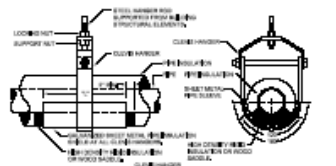
TYPICAL PIPE IDENTIFICATION MARKERS
NO SCALE



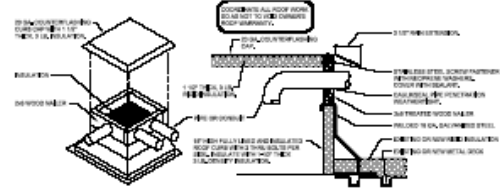
PIPE SLEEVE THRU INTERIOR WALL DETAIL
NO SCALE



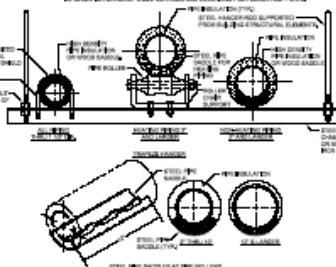
PIPE SLEEVE THRU EXTERIOR WALL ABOVE GRADE
NO SCALE



TYPICAL PIPE HANGER DETAILS
NO SCALE



PIPING OR CONDUIT ROOF CURB DETAIL
NO SCALE



REFRIGERANT PIPING OR CONDUIT ROOF SUPPORT DETAIL
NO SCALE



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Energy Renovations and Upgrades

For Waltham C.C. Elementary School District #185

Project No. 185-000000-0000

PRELIMINARY
NOT FOR CONSTRUCTION

HVAC DETAILS
Project 19085 HV2.11



Unit Ventilators

WALTHAM SOUTH ELEMENTARY SCHOOL – UNIT VENTILATORS

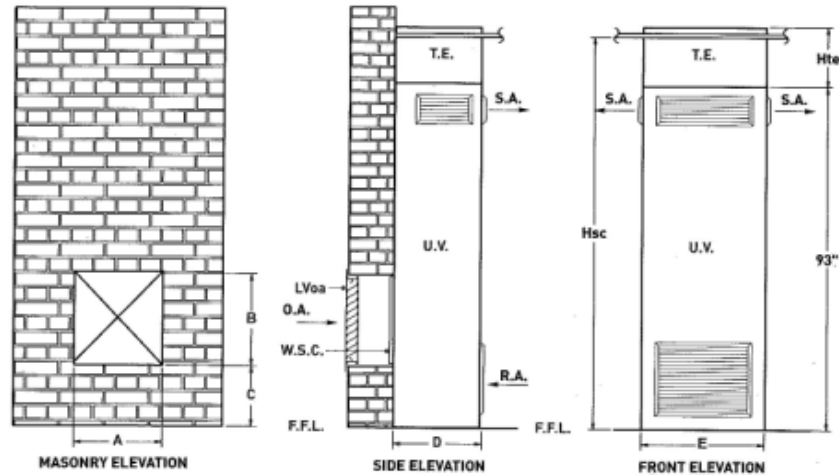
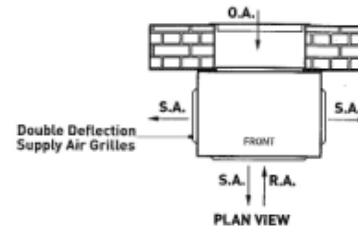
Application Layout Models VUF 1200, VUF 1500



FREEBLOW CONFIGURATION

U.V.	Unit ventilator
T.E.	Top extension (optional)
Hte	Height of top extension
LVoa	Outdoor air louver
W.S.C.	Wall sleeve collar
S.C.	Suspended ceiling
Hsc	Height from F.F.L. to suspended ceiling
F.F.L.	Finished floor level
S.A.	Supply air
R.A.	Return air
O.A.	Outdoor air intake

Not To Scale



Model No.	DIMENSION				
	A	B	C	D	E
VUF 1200	22.5"	21"	16"	21.5"	28"
VUF 1500	36.5"	16.5"	4"	23"	44"

Unit Ventilators

WALTHAM SOUTH ELEMENTARY SCHOOL – UNIT VENTILATORS



Schedule:

- January Board Meeting
 - Approval to go Out to Bid (OTB)
- Receive Bids Early February
 - Board Approval at Feb. Board Mtg.
- Order Equipment – Winter/Spring
- Wind & Solar install in Spring
- Unit Vent Replacement over Summer.

Questions?



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