Public Facilities Committee Report
City of Newton
In City Council

Wednesday, December 5, 2018

Present: Councilors Crossley (Chair), Leary, Norton, Kelley, Danberg, Laredo, Lappin, Downs

Absent: Councilor Gentile

City Staff Present: Chief Operating Officer Jonathan Yeo, Commissioner of Public Works Jim McGonagle, City Engineer Lou Taverna, Co-Director of Sustainability Ann Berwick, Co-Director of Sustainability Bill Ferguson

#599-18 **Update on the status of the Solar Phase 3 Projects**
COUNCILOR CROSSLEY requesting an update on the status of the Solar Phase 3 Projects.
Action: **Public Facilities Held 7-0**

Note: The purpose of today's meeting is to introduce the proposed siting and scope of solar installations, and to solicit input from the Committee to help prepare for a final presentation in January. Co-Director of Sustainability Bill Ferguson introduced the City's consultants who were selected to evaluate options for solar installations at the sites shown on the attached chart. Ameresco will be assessing feasibility for the sites shown in blue and Macquarie for the sites shown in white. Mr. Ferguson noted that three community meetings will be held in December and stated that notices of the meetings were mailed to residents within 300' of each site. Mr. Ferguson stated that it is the administration's intent to return to the Committee with the completed assessments and refined designs in January 2019, when they will seek Council approval to enter into lease negotiations for each site.

Mr. Ferguson noted that the proposed solar sites are part of the third phase of solar projects on municipal properties. Phase I comprised four rooftop installations which were completed in 2013. Phase II comprised eight sites, including two parking lot canopy installations and ground mounted solar at the Rumford landfill, which were completed in 2017. Mr. Ferguson noted that the Phase I and II sites generate the equivalent of 21% of the City's municipal electrical energy use and stated that the expected output of the Phase III solar installations will serve the equivalent of an additional 26% of municipal energy use. He noted that much of the power generated at the Phase III solar installations can be utilized at the collection sites.

Macquarie Representatives Henry Shine, Susan Brodie and Chaim Mosbacher provided an overview of proposed solar facilities at their assigned sites. The presentation (attached) showed preliminary renderings of each installation from an aerial perspective and from the street. Details of the expected output from each location can be found on the attached chart. Mr. Mosbacher explained that the split design and tilt of the solar canopies is optimal for the collection of energy and also allows snow

and ice to melt and drain. He noted that heaters will be necessary to facilitate melting and that each location will INCLUDE a plan for water collection, depending on the location of discharge.

Committee members expressed support for the solar canopy design, in particular noting the ability to integrate rain water management systems. In response to a question, Mr. Shine confirmed that solar installations can be repurposed, but at a significant cost to the City. Chief Operations Officer Jonathan Yeo said that the City will not seek to install a solar array at a school that will be renovated or relocated in the near future. A Committee member questioned whether the solar panels pose any hazard to wildlife and if they are being designed sensitively. It was noted that there are no known hazards to wildlife and the solar arrays are designed as carports with lighting underneath, so there is no up lighting. Mr. Mosbacher confirmed that the paved areas should not be impacted as they will use a directional boring technique (horizontal drilling) underground to install conduit. Mr. Ferguson confirmed that all solar canopy installations will include conduit for EV charging station readiness at 10% of the parking stalls.

Business Development Manager Hal Meyer and Project Manager Steve McDonough presented a similar overview of the sites being evaluated BY Ameresco, noting expected output at each site. He showed a design for parking at the library that was pulled from an old City file, showing a redesign of the lot to add parking. The design entails the removal of the berms and 12 trees to create 16 additional parking spaces. The intention is to reconstruct and repave the lot with pervious asphalt and integrate a robust storm water management system using the solar canopies to collect and direct rain water to underground recharge basins. This is to address a history of chronic flooding at this lot.

Committee members asked that the administration be prepared to address how the library work will impact existing CIP items. COO Yeo confirmed that there are funds in the budget for the reconstruction and paving of municipal parking lots and that the library lot is a high priority. Ameresco is developing estimates for a plan that includes the drainage, repaving, tree removal (and replacement) and installation of the solar canopies. The City stated its commitment to replant (smaller trees) and replace all trees per caliper inch with resilient species. Mr. Ferguson confirmed that all new City building roofs were designed and mapped to maximize solar panel installations, and that the City is working with the roof companies to assure compliance with the roof warranties.

Committee members asked Macquarie, Ameresco and City staff to be prepared in January to address any impacts that solar installations may have on neighboring residents, specifics on how drainage plans will be incorporated, where applicable, that trees impacted be identified (species and condition), counted, and sized at each site, that tree canopy impact on the solar installation and a copy of the RFP be included in the packet prior to the meeting in January. Committee members voted unanimously in favor of holding the item with a motion from Councilor Lappin.

#600-18 **Update on the Climate Action Plan**
PUBLIC FACILITIES COMMITTEE requesting updates on the status of the Climate Action Plan.

Action: **Public Facilities Held 7-0**

Note: Metropolitan Area Planning Council (MAPC) Energy Analyst Megan Aki presented an update to the Committee on the status of the Climate Action Plan. The MAPC was hired by the City to create a Climate Action Plan and facilitate community engagement. Ms. Aki noted that the Climate Action Plan is in response to the City's desire to address the considerable day to day threats relative to the impact of greenhouse gas emissions on the environment and human health. Ms. Aki's presentation is attached. She explained that the Climate Action Plan is being developed in tandem with the Municipal Vulnerability Assessment and the Hazard Mitigation Plan. Ms. Aki explained that the Climate Action Plan will seek to implement strategies to reduce greenhouse gas emissions across all sectors, including; waste reduction, transportation and stationary energy use (buildings, lighting, etc.). The reduction of greenhouse gas emissions will be achieved by reducing energy consumed, using cleaner and renewable energy and by the capture of carbon from the environment (i.e. tree planting).

Ms. Aki noted that community outreach has been focused on active members of the energy community, including the Energy Commission and various environmental leaders and groups. The MAPC hosted a workshop attended by over 60 residents to encourage robust discussion and identify some of the City's goals and priorities. Ms. Aki noted that pronounced themes at the workshop included; support for Newton Power Choice, the electrification of heating and cooling, transportation, improved biking and walking facilities and City led outreach and education. An on-line questionnaire has reflected consistent themes among residents. Ms. Aki noted that a memo will be distributed that summarizes the information obtained.

Ms. Aki noted that the MAPC has worked to update the City's Greenhouse Gas Inventory (last updated by the Energy Commission in 2013) but stated that data relative to public transportation AND waste disposal is not included. The Greenhouse Gas Inventory helps to identify the largest sources of emissions, which informs the types of actions to prioritize in the Climate Action Plan. Ms. Aki noted that the MAPC has been working with City staff to identify past and current measures taken and to identify priorities. Additionally, the Climate Action Plan will incorporate commonalities and best practices found in other Climate Action Plans. The plan will identify what actions must take place, when and by whom. Ms. Aki noted that the MAPC will be working with the Energy Commission to develop specific actions. It is expected that the plan will be completed by April 2019.

Energy Commission Chair Halina Brown noted that the City's residents generate the majority of the Greenhouse gas emissions. She explained that the City has a role in providing leadership, information, mandates and incentives; but emphasized that the burden of change will fall on the residents. Ms. Brown proposes that progress should be measured by energy use per capita or greenhouse gas emissions per capita in order to generate the most reflective results. She noted that the Energy Commission will be working with the MAPC in the coming months on the collection of data and implementation of the Climate Action Plan. Ms. Brown also noted that using more renewable energy will not be enough and stated that the City must engage in efforts to reduce the energy consumption as well.

The Chair invited members of the Energy Commission and MAPC to help identify what the City's

goals are, what the challenges may be to achieve them and anything that can be done to regulate change. Committee members acknowledged that the development of a Climate Action Plan is urgent and urged ambitious goals for the City. Noting the significant impact on residents, Committee members encouraged Ms. Aki to expand community outreach and provide recommendations on how to further engage the community. Committee members requested guidance with regard to taking action at the state/federal level and any opportunities for funding. Councilors requested that information be collected describing the cost of specific actions, whether there is a payback period as well as the staff capacity needed to complete the work. Committee members were supportive of the joint efforts on behalf of the Energy Commission and the MAPC to draft the Climate Action Plan. With that, Councilor Lappin motioned to hold the item which carried unanimously.

#205-18 **Resolution to reach Zero Carbon Pollution by 2050**
COUNCILORS BROUSAL-GLASER, NORTON AND LEARY requesting a resolution from the City Council committing the City to reach Zero Carbon Pollution by 2050, with a plan and interim targets toward reaching that goal.
Action: **Public Facilities Held 7-0**

Note: Councilor Norton presented the Zero Carbon Pollution by 2050 Resolution. Councilor Norton noted that while resolutions from around the country are typically focused on municipal action, they do not include interim timelines. She explained that the interim timelines, with targets by sector, are more pragmatic and were drafted with assistance by members of the Energy Commission and other energy professionals. Councilor Norton emphasized the social responsibility of the City to demonstrate ITS commitment to zero carbon pollution as a model for other communities and urged Committee members to support the resolution. Co-docketer Councilor Leary noted that progress is being made with regard to renewables and encouraged Committee members to set high standards and endeavor to meet those goals.

Chief Operations Officer Jonathan Yeo noted that the City is in the process of developing a Climate Action plan that will identify actionable goals within a five-year time frame, but with an eye toward longer range goals. He noted that the administration believes that it is premature to support a resolution that sets actionable goals that may not be attainable. Committee members expressed concern relative to passing a resolution with unattainable goals. Committee members agreed that the Climate Action Plan will be a useful tool to inform details of the resolution. Committee members agreed to continue the discussion early in 2019, pending additional information from the Climate Action Planning group. Councilor Laredo motioned to hold the item and Committee members voted unanimously to hold.

Chair's Note: The administration introduced its I&I (inflow and infiltration) Mitigation policy, recently revised in order to manage compliance with DEP rulings, so that the Committee may discuss its application and implications to both municipal and land use development projects across the city.

Note: Chief Operations Officer Jonathan Yeo introduced the administration's revised Inflow and Infiltration mitigation policy. He noted that the administration plans to propose an ordinance to

codify the policy in the next few months. City Engineer Lou Taverna provided background on the I&I policy. When the Kesseler Woods Development was proposed in 2005, it was identified that the sewer mains did not have the capacity to manage the flows of the proposed development. The City created an I&I mitigation policy that requested funds from developers as a condition of their Special Permit. Mr. Taverna explained that the City revised the policy in 2011, to apply not only to Special Permit projects, but to projects having greater than 100-bedrooms. He believes that developers might design projects just below the 100-bedroom threshold to avoid the mitigation fee. The administration is now adopting a policy whereby Engineering will recommend a mitigation fee apply to both Special Permit projects and all by-right development having greater than four residences on a parcel.

Mr. Taverna explained that the cost of transporting the flows can be calculated by transmission and treatment costs or the known capital cost of the sewer rehabilitation program. He noted that the Law Department said that the transmission/treatment costs may be more difficult to defend. It was noted that the rate at which developers were charged has not been escalated appropriately, so the proposed rate is over twice what the previous rate was. Mr. Taverna explained that when projects are proposed to the City, Engineering will first evaluate the condition of the sewer system in that area. If the City has already improved the condition and capacity in the sewers in that area, the Council could waive the fee and/or direct the funds to serve other capital costs related to the proposed project. The Chair noted that the Council currently has the authority to waive such fees in the Special Permit process, and the sewer rehabilitation program has implemented a funding strategy. Committee members noted that implementation of fee could be cost prohibitive and might cause developers to make other compromises that impact the development. Additionally, Committee members expressed some concern that implementing a high mitigation fee could discourage development altogether.

The Committee was in agreement that an ordinance should be drafted that contains clear metrics to guide consistent fee application as well as clear metrics by which the Council might waive the fee. Committee members asked that when the item is docketed, the administration provide a clear explanation of the Council's discretion.

The Committee adjourned at 10:05 pm.

Respectfully submitted,

Deborah Crossley

PROPOSED PHASE 3 SOLAR SITES

	Roof Sites	Total First Year Output kWh	Location
1	Ed Center roof, 100 Walnut St.	95,799	Roof
2	Fire Station #3 and Headquarters, 31 Willow Street, roof	77,395	Roof
3	Zervas Elementary School, 30 Beethoven Ave	216,094	Roof
4	FA Day Middle School roof, 21 Minot PlaceRoof	303,215	Roof
5	Angier Elementary School Gym roof, 1697 Beacon St	95,355	Roof
6	Williams Elementary School, 141 Grove Street	138,466	Roof
7	Cabot gym roof, 229 Cabot School	68,432	Roof
8	Carr School, 225, Nevada Street	68,486	Roof
	Total Phase 3 Roof sites kWh	1,063,242	

	Parking Lot Canopy Sites		
9	Newton Free Library, 330 Homer Street	262,909	Parking lot
10	Countryside Elementary School parking lot, 191 Dedham Street	383,040	Parking lot
11	North High School lots, 360 Lowell Ave and Walnut Street	973,560	Parking lot
12	Auburndale Cove, West Pine St.	398,677	Parking lot
13	250 Albermarle Road, on street parking	598,100	Parking lot
14	Pleasant Street lot	114,709	Parking lot
15	Brown Middle School lot, corner of Meadowbrook Road and Wheeler Road	466,029	Parking lot
16	Memorial Spaulding Elementary School parking lot, 250 Brookline Ave	178,639	Parking lot
17	Oak Hill MS parking lot, 130 Wheeler Road, behind Oak Hill Middle School	208,718	Parking lot
18	Ed Center parking lot, 100 Walnut St.	302,240	Parking lot
19	Bigelow Middle School parking lot, Park Street (behind Bigelow School)	286,550	Parking lot
20	Mason Rice Elementary School Parking lot, 149 Pleasant St	191,674	Parking lot
	Total Phase 3 Canopy sites kWh	4,364,845	

		FY 2018 kWh	Per Cent of Municipal Use
	Phase 3 Total kWh-design	5,428,087	26%
	Phase 2 Total kWh-actual	3,773,369	18%
	Phase 1 Total kWh-actual	622,475	3%
	All Phases kWh	9,823,931	

Municipal Total Use kWh FY 2018 20,600,000

Newton Township – 11 Sites Design Summary Table

12-04-2018

	Site	System Type	Mods	kW	INV	INVs	kW ac	Yield	Expected kWh	90% Guarantee
1	Angier ES	Roof	245	82.075	50, 23TL	2	73	1162	95,355	85,820
2	Williams ES	Roof	355	118.925	50, 28, 23TL	3	101	1164	138,466	124,619
3	Auburndale Cove	Canopies	1,014	339.69	60, 50, 36TL	6	282	1174	398,677	358,810
4	250 Albermarle Road	Canopies	1,566	524.61	60, 50, 36TL	8	412	1140	598,100	538,290
5	Pleasant Street Lot	Canopies	306	102.51	50TL	2	100	1119	114,709	103,238
6	Brown MS Lot	Canopies	1,170	391.95	60, 50TL	6	320	1189	466,029	419,426
7	Memorial Spaulding ES Parking Lot	Canopies	474	158.79	50, 36TL	3	136	1125	178,639	160,775
8	Oak Hill MS Parking Lot	Canopies	528	176.88	60, 50, 36TL	3	146	1180	208,718	187,847
9	Ed Center Parking Lot	Canopies	762	255.27	60TL	4	240	1184	302,240	272,016
10	Bigelow MS Parking Lot	Canopies	714	239.19	60TL	3	180	1198	286,550	257,895
11	Mason Rice ES Parking Lot	Canopies	480	160.8	60, 36TL	3	132	1192	191,674	172,506
	Totals 11 Sites		7,614	2,550.69				1168	2,979,156	2,681,240

Type: Roof-Mounted
kw: 82.075 DC

Newton:
Angier ES

1697 Beacon Street
Waban, MA 02468

System Information:

Module Quantity: 245
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 82.075
kW AC: 73
Roof-Mounted

Project Milestones:	Date
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1/19 - 7/29/19
Project Completion:	8/31/19

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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #: MA-18-116		MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMIUTH: 137 & 147	TOTAL STRINGS: 14	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME: ANGIER ELEMENTARY SCHOOL		MODULE QUANTITY: 245	RACKING STRUCTURE: ROOF MOUNTED			DESIGNER: MP	
SITE ADDRESS: 1697 BEACON STREET NEWTON, MA		SYSTEM SIZE kW (DC): 82.075					
CLIENT NAME: THE CITY OF NEWTON		SYSTEM SIZE kW (AC): 73	INVERTER: SOLECTRIA PVI 50 & 23TL				SCALE: NTS

Newton:

Type: Roof-Mounted
kW: 118.925 DC

Williams ES

141 Grove Street
Auburndale, MA 02466

System Information:

Module Quantity: 355
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 118.925
kW AC: 101
Roof-Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1/19 - 7/29/19
Project Completion:	8/31/19

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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #: MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMIUTH: 139 & 199	TOTAL STRINGS: 20	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME: WILLIAMS ELEMENTARY SCHOOL	MODULE QUANTITY: 355	RACKING STRUCTURE: ROOF MOUNTED			DESIGNER: MP	
SITE ADDRESS: 141 GROVE STREET NEWTON, MA	SYSTEM SIZE kW (DC): 118.925	INVERTER: SOLECTRIA PVI 50, 28, & 23TL				
CLIENT NAME: THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 101					SCALE: NTS

Type: Canopy
kW: 339.69 DC

Newton:
Auburndale Cove

West Pine Street
Newton, MA 02466

System Information

Module Quantity: 1014
Module Type: Canadian Solar CS6U-335P
kW DC: 339.69
kW AC: 282
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/5 - 10/31/19
Project Completion:	11/15/19

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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMIUTH: 158 & 234	TOTAL STRINGS: 57	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	AUBURNDALE COVE	MODULE QUANTITY: 1014	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS:	WEST PINE STREET NEWTON, MA	SYSTEM SIZE kW (DC): 339.69	INVERTER: SOLECTRIA PVI 60, 50 & 36TL				
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 282					SCALE: NTS

Type: Canopy
kW: 524.61 DC

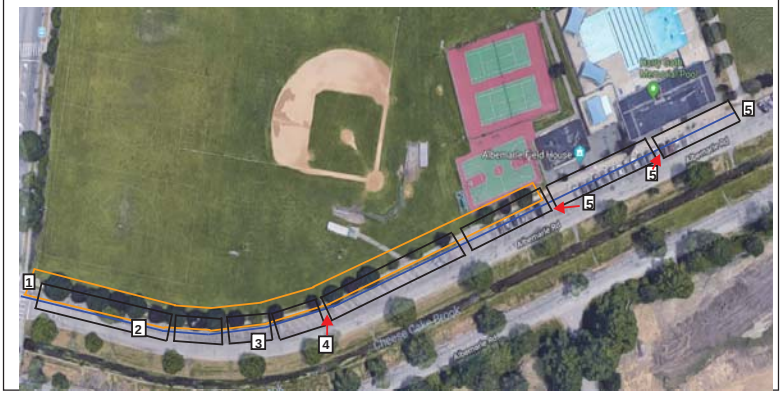
Newton:
Albermarle Road

250 Albermarle Road
Newton, MA 02459

System Information

Module Quantity: 1566
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 524.61
kW AC: 412
Canopy Mounted
Base Foundation: 36" above curb height
Interconnect Voltage: 277/480 VAC

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	8/31-10/31/19
Project Completion:	11/15/19



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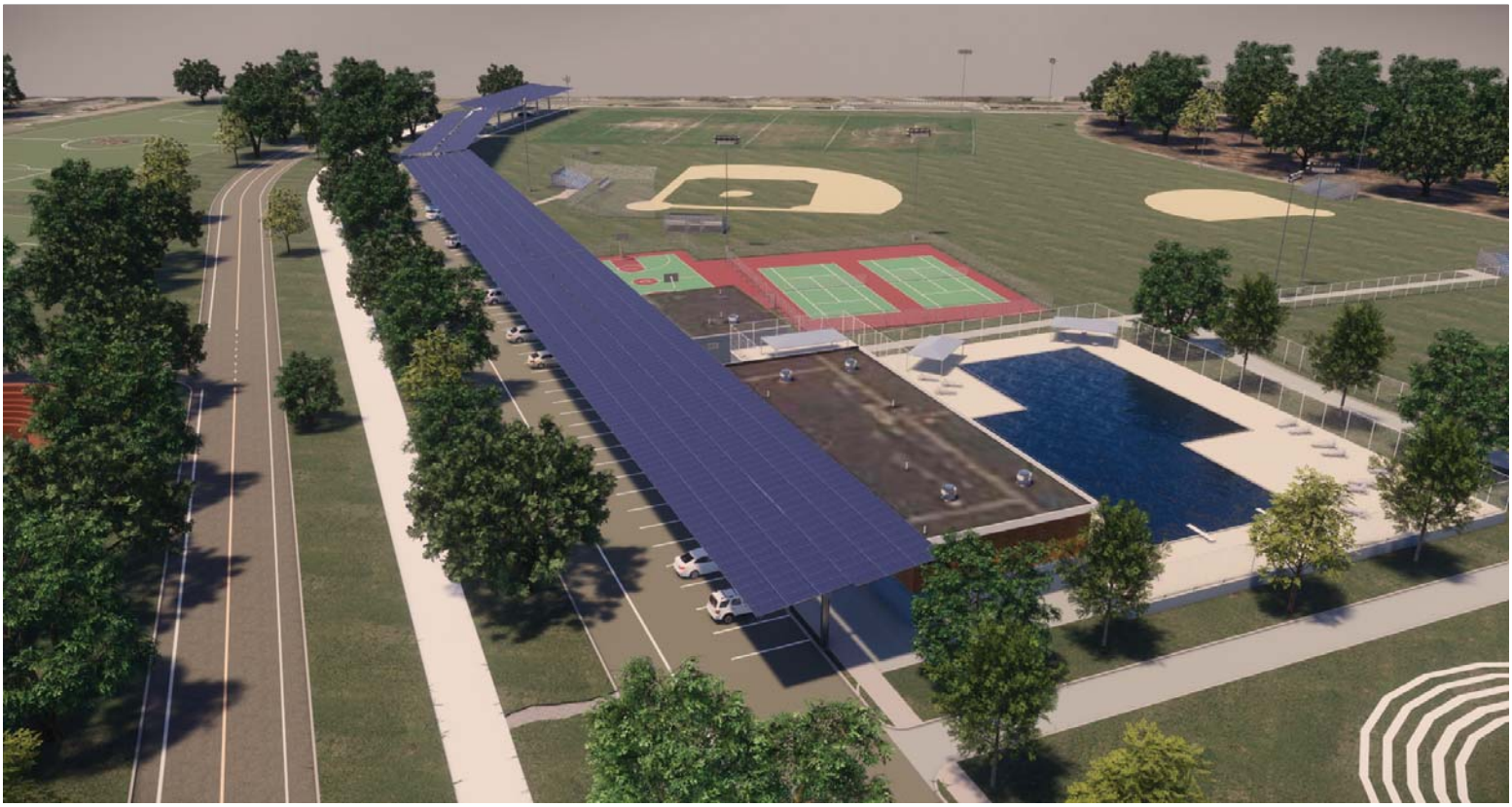
PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: Canadian Solar Inc., CS6U - 335P (335W)	TILT ANGLE: 7	AZIMIUTH: VARIES	TOTAL STRINGS: 88	DATE: 11.21.18	SHEET NO: PV 0
PROJECT NAME:	250 ALBERMARLE ROAD	MODULE QUANTITY: 1,566	RACKING STRUCTURE: CANOPY MOUNTED: T- & Y-FRAME STRUCTURES			DESIGNER: DG	
SITE ADDRESS:	250 ALBERMARLE ROAD NEWTON, MA 02460	SYSTEM SIZE kW (DC): 524.61					
CLIENT NAME:	CITY OF NEWTON	SYSTEM SIZE kW (AC): 412	INVERTER: SOLECTRIA PVI 36, 50 & 60TL				SCALE: NTS



Type: Canopy
kW: 102.51 DC

Newton:

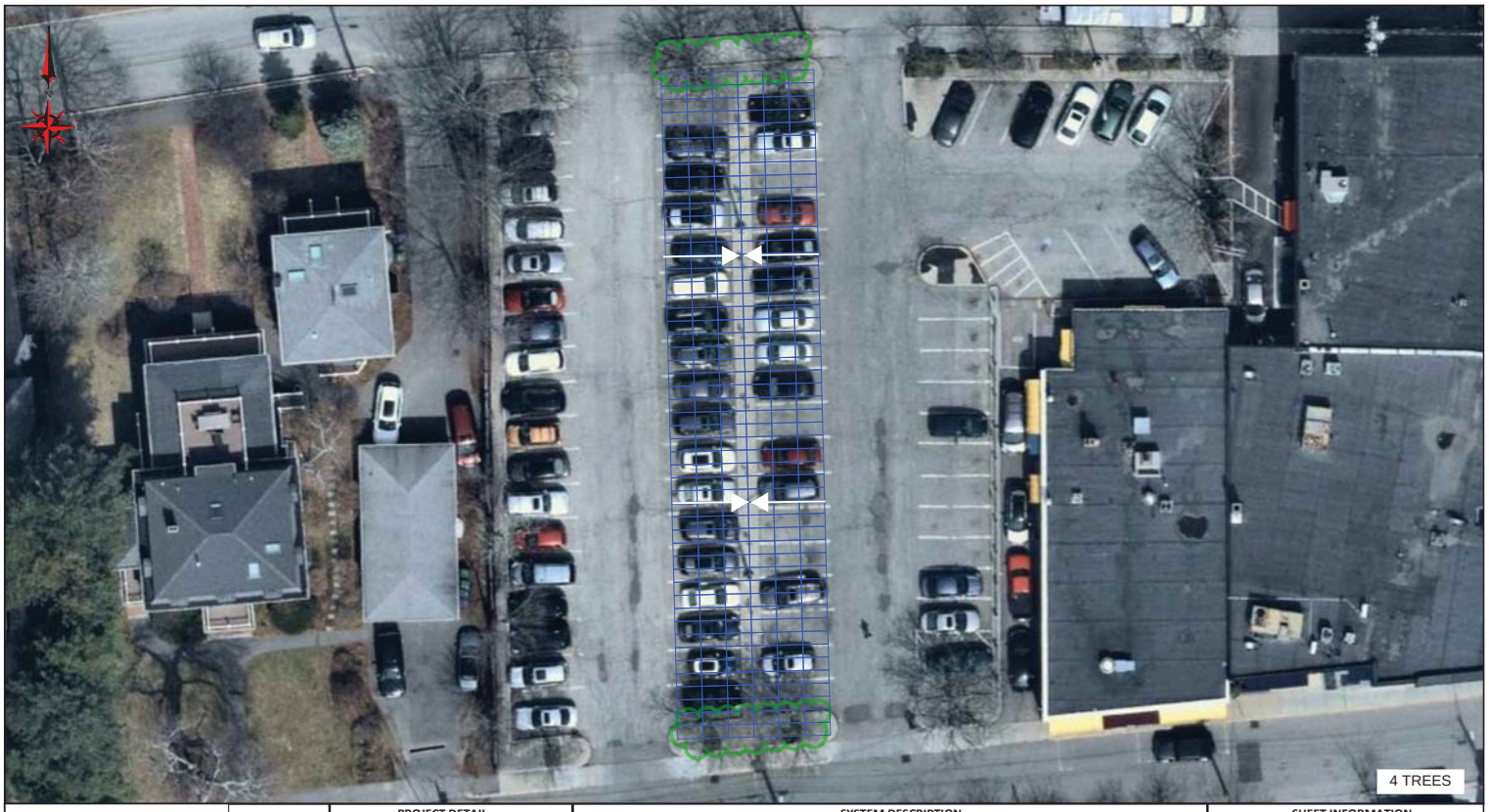
Pleasant Street Lot

26-28 Pleasant Street
Newton, MA 02459

System Information:

Module Quantity: 306
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 102.5
kW AC: 100
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	9/1-10/31/19
Project Completion:	11/15/19



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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMIUTH: 269	TOTAL STRINGS: 18	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	PLEASANT STREET LOT	MODULE QUANTITY: 306	RACKING STRUCTURE: CANOPY MOUNTED: Y-FRAME STRUCTURE			DESIGNER: MB	
SITE ADDRESS:	26-28 PLEASANT STREET NEWTON, MA	SYSTEM SIZE kW (DC): 102.51					
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 100	INVERTER: SOLECTRIA PVI 50TL				SCALE: NTS

Newton:

Brown Middle School

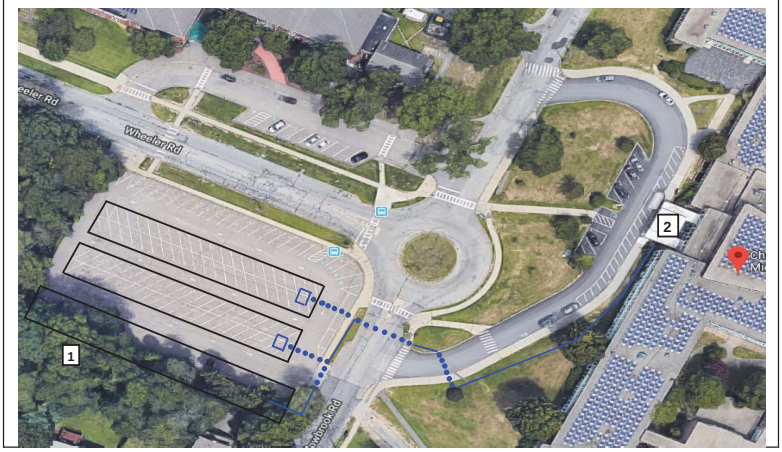
Type: Canopy
kW: 391.95 DC

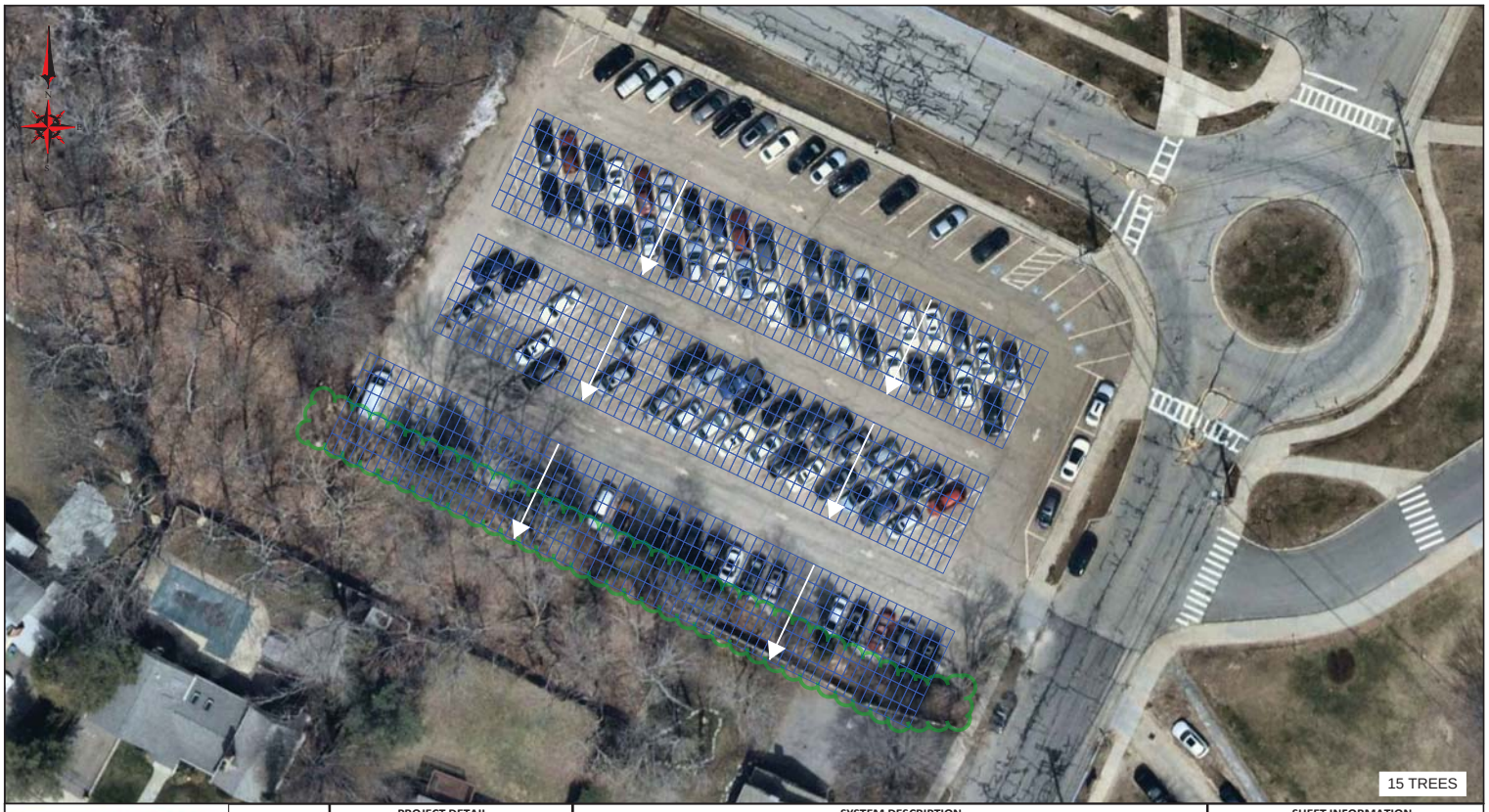
125 Meadowbrook Rd
Newton, MA 02459

System Information

Module Quantity: 1170
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 391.95
kW AC: 320
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/2-8/31/19
Project Completion:	9/30/19





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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMIUTH: 205	TOTAL STRINGS: 64	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	BROWN MIDDLE SCHOOL	MODULE QUANTITY: 1170	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS:	WHEELER ROAD NEWTON, MA	SYSTEM SIZE kW (DC): 391.95	INVERTER: SOLECTRIA PVI 60 & 50TL				
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 320					SCALE: NTS

Type: Canopy
kW: 158.79 DC

Newton:
Memorial Spaulding ES

250 Brookline Ave
Newton, MA 02459

System Information

Module Quantity: 474
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 158.79
kW AC: 136
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1-8/31/19
Project Completion:	9/30/19

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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMUTH: 263	TOTAL STRINGS: 27	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	MEMORIAL SPAULDING ES	MODULE QUANTITY: 474	RACKING STRUCTURE: CANOPY MOUNTED: T- & Y-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS:	250 BROOKLINE AVE NEWTON, MA	SYSTEM SIZE kW (DC): 158.79					
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 136	INVERTER: SOLECTRIA PVI 50 & 36TL				SCALE: NTS

Type: Canopy
kW: 176.88 DC

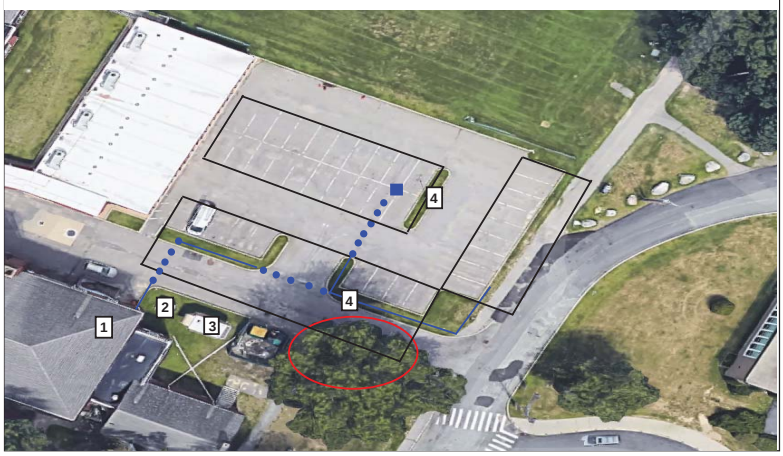
Newton:
Oak Hill MS

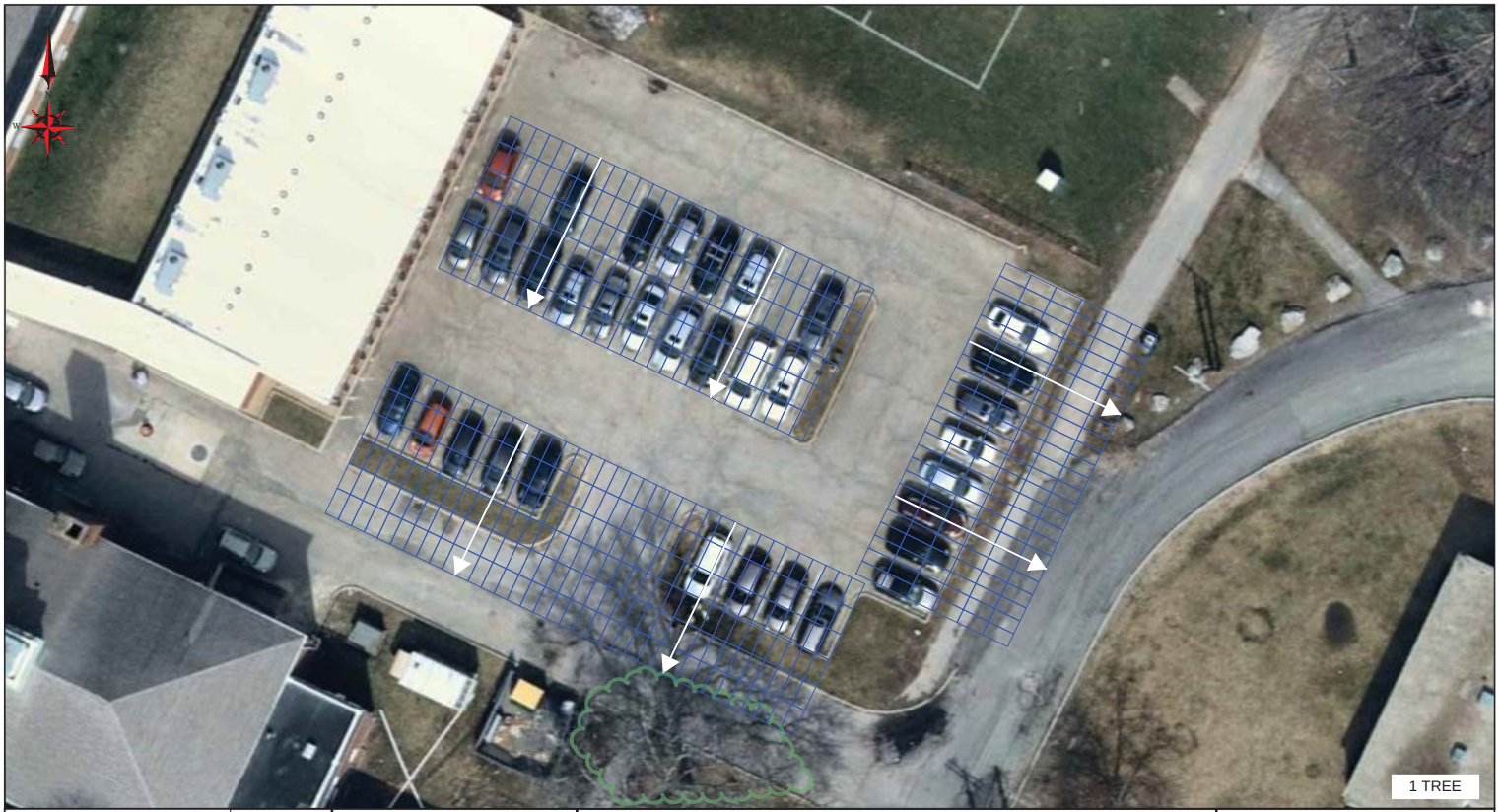
130 Wheeler Road
Newton, MA 02459

System Information

Module Quantity: 528
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 176.88
kW AC:146
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1-8/31/19
Project Completion:	10/1/19





HESP SOLAR

HESP SOLAR, LLC
400 Rella Blvd
Suite 160,
Suffern, NY 10901
www.hespsolar.com

PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMUTH: 205 & 116	TOTAL STRINGS: 29	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	OAK HILL MIDDLE SCHOOL	MODULE QUANTITY: 528	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS:	130 WHEELER ROAD NEWTON, MA	SYSTEM SIZE kW (DC): 176.88					
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 146	INVERTER: SOLECTRIA PVI 60, 50, & 36TL				SCALE: NTS

Type: Canopy
kW: 255.27 DC

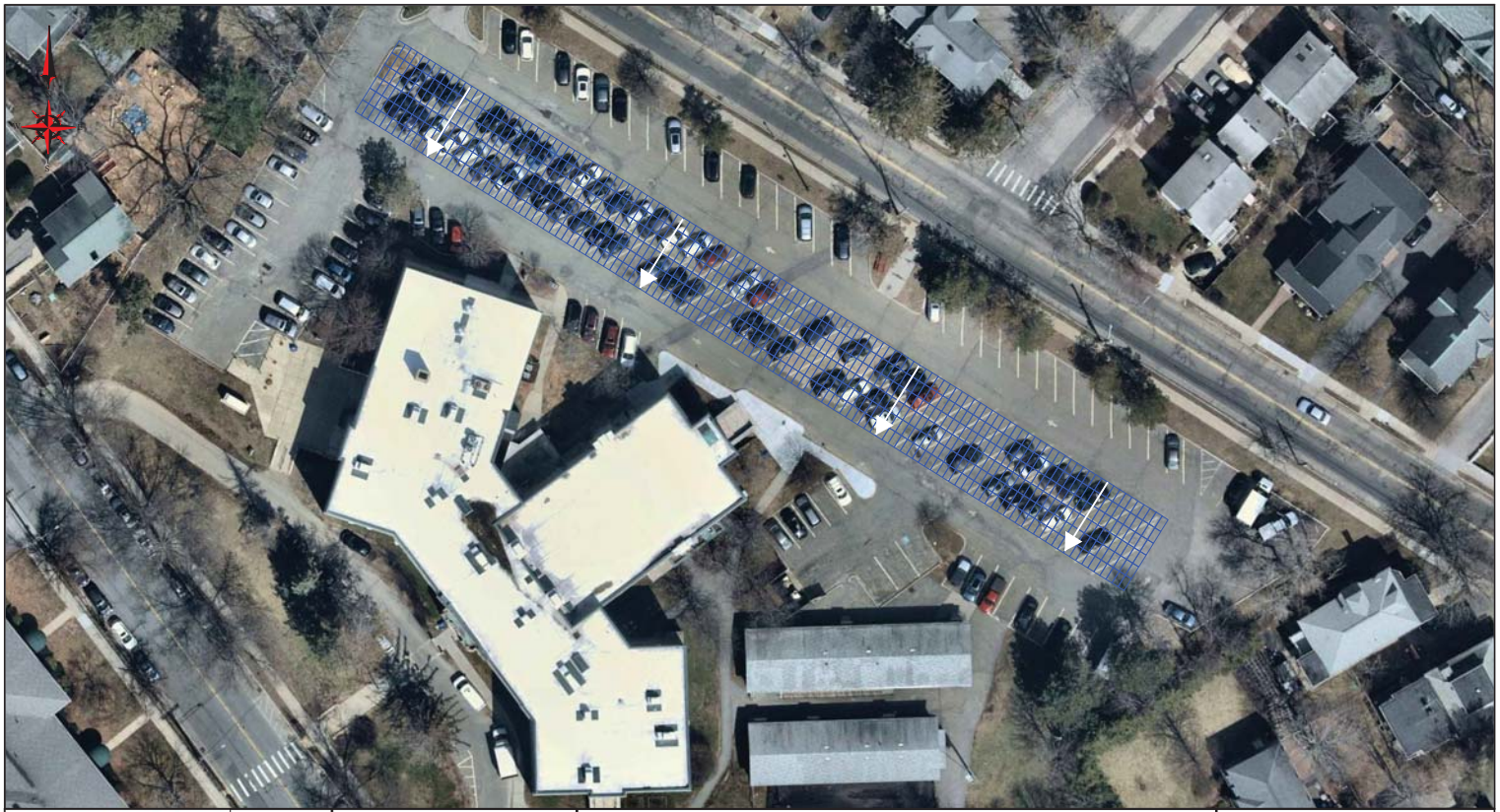
Newton:
Educational Center

100 Walnut Street
Newton, MA 02460

System Information:

Module Quantity: 762
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 255.27
kW AC: 240

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1-8/31/19
Project Completion:	9/3019



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400 Rella Blvd
Suite 160,
Suffern, NY 10901
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PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMUTH: 212	TOTAL STRINGS: 42	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	EDUCATIONAL CENTER PARKING	MODULE QUANTITY: 762	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURE			DESIGNER: MB	
SITE ADDRESS:	100 WALNUT STREET NEWTON, MA	SYSTEM SIZE kW (DC): 255.27					
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 240	INVERTER: SOLECTRIA PVI 60TL				SCALE: NTS

Type: Canopy
kW: 239.19 DC

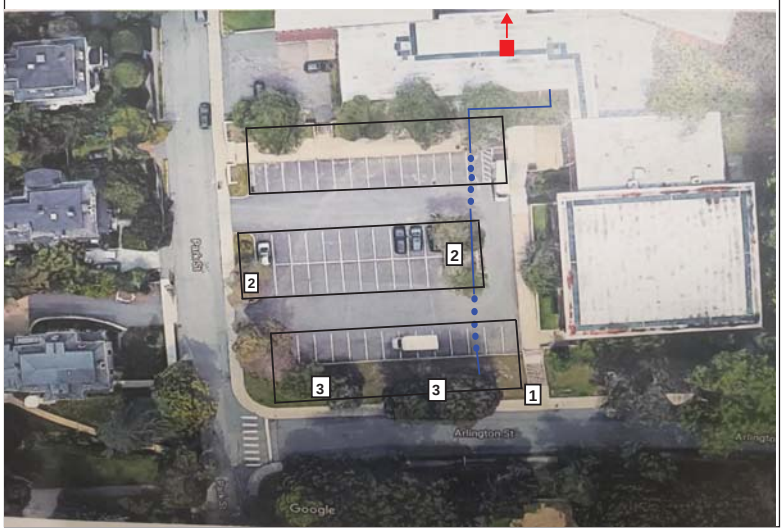
Newton:
Bigelow Middle School

42 Vernon Street
Newton, MA 02458

System Information

Module Quantity: 714
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 239.19
kW AC: 180
Canopy-Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1-8/31/19
Project Completion:	9/30/19



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400 Rella Blvd
Suite 160,
Suffern, NY 10901
www.hespsolar.com

PROJECT DETAIL		SYSTEM DESCRIPTION				SHEET INFORMATION	
PROJECT #:	MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMUTH: 175	TOTAL STRINGS: 39	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME:	BIGELOW MIDDLE SCHOOL	MODULE QUANTITY: 714	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS:	42 VERNON STREET NEWTON, MA	SYSTEM SIZE kW (DC): 239.19					
CLIENT NAME:	THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 180	INVERTER: SOLECTRIA PVI 60TL				SCALE: NTS

Type: Canopy
kW: 160.8 DC

Newton:
Mason Rice ES

149 Pleasant St
Newton Centre, MA 02459

System Information

Module Quantity: 480
Module Type: Canadian Solar Inc, CS6U-335P
kW DC: 160.8
kW AC: 132
Canopy Mounted

Project Milestone:	Date:
Engineering:	1/7/19
Interconnect Application:	12/31/18
Procurement of Material:	3/30/19
Delivery of Material:	6/26/19
Construction:	7/1-8/31/19
Project Completion:	9/30/19

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Suite 160,
Suffern, NY 10901
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PROJECT DETAIL		SYSTEM DESCRIPTION			SHEET INFORMATION	
PROJECT #: MA-18-116	MODULE TYPE: CANADIAN SOLAR INC., CS6U-335P	TILT ANGLE: 7	AZIMUTH: 157	TOTAL STRINGS: 26	DATE: 07.02.18	SHEET NO: PV 0
PROJECT NAME: MASON RICE ELEMENTARY SCHOOL	MODULE QUANTITY: 480	RACKING STRUCTURE: CANOPY MOUNTED: T-FRAME STRUCTURES			DESIGNER: MB	
SITE ADDRESS: 149 PLEASANT STREET NEWTON, MA	SYSTEM SIZE kW (DC): 160.8					
CLIENT NAME: THE CITY OF NEWTON	SYSTEM SIZE kW (AC): 132	INVERTER: SOLECTRIA PVI 60 & 36TL				SCALE: NTS

PatriotSolarGroup

Galactic

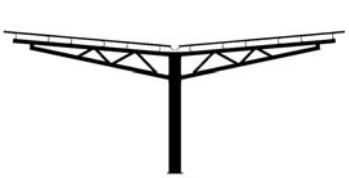
Solar Carport - T & Y Frame

GALACTIC
T- or Y-Frame Solar Carport - 33 or 36 Panel

Simple & Quick Installation

The Solar Carport is able to accommodate virtually any solar panel style and manufacturer and is comprised of all galvanized steel to protect it from corrosion. The purlin rail design allows for installers to mount panels from underneath the structure resulting in a major reduction in installation time and effort. Bolted rail and truss assembly eliminates costly welding requirements.

Side View



Key Features

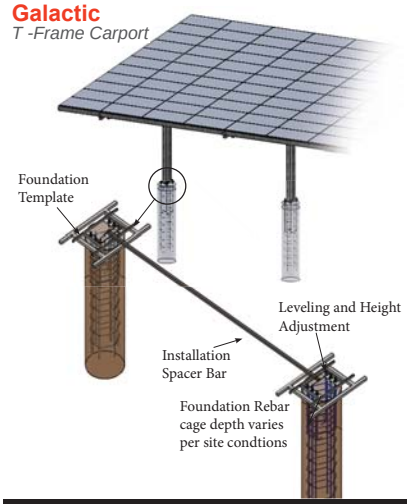
- Panel installation from under panels
- Galvanized and hot-dipped steel construction
- Bolted connection - no field welding
- Pre-wired foundation, bolt cage included
- Aesthetically pleasing clean design
- Material comes finished, no need for paint
- 20-year guarantee against mechanical failure (breakage) of the frame construction

"Your Single Solar Source"

SLR-MTCAR4-T 6-18

Galactic

T -Frame Carport



Technical Specifications

Application	Parking Area or Sidewalk
Foundation	Concrete
Modules per Section	33 Modules (6 tall x 5.5 wide) 36 Modules (6 tall x 6 wide)
Ground Space Per Section	Landscape - EW - 19' 4" NS - 36' 1" / 40' Portrait - EW - 18' or 19' 8" NS - 38' 5"
Module Orientation	Portrait or Landscape
Module Compatibility	All Major Brands - 60 & 72 Cell Modules
Tilt Angle Available	7° - Standard 5° - available upon order
Ground Clearance	Standard - 14' clearance
Wind Load	Up to 125 MPH *
Snow Load	Up to 50 PSF *
Post Spacing	19' 4" - Landscape 18', 19' 8" - Portrait
Cantilever	1 or 2 panels
Purlin Length	Landscape - 232" Portrait - 216"
Material Composition	Hot-Dipped Galvanized Steel, 16" I-Beam Post, Welded Girder Truss, Heavy C-Channel Purlin
Warranty	20 Years

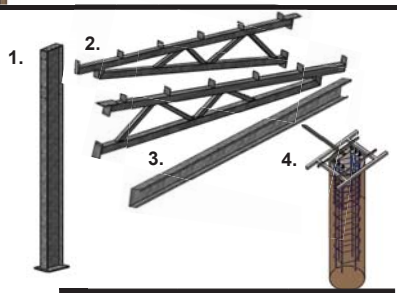
Major Components

1. Steel Post - 16" I-Beam
Multiple lengths available to meet various height clearances. Pre-punched holes for bolting carport truss. Foundation bolted with leveling adjustment and +/- 1" of height adjustment.

2. Bolted Truss - Girder Style
Pre-punched truss design allows for faster connection to post. Truss is designed for 5 or 7 degree tilt angle.

3. Purlin
Panels are installed in a matter of seconds without any top clamp hardware. Panels are attached from underneath the structure using bolts through the module mounting holes.

4. Foundation Rebar Cage
Pre-fabricated foundation rebar cages with welded J-bolts. Rebar cages are ready for installation upon arrival.

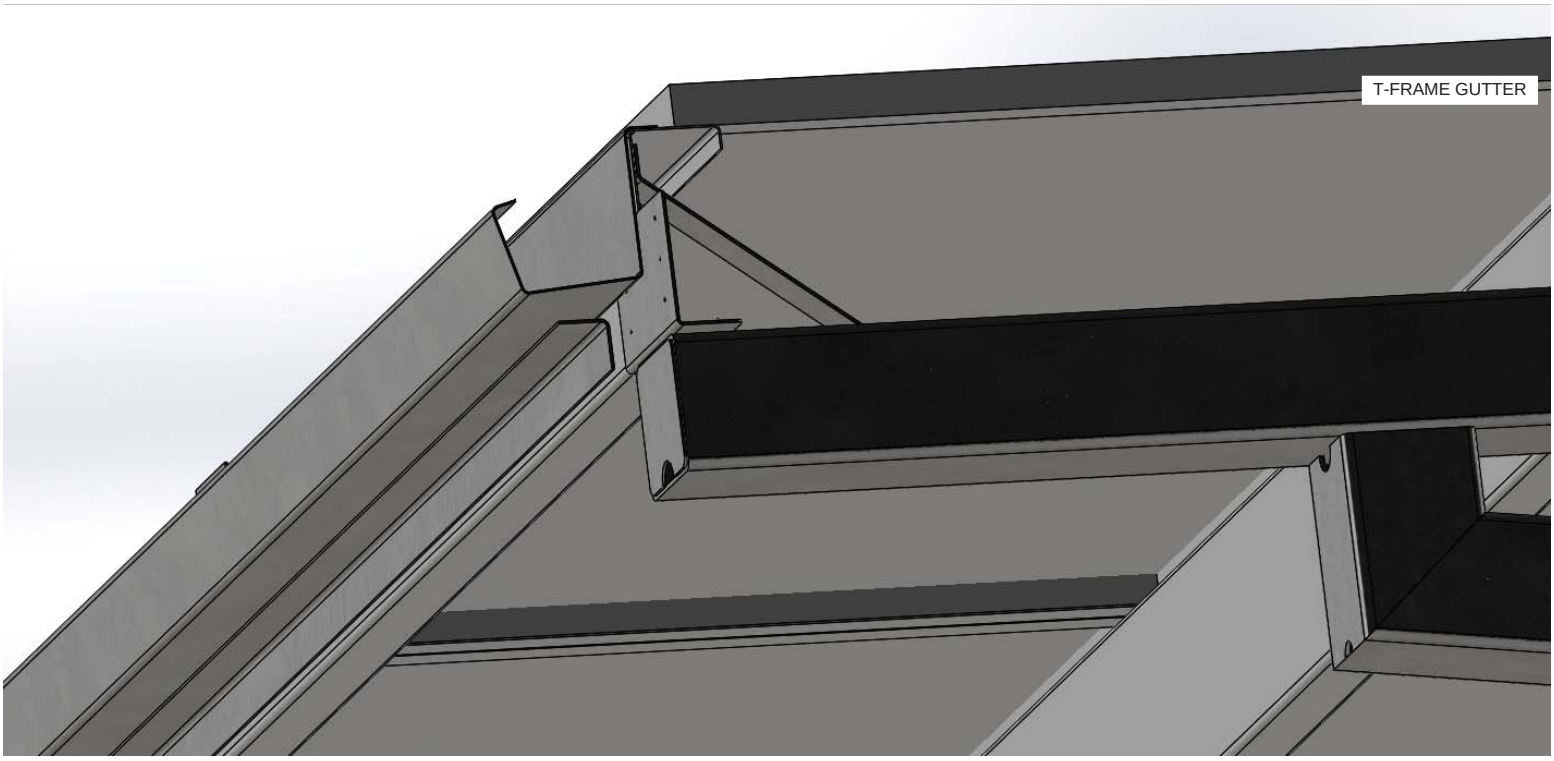


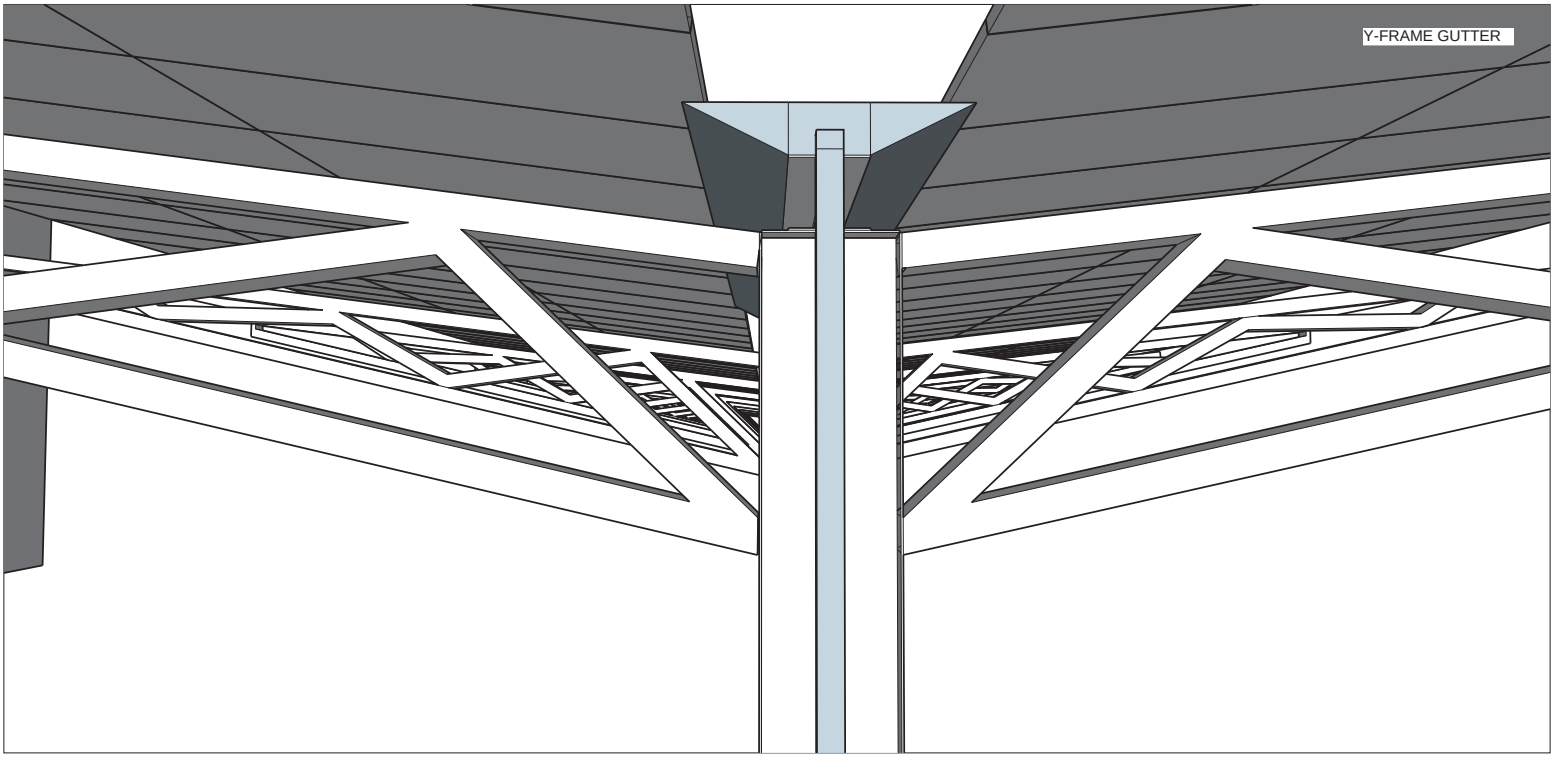
No.	Part	STARTER SECTION	ADD-ON SECTION
1.	Steel Post	2 pcs	1 pc
2.	Angle Truss	4 pcs	2 pc
3.	Stamped Purlin	12 pcs	12 pcs
4.	Foundation Cage Rebar Cage	2 pcs	1 pc
All assembly hardware included.			

*Snow loads are ground snow loads estimated at 7 deg.
*Wind loads are estimated at 7 deg.

*All specifications subject to change without notice.

PatriotSolarGroup
www.PatriotSolarGroup.com
1007 Industrial Blvd
Albion, Michigan 49224
(517) 629-9292
info@PatriotSolarGroup.com


T-FRAME GUTTER


Y-FRAME GUTTER

CITY OF NEWTON SOLAR PV-PHASE 3

DECEMBER 5, 2018

WE VALUE OUR LONGSTANDING RELATIONSHIP WITH THE CITY OF NEWTON

Project	Number of Sites	Size kW DC	Location	Financing	COD (mmm-yy)	Installation Type
City of Newton - Rumford Landfill (Phase 2)	1	2500	Newton, MA	PPA	Jun-17	Landfill
City of Newton - Phase 2	7	1278	Newton, MA	PPA	Jan-17	Roof and Canopy
City of Newton - Phase 1	4	686	Newton, MA	PPA	Dec-13	Roof Mounted

Phase 1: 4 Rooftops

- Brown Middle School
- Countryside Elementary School
- Memorial Spaulding Elementary School
- Newton North High School

Phase 2: 6 Rooftops + 2 Canopies

- Angier Elementary School
- Bowen Elementary School
- Oak Hill Middle School
- Newton South High School
- Lower Falls Community Center
- Fire Station 10
- DPW Canopy
- Newton South High School Canopy

PROJECT LOCATIONS – PHASE III

Site	DC Capacity (kW)	AC Capacity (kW)	Inverter (Qty) Model-(kW)	Racking Manufacturer	Racking Design	Electricity Production (kWh/year)	Trees Removed/ Diameter	Solar CO2E/ Acre Trees
Zervas ES Rooftop	181.67	167	(1) SolarEdge 100 kW (1) SolarEdge 66.6 kW	Ballasted PanelClaw	1-High Landscape	216,094	NA	189
F. A. Day MS Rooftop	253.82	233	(1) SolarEdge 100 kW (2) SolarEdge 66.6 kW	Ballasted PanelClaw	1-High Landscape	303,215	NA	266
Ed Center Rooftop	80.66	66.6	(1) SolarEdge 66.6 kW	Ballasted PanelClaw	1-High Landscape	95,799	NA	84
Fire Station 3 Rooftop	62.9	66.6	(1) SolarEdge 66.6 kW	Ballasted PanelClaw	1-High Landscape	77,395	NA	68
Library Lot Canopy	280.80	206	(2) Solectria PVI 60-TL (1) Solectria PVI 50-TL (1) Solectria PVI 36-TL	Sunpower Solaire 360D Dual-Tilt	Dual Tilt	326,023	12 trees/ 9.5" diameter	286
Newton North HS Lowell Ave. Canopy	491.79	366	(3) Solectria PVI 60-TL (3) Solectria PVI 50-TL (1) Solectria PVI 36-TL	Sunpower Solaire LongSpan	Dual Tilt	589,262	NA	517
Newton North HS Walnut St. Canopy	266.76	192	(2) Solectria PVI 60-TL (2) Solectria PVI 36-TL	Sunpower Solaire LongSpan	Dual Tilt	319,631	NA	280
Countryside Lot Canopy	336.96	240	(4) Solectria PVI 60-TL	Sunpower Solaire LongSpan	Dual Tilt	403,745	2 trees/ 5.5" diameter	354

Estimated Savings of 1735 Metric Tons CO_2 per year

Source: EPA GHG Equivalencies Calculator

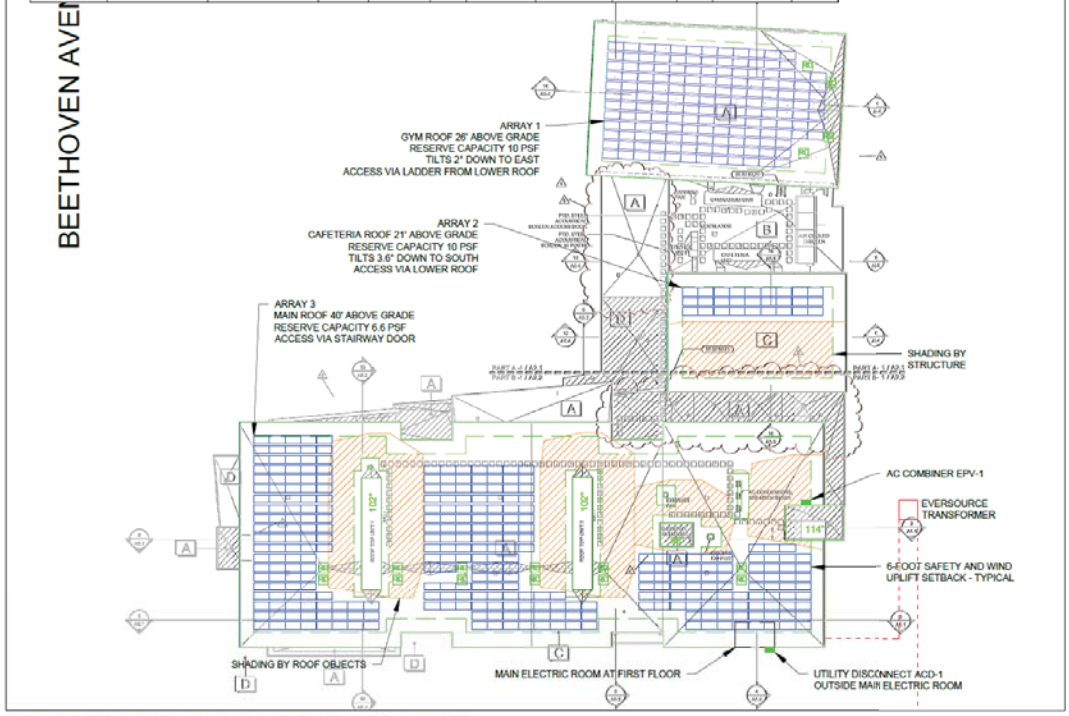
ZERVAS ELEMENTARY ROOFTOP

AMERESCO

POWER TABLE											
ARRAY				MOUNT			INVERTER				
LOCATION	# OF MODULES	MODULE TYPE	kWp	AZIMUTH	TILT	TYPE	TYPE	SIZE (kW)	QTY	EFFICIENCY	kW AC
ARRAYS 1-3	490	JAM6(K)-72-370/PR	181.30	170	5	BALLASTED	SOLAREDGE	100	1	98.5%	100
							SOLAREDGE	66.6	1	98.5%	67
TOTAL	490		181.30						2		167

NOT FOR CONSTRUCTION

NOTES:
1. SHADING PATTERN IS CALCULATED BASED ON JUNE 21ST FROM 7AM TO 5PM, FEBRUARY 21ST FROM 9AM TO 3PM, AND DECEMBER 21ST AT NOON, TAKING INTO ACCOUNT SITE LATITUDE AND LONGITUDE.
2. SHADING FOR OBJECTS NOT IMPACTING THE PV SYSTEM IS NOT SHOWN.



ZERVAS ELEMENTARY SCHOOL ROOFTOP - OVERALL ARRAY LAYOUT
SCALE: 1"=16' WHEN PRINTED 36" x 24"

SCALE: 1" = 16' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV 26, 2018
REVISIONS:

CITY OF NEWTON - PHASE 3 SOLAR
30 BEETHOVEN AVENUE
NEWTON, MASSACHUSETTS 02468

ZERVAS ELEMENTARY SCHOOL ROOFTOP PV ARRAY
181.30 kWp DC STC PV ARRAY (166.6 kW AC)

PHOTOVOLTAIC ARRAY LAYOUT

AMERESCO
111 Speen Street, Suite 410
Framingham, Massachusetts 01701
(508) 661-2200

E-100

F.A. DAY MIDDLE SCHOOL ROOFTOP

AMERESCO

AMERESCO

POWER TABLE

ARRAY				MOUNT			INVERTER				
LOCATION	# OF MODULES	MODULE TYPE	kWp	AZIMUTH	TILT	TYPE	TYPE	SIZE (kW)	QTY	EFFICIENCY	kW AC
ARRAY 1	306	JAM72S01-370/PR	113.22	197	5	BALLASTED	SolarEdge	100	1	98.5%	100
ARRAY 2	190	JAM72S01-370/PR	70.3	197	5	BALLASTED	SolarEdge	66.6	1	98.5%	67
ARRAY 3	190	JAM72S01-370/PR	70.3	197	5	BALLASTED	SolarEdge	66.6	1	98.5%	67
TOTAL	686		253.82						3		233

F. A. DAY MIDDLE SCHOOL - OVERALL ARRAY LAYOUT
SCALE: 1"=20' WHEN PRINTED 36" x 24"

NOT FOR CONSTRUCTION

NOTES:
1. SHADING PATTERN IS CALCULATED BASED ON JUNE 21ST FROM 7:00AM TO 4:00PM, FEBRUARY 21ST FROM 9AM TO 3PM, AND DECEMBER 21ST AT NOON, TAKING INTO ACCOUNT SITE LATITUDE AND LONGITUDE.
2. SHADING FOR OBJECTS NOT IMPACTING THE PV SYSTEM IS NOT SHOWN.
3. GROUND SNOW LOAD = 40 PSF, BASIC WIND SPEED = 100 MPH, EXPOSURE TYPE C.

SCALE: 1" = 20' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV 20, 2018
REVISIONS

CITY OF NEWTON - PHASE 3 SOLAR
21 MINOT PLACE
NEWTON, MASSACHUSETTS 02460

F. A. DAY MIDDLE SCHOOL ROOFTOP PV ARRAY
253.82 kWp DC STC PV ARRAY (233 kW AC)

PHOTOVOLTAIC ARRAY LAYOUT

AMERESCO
111 Speen Street, Suite 410
Framingham, Massachusetts 01701
(508) 661-2200

E-100

EDUCATION CENTER ROOFTOP

AMERESCO

AMERESCO

POWER TABLE

ARRAY				MOUNT			INVERTER				
LOCATION	# OF MODULES	MODULE TYPE	kWp	AZIMUTH	TILT	TYPE	TYPE	SIZE (kW)	QTY	EFFICIENCY	kW AC
ARRAYS 1-4	218	JAM6(K)-72-370/PR	80.66	VARIES	5	BALLASTED	SolarEdge	66.6	1	98.0%	66.6
TOTAL	218		80.66						1		66.6

NOT FOR CONSTRUCTION

NOTES:

1. SHADING PATTERN IS CALCULATED BASED ON JUNE 21ST FROM 7:30AM TO 4:30PM, FEBRUARY 21ST FROM 9AM TO 3PM, AND DECEMBER 21ST AT NOON, TAKING INTO ACCOUNT SITE LATITUDE AND LONGITUDE.
2. SHADING FOR OBJECTS NOT IMPACTING THE PV SYSTEM IS NOT SHOWN.
3. GROUND SNOW LOAD = 40 PSF, BASIC WIND SPEED = 105 MPH, EXPOSURE TYPE C.

EDUCATION CENTER - OVERALL ARRAY LAYOUT
SCALE: 1"=16' WHEN PRINTED 36" x 24"

1" = 16'

SCALE: 1" = 16' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV. 27, 2018
REVISIONS:

CITY OF NEWTON - PHASE 3 SOLAR
100 WALNUT STREET
NEWTON, MASSACHUSETTS 02460

EDUCATION CENTER ROOFTOP PV ARRAY
80.66 kWp DC STC PV ARRAY (66.6 kW AC)

PHOTOVOLTAIC ARRAY LAYOUT

AMERESCO
111 Speen Street, Suite 410
Framingham, Massachusetts 01701
(508) 661-2200

E-100

FIRE STATION 3 ROOFTOP

AMERESCO

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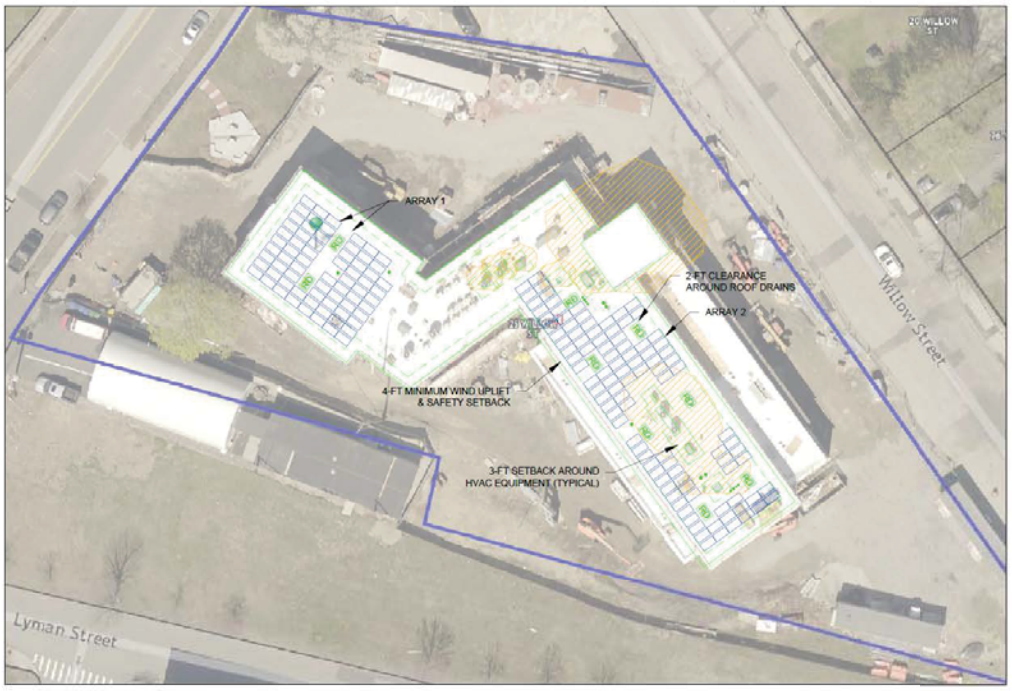
POWER TABLE

ARRAY				MOUNT			INVERTER				
LOCATION	# OF MODULES	MODULE TYPE	kWp	AZIMUTH	TILT	TYPE	TYPE	SIZE (kW)	QTY	EFFICIENCY	kW AC
ARRAYS 1 & 2	171	JAM6(K)-72-370/PR	63.27	VARIES	5	BALLASTED	SolarEdge	66.6	1	98.0%	67
TOTAL	171		63.27						1		67

NOT FOR CONSTRUCTION

NOTES:

1. SHADING PATTERN IS CALCULATED BASED ON JUNE 21ST FROM 7:30AM TO 4:30PM, FEBRUARY 21ST FROM 9AM TO 3PM, AND DECEMBER 21ST AT NOON, TAKING INTO ACCOUNT SITE LATITUDE AND LONGITUDE.
2. SHADING FOR OBJECTS NOT IMPACTING THE PV SYSTEM IS NOT SHOWN.
3. GROUND SNOW LOAD = 40 PSF, BASIC WIND SPEED = 100 MPH, EXPOSURE TYPE C.



FIRE STATION #3 AND HEADQUARTERS - OVERALL ARRAY LAYOUT
SCALE: 1"=16' WHEN PRINTED 36" x 24"

CITY OF NEWTON - PHASE 3 SOLAR
1164 CENTRE STREET
NEWTON, MASSACHUSETTS 02459

FIRE STATION #3 ROOFTOP PV ARRAY
63.27 KWh DC STC PV ARRAY (66.6 KW AC)

PHOTOVOLTAIC ARRAY LAYOUT

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NEWTON NORTH HS LOWELL AVE. CANOPY

AMERESCO

NEWTON NORTH HS WALNUT ST. CANOPY

AMERESCO

COUNTRYSIDE LOT CANOPY

AMERESCO

LIBRARY LOT CANOPY

AMERESCO

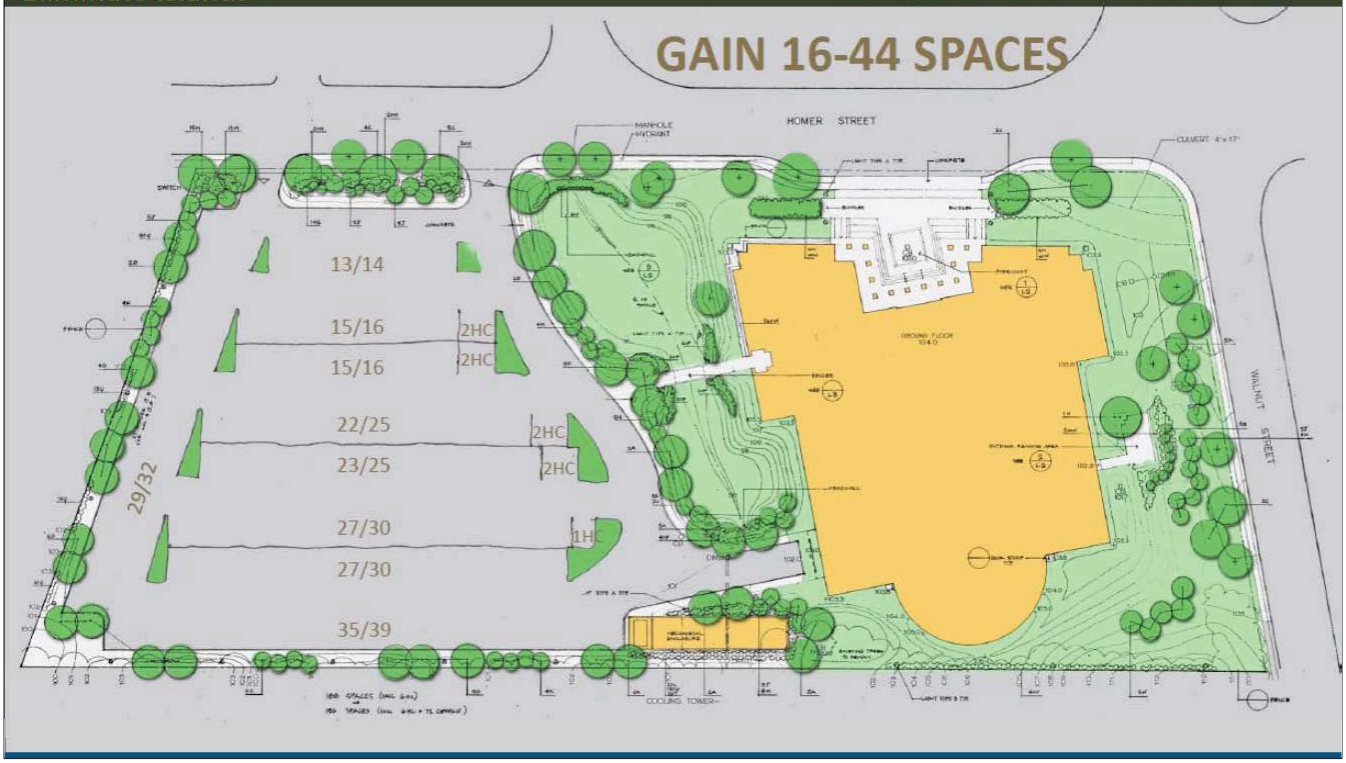
PHASE II | Site Options

Newton Free Library
Turowski2 Architecture
Newton, MA

PROPOSED PARKING CONFIGURATION
Eliminate Islands

206 spaces @ 9' wide
227 spaces @ 8' wide
7 handicapped spaces

Total: 213 spaces @ 9' wide
Total: 234 spaces @ 8' wide



SUNPOWER®
*Patent Pending : 514202US

Newton Free Library

AMERESCO
Green • Clean • Sustainable

SOLAR CANOPY BENEFITS

- Reduction in electricity costs
- Protect against rising energy costs
- Reduce impact to the environment via carbon emission reductions
- Make efficient use of urban space
- Provides shading and precipitation protection
- Configured for EV charging readiness

THANK YOU

Steve McDonough
Senior Development Manager
111 Speen Street, Suite 410
Framingham, MA 01701
Ph: 413-209-1608
Email: smcdonough@Ameresco.com

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