Newton City Council

Committee of the Whole Agenda

Wednesday, January 16, 2019

Council Chamber
7:00 PM

The City Council will meet in a Committee of the Whole with Public Facilities presiding on Wednesday, January 16, 2019 at 7:00 pm, in the Council Chamber, Second Floor, City Hall, 1000 Commonwealth Avenue, to conduct a Public Hearing on the proposed lease negotiations for Solar Phase III projects.

#23-19 **Authorization to enter into lease negotiations for Solar Phase III project sites**
HER HONOR THE MAYOR requesting authorization to enter into negotiations for the potential lease on 18 municipal and school properties for purposes of third-party construction, ownership, and operation of on-site renewable solar energy generation from which the City will purchase electric output and/or net metering credits.

Locations:

Brown Middle School Parking Lot	Oak Hill Middle School Parking Lot
Memorial Spaulding Elementary School Parking Lot	Education Center Parking Lot
Bigelow Middle School Parking Lot	Mason Rice Elementary School Parking Lot
Newton North High School Parking Lots	Pleasant Street Parking Lot
Newton Free Library Parking Lot	Auburndale Cove Parking Lot
Fire Station #3 and Headquarters Roof	Zervas Elementary School Roof
FA Day Middle School Roof	Angier Elementary School Gym Roof
Williams Elementary School Roof	Cabot Elementary School Gym Roof
Carr School Roof	Education Center Roof

The location of this meeting is accessible and reasonable accommodations will be provided to persons with disabilities who require assistance. If you need a reasonable accommodation, please contact the city of Newton's ADA Coordinator, Jini Fairley, at least two business days in advance of the meeting: jfairley@newtonma.gov or (617) 796-1253. The city's TTY/TDD direct line is: 617-796-1089. For the Telecommunications Relay Service (TRS), please dial 711.

Shawna Sullivan

From: Jonathan Yeo
Sent: Thursday, January 10, 2019 9:38 PM
To: City Council
Cc: Ann G. Berwick; William Ferguson; Shawna Sullivan; MayorsOffice
Subject: January Revisions to Solar Phase 3 Project for 1/16 Public Presentation and Hearing

Councilors:
In advance of the Solar Phase 3 presentation and public meeting next Wednesday, the City's project consultants and Sustainability team have completed revisions to the proposal. The "January Updates and Revisions" section at http://www.newtonma.gov/gov/building/solar_phase_3.asp has nine attachments for your review. They are:

"January Project Update Sustainability Office" is an overview of project revisions: www.newtonma.gov/civicax/filebank/documents/94535
"January Update The Basics" is summary of the program: www.newtonma.gov/civicax/filebank/documents/94536
"kWh-KW Phase 3 Sites Rev" shows the electric production by site: www.newtonma.gov/civicax/filebank/documents/94538
"Solar kWh as %" shows the site electric production as a % of facility use: www.newtonma.gov/civicax/filebank/documents/94540
"Carbon Analysis Update" shows the carbon emissions impacts: www.newtonma.gov/civicax/filebank/documents/94534
"Phase 3 Tree Plan 1-10-19" shows the greatly changed impacts on trees: www.newtonma.gov/civicax/filebank/documents/94539
"January Update Ameresco" shows details on their site deployments: www.newtonma.gov/civicax/filebank/documents/94537
"January Update Macquarie Part 1" shows details on their site deployments: www.newtonma.gov/civicax/filebank/documents/94541
"January Update Macquarie Part 2" shows details on sites plus all the tree impact photos: www.newtonma.gov/civicax/filebank/documents/94542

The revisions represent changes made to the December proposal as a result of comments at three well-attended public meetings, public emails, site visits, and further consultant engineering and analysis. Two sites were eliminated (Albemarle and Bigelow), solar canopies were moved at several parking lots, and many trees were left intact as a result. There were originally estimated to be 94 trees impacted and the new proposal has reduced that to 28. Of those, 15 will be moved and only 13 cut. Based on the sizes of the cut trees, there will be about 140 new replacement trees planted as part of the contract with Ameresco and Macquarie. The City Forester Marc Welch will determine where the new trees will be planted. The electrical generation from these sites will be significant for the City, both from a local generation standpoint (36% of the local site demand) and from a carbon emissions impact perspective (2,192 tons of CO_2 per year avoided).

Please let us (myself, Bill Ferguson, Ann Berwick) know if you have any questions,

Jonathan

PROPOSED PHASE 3 SOLAR SITES rev 1-8-2019

	Ameresco projects
	Macquarie projects

	Roof Sites	Total First Year Output (kWh)	KW (AC)	KW (DC)	Location
1	Ed Center roof, 100 Walnut St.	95,799	67	81	Roof
2	Fire Station #3 and Headquarters, 31 Willow Street	77,395	67	63	Roof
3	Zervas Elementary School, 30 Beethoven Ave	216,094	167	182	Roof
4	FA Day Middle School roof, 21 Minot Place	303,215	233	254	Roof
5	Angier Elementary School Gym roof, 1697 Beacon St	102,448	73	91	Roof
6	Cabot gym roof, 229 Cabot School	75,582	50	64	Roof
7	Carr School, 225, Nevada Street	75,651	50	65	Roof
8	Williams Elementary School, 141 Grove Street	152,891	101	131	Roof
	Total Phase 3 Roof sites kWh	**1,099,075**			

	Parking Lot Canopy Sites				
9	Education Center parking lot, 100 Walnut St. (Crafts St side)	333,817	240	282	Parking lot
10	Oak Hill MS parking lot, 130 Wheeler Road, behind Oak Hill Middle School	192,208	136	164	Parking lot
11	Memorial Spaulding Elementary School parking lot, 250 Brookline Ave	197,303	136	175	Parking lot
12	Pleasant Street lot,Newton Centre	121,725	100	109	Parking lot
13	Mason Rice Elementary School Parking lot, 149 Pleasant St	195,822	136	164	Parking lot
14	North High School, Lowell Ave	589,262	366	492	Parking lot
	North High School, Walnut Street	319,631	192	267	Parking lot
15	Brown Middle School lot, corner of Meadowbrook Road and Wheeler Road	447,572	320	380	Parking lot
16	Auburndale Cove, West Pine St.	420,779	282	360	Parking lot
17	Newton Free Library, 330 Homer Street	415,000	260	334	Parking lot
	Total Phase 3 Canopy sites kWh	**3,233,119**			

	Phases	Annual kWh			Per Cent of Municipal Use
	Phase 3 Total kWh-design	4,332,194			21%
	Phase 2 Total kWh-actual	3,773,369			18%
	Phase 1 Total kWh-actual	622,475			3%
	All Phases kWh	8,728,038			**42%**
	Municipal Total Use kWh	**20,600,000**			

Acres of forest equivalent in terms of carbon sequestration for Phase 3: 2,264

PROPOSED PHASE 3 SOLAR SITES

	Ameresco projects
	Macquarie projects

	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	77,395	Roof
3	Zervas Elementary School, 30 Beethoven Ave	216,094	Roof
4	FA Day Middle School roof, 21 Minot Place	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	326,023	Parking lot
10	North High School lots, 360 Lowell Ave and Walnut Street	908,913	Parking lot
11	Auburndale Cove, West Pine St.	398,677	Parking lot
12	Pleasant Street lot,Newton Centre	114,709	Parking lot
13	Brown Middle School lot, corner of Meadowbrook Road and Wheeler Road	466,029	Parking lot
14	Memorial Spaulding Elementary School parking lot, 250 Brookline Ave	178,639	Parking lot
15	Oak Hill MS parking lot, 130 Wheeler Road, behind Oak Hill Middle School	208,718	Parking lot
16	Education Center parking lot, 100 Walnut St. (Crafts St side)	302,240	Parking lot
17	Bigelow Middle School parking lot, Park Street (behind Bigelow School)	286,550	Parking lot
18	Mason Rice Elementary School Parking lot, 149 Pleasant St	191,674	Parking lot
	Total Phase 3 Canopy sites kWh	**3,382,172**	

	Phases	Annual kWh	Per Cent of Municipal Use
	Phase 3 Total kWh-design	4,445,414	22%
	Phase 2 Total kWh-actual	3,773,369	18%
	Phase 1 Total kWh-actual	622,475	3%
	All Phases kWh	8,841,258	**43%**
	Municipal Total Use kWh	**20,600,000**	

Acres of forest equivalent in terms of carbon sequestration for Phase 3: 2,265

OFFICE OF SUSTAINABILITY

JANUARY UPDATE

SOLAR PHASE 3: The Basics

The Basics of Global Warming

- Carbon emissions are the primary cause of global warming. Much of this carbon comes from electric power plants.
- The 4th National Climate Assessment report concludes that temperature rise could reach 9.5 degrees Fahrenheit by the end of this century. Aggressive action will be required to reverse this trend.
- The effects of global warming include sea level rise, extreme weather, drought, forest fires, and floods.
- The World Bank says that 143 million people could be displaced internally by 2050 due to sea level rise, drought, famine.
- Phase 3 Solar includes 17 locations around the city. It will generate carbon free electricity in place of electricity from fossil fuels. This will offset 2,192 tons of carbon emissions annually. The equivalent of 2,340 acres of forest and reducing VMT by 4,861,000 miles.

Why the City of Newton? Why Not Let Someone Else Do It?

- Answer: every single one of us needs to take individual action. Not just the City.
- We all have to be in this together and collectively to make an impact.
- It is more important than ever to take action on the state, local and individual level due to a lack of national leadership.
- State and local governments can provide a clear plan, a regulatory framework to support a plan, financial incentives, guidance, encouragement and leadership.
- With Phase 3 solar, we are trying to provide leadership that shows that we walk the talk and to show how to do it.
- This will put us in a better position to assist, encourage and secure commitments from businesses, non-profits and residents.
- The Mayor's Climate Action Plan will set climate goals for the community and spell out actions for attaining these goals.

How Urgent Is It To Take Action?

- It is very urgent. Why?
- Partly because it is so hard to do. And while we are trying to do it the situation is getting worse.
- Financial consideration for Phase 3 Solar: the State's financial incentives decline over time.

The City's Progress in Reducing its Electricity Carbon Footprint

- Reduction in electricity use since 2008: 20%
- Solar energy since 2013, Phases 1 and 2: 21%
- Phase 3 Solar: 21%

PPA (Purchase Power Agreement) Basics

- 20 year contracts.
- The project economics are based on the State's solar incentive programs.

- Solar company responsibilities:
  - Design, finance, own, maintain and operate.
  - Provide a minimum performance guarantee.

- City responsibilities:
  - Provide site.
  - Review and approve project designs.
  - Provide access to site for maintenance and operation.
  - Purchase electricity generated by the projects at a reduced cost.

Procurement Basics

- RFP issued by City Purchasing in July 2018.
- Reviewed by each member of the evaluation committee independently.
- Two-part evaluation:
  - Technical Evaluation and Qualifications of proposer: This carried the most weight.
  - Pricing: Pricing information is withheld from the evaluation committee until all members submit their Technical evaluations. Analysis of pricing by Cadmus. This analysis is then reviewed independently by each member of the evaluation committee.
- CPO then compiles the results.
- Two firms were selected in order to mitigate the City's risk. We did not want to put all of our eggs in one basket.

South High School

Solar Canopies on line since January 2017

SOUTH HIGH SCHOOL

Solar canopies on line since January 2017

OFFICE OF SUSTAINABILITY

JANUARY UPDATE 1-10-2019

SOLAR PHASE 3: The Projects

Community Meetings Held

- December 11th and 12th at the War Memorial Auditorium from 6:30 to 9:00 pm with a presentation and public comments on all projects.
- December 18th, 2018 at the Newton Free Library from 630 to 9:00 pm with a focus on the library project.
- Meetings were well attended and all attendees were given a chance to speak at least once.
- We have made revisions to the scope and design as a result of comments made during these meetings.

The City's Progress in Reducing its Electricity Carbon Footprint

- Reduction in electricity use since 2008: 20%
- Solar energy since 2013, Phases 1 and 2: 21%
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  - Provide a minimum performance guarantee.

- City responsibilities:
  - Provide site.
  - Review and approve project designs.
  - Provide access to site for maintenance and operation.
  - Purchase electricity generated by the projects at a reduced cost.

Project Scope Revisions

- March 14, 2018-

  List presented to PF included 40 locations
- July 2018-

  RFP included 26 locations.
- Revised to 19 after review of proposals.
- Revised to 17 locations after Community Meetings

Projects Removed from Scope After Community Meetings

- Albemarle Road- 26 trees
- Bigelow Middle School-10 trees

Projects Redesigned After Community Meetings

- Auburndale Cove canopy- 6 trees to 1 tree removed
- Brown Middle School- 15 trees to 1 tree removed
- Oak Hill Middle School- 1 tree to 0 trees removed
- Pleasant St lot- 4 trees to 2 trees removed
- Newton Free Library- add 24 to 36 parking spaces.

  Will move 5 of the 12 impacted trees.

  Will plant 68 replacement trees.

Tree Plan

- The original proposals called for removal of 94 trees.
- The revised scope of projects calls for removal of 28 trees.
- 15 of these will be moved. 13 will be cut down.
- 140 new trees will be planted.
- 10 trees will be trimmed

Carbon Reduction from Solar Phase 3

- Solar Phase 3 will generate carbon free electricity in place of electricity generated from fossil fuels.
- It will offset 2,192 tons of carbon emissions.
- Equivalent to 2,340 acres of forest.
- Equivalent to reducing vehicle miles travelled by 4,861,000 miles.
- This will be the largest single project for carbon impact done by the City for municipal sites.

Solar Phase 3 Carbon Emissions Impacts

Expected Energy Generation Year 1	Tree Removal		Avoided CO_2 Emissions	Equivalent to Carbon Sequestration by	Equivalent to
MWh/year	Number of Potential Trees Removed	Annual Carbon Sequestration Lost (tons CO_2)	Tons CO_2/year	Acres of U.S. Forest	Miles driven by an average passenger vehicle
4,333	13	2.94	2,192	2,340	4,861,978

Cadmus conducted an analysis of the Carbon Dioxide Emissions impacts of the Solar Phase 3 Sites. The team utilized the EPA's Avoided Emissions and Generation Tool (AVERT) to calculate regional avoided emissions based on kW capacity (AC). The team utilized the USDA's CUFR Tree Carbon Calculator for carbon sequestration potential of removed trees (using developer assumptions). The team utilized the EPA's Greenhouse Gas Equivalencies Calculator to generate equivalencies.

Oak Hill Middle School-Redesign

- Shift location of one canopy to avoid tree shading.
- Remove no trees instead of one.
- Solar will generate 192,208 kWh which is 31% of the school's electricity use.

Brown Middle School-Redesign

- Remove canopy row closest to the trees at edge of parking lot.
- Add a canopy in front of entrance to Brown School.
- Remove or relocate one tree instead of 20 .
- If removed, replace with 7 trees on site.
- Solar will generate 447,572 which is the second largest of all the sites.
- This is 96% of the schools electricity use.

Auburndale Cove- Redesign

- Shorten solar canopy layout on west side
- Remove 1 tree instead of 6
- Plant 24 trees in park area beyond right field of baseball field
- Will generate 420,779 kWh which is the third highest of all 17 sites.

Newton Free Library- Redesign

- Remove berms to increase parking.
- Add 24 parking spaces with two walkways. Add 36 without walkway.
- Improve water management.
- Move 5 trees and replace 7 trees with 68 trees.
- 3 to 4 trees can be relocated on site. The remaining trees will be replanted or relocated in the area.
- Add three solar parking canopies which will generate 415,000 kWh per year which is the fourth largest of all the sites.
- About 49% of the Library's use.
- Library Board of Trustees has given conditional approval.

Projects Connected to Buildings

Solar Project Meeting Building Demand	FY 2018		
Facility	kWh	Solar kWh	%
Newton North HS canopies	3,896,363	908,893	23%
Brown Middle School canopies	464,764	447,572	96%
Education Center roof and canopies	802,013	429,616	54%
Main Library canopies	839,940	415,000	49%
F A Day MS roof	1,198,428	303,215	25%
Zervas New School roof	543,408	216,094	40%
Memorial Spaulding ES canopies	237,760	197,303	83%
Mason-Rice ES canopies	224,760	195,822	87%
Oak Hill MS canopies	620,468	192,208	31%
Williams ES roof	174,440	152,891	88%
Angier Elementray School roof	450,672	102,448	23%
FD 3# and HQ New roof	484,200	77,395	16%
Carr School roof	260,560	75,651	29%
Cabot New School roof	463,606	75,582	16%
Total	10,661,382	3,789,690	36%

EV Charging Stations

- At least 10% of the parking spaces under the canopies will be EV charging station ready.

South High School

Solar Canopies on line since January 2017

SOUTH HIGH SCHOOL

Solar canopies on line since January 2017

CITY OF NEWTON SOLAR PV-PHASE 3

JANUARY 2019

ZERVAS ELEMENTARY ROOFTOP

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.

BEETHOVEN AVEN

ARRAY 1
GYM ROOF 26' ABOVE GRADE
RESERVE CAPACITY 10 PSF
TILTS 2° DOWN TO EAST
ACCESS VIA LADDER FROM LOWER ROOF

ARRAY 2
CAFETERIA ROOF 21' ABOVE GRADE
RESERVE CAPACITY 10 PSF
TILTS 3.6° DOWN TO SOUTH
ACCESS VIA LOWER ROOF

ARRAY 3
MAIN ROOF 40' ABOVE GRADE
RESERVE CAPACITY 6.6 PSF
ACCESS VIA STAIRWAY DOOR

SHADING BY STRUCTURE

AC COMBINER EPV-1

EVERSOURCE TRANSFORMER

6-FOOT SAFETY AND WIND UPLIFT SETBACK - TYPICAL

SHADING BY ROOF OBJECTS

MAIN ELECTRIC ROOM AT FIRST FLOOR

UTILITY DISCONNECT ACD-1
OUTSIDE MAIN ELECTRIC ROOM

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

1" = 16'
0 16 32 48 64 80 96

SCALE: 1" = 16' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV. 29, 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

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"

1" = 20'
0 20 40 60 80 100 120

N

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.

SCALE: 1" = 20' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV 29, 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

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:

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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' 0 16 32 48 64 80 96

N

SCALE: 1" = 16' WHEN PRINTED 36" x 24"
DRAWN BY: SS
CHECKED BY:
DATE: NOV. 21, 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

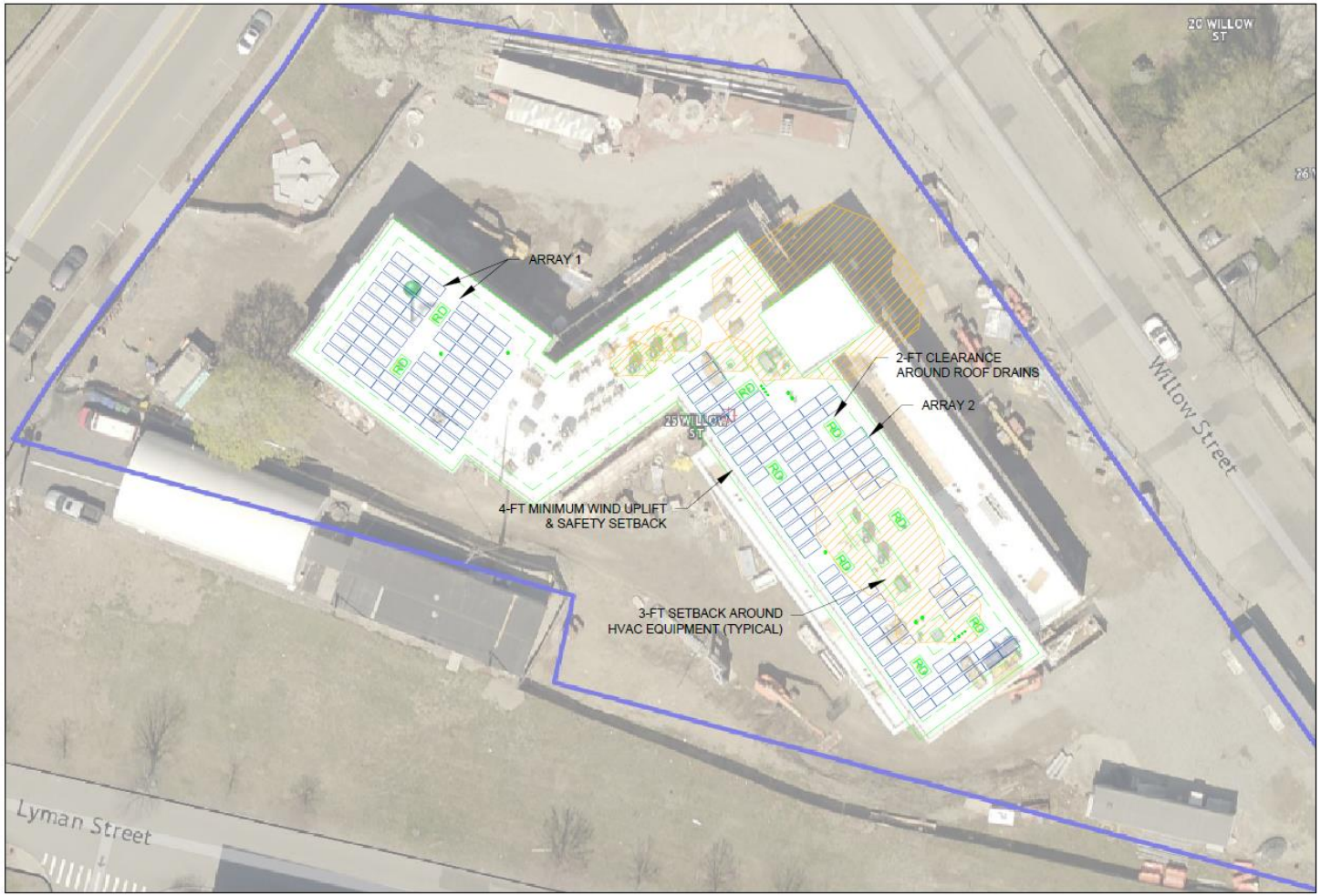
FIRE STATION 3 ROOFTOP

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 = 105 MPH, EXPOSURE TYPE C.



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

1" = 16'
0 16 32 48 64 80 96

N

SCALE: SS
DRAWN BY: SS
CHECKED BY: LA
DATE: NOV. 29, 2018
REVISIONS:

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

FIRE STATION #3 ROOFTOP PV ARRAY
63.27 kWp DC STC PV ARRAY (66.6 kW AC)

PHOTOVOLTAIC ARRAY LAYOUT

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

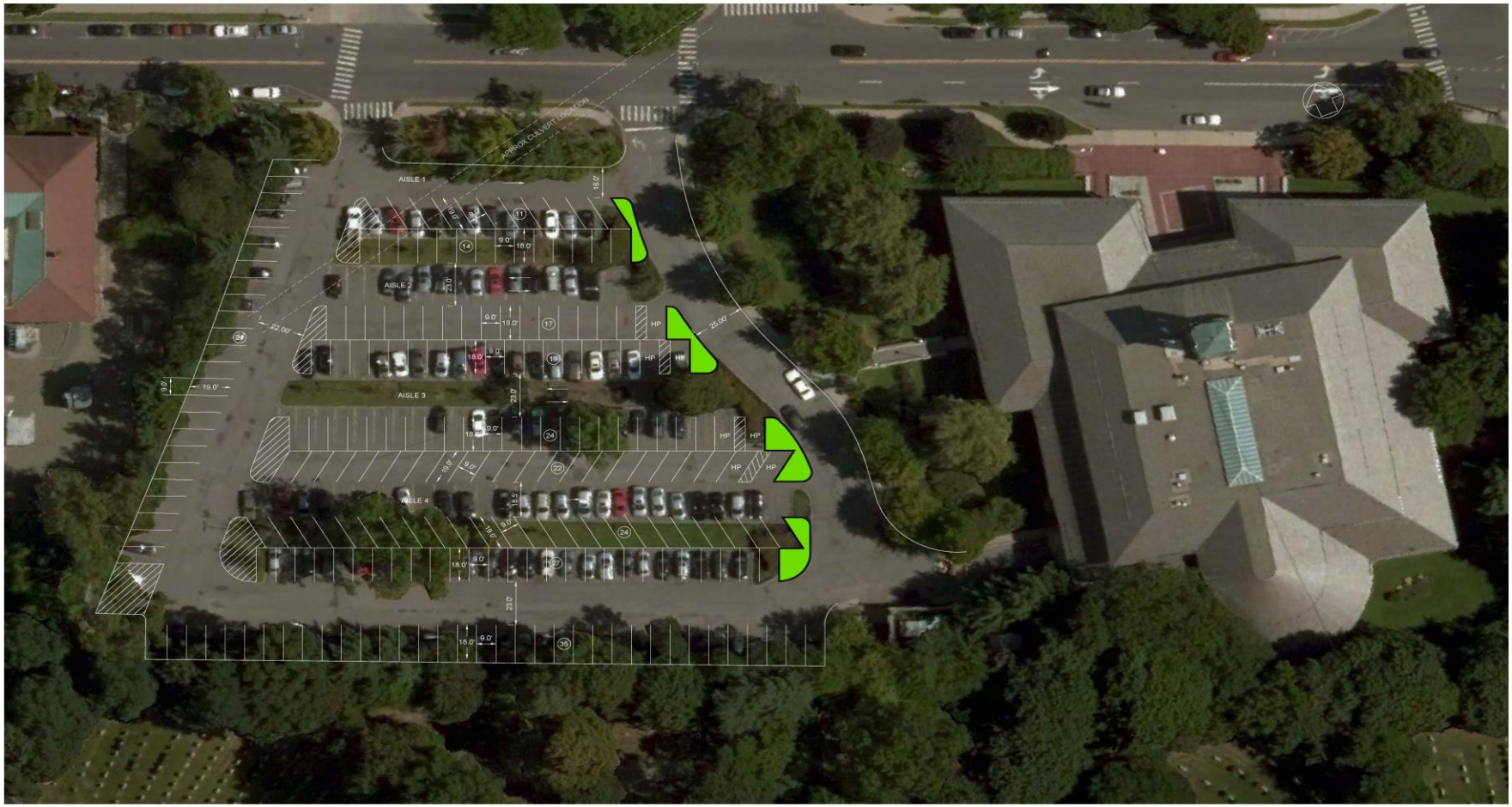
E-100

NEWTON NORTH HS LOWELL AVE. CANOPY

NEWTON NORTH HS
WALNUT ST.
CANOPY

LIBRARY LOT CANOPY

LIBRARY WITH NO WALKWAYS +36 SPACES



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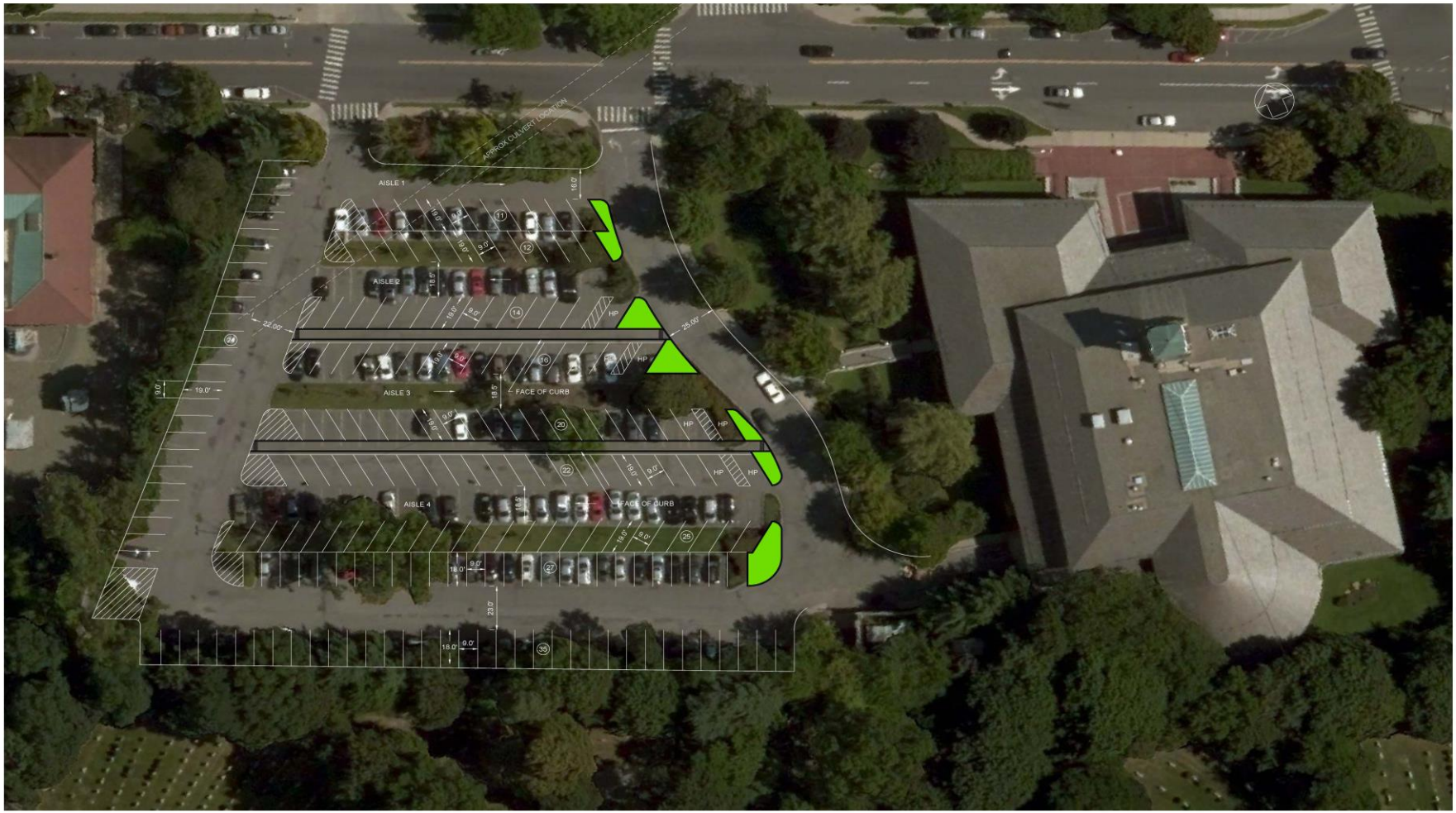
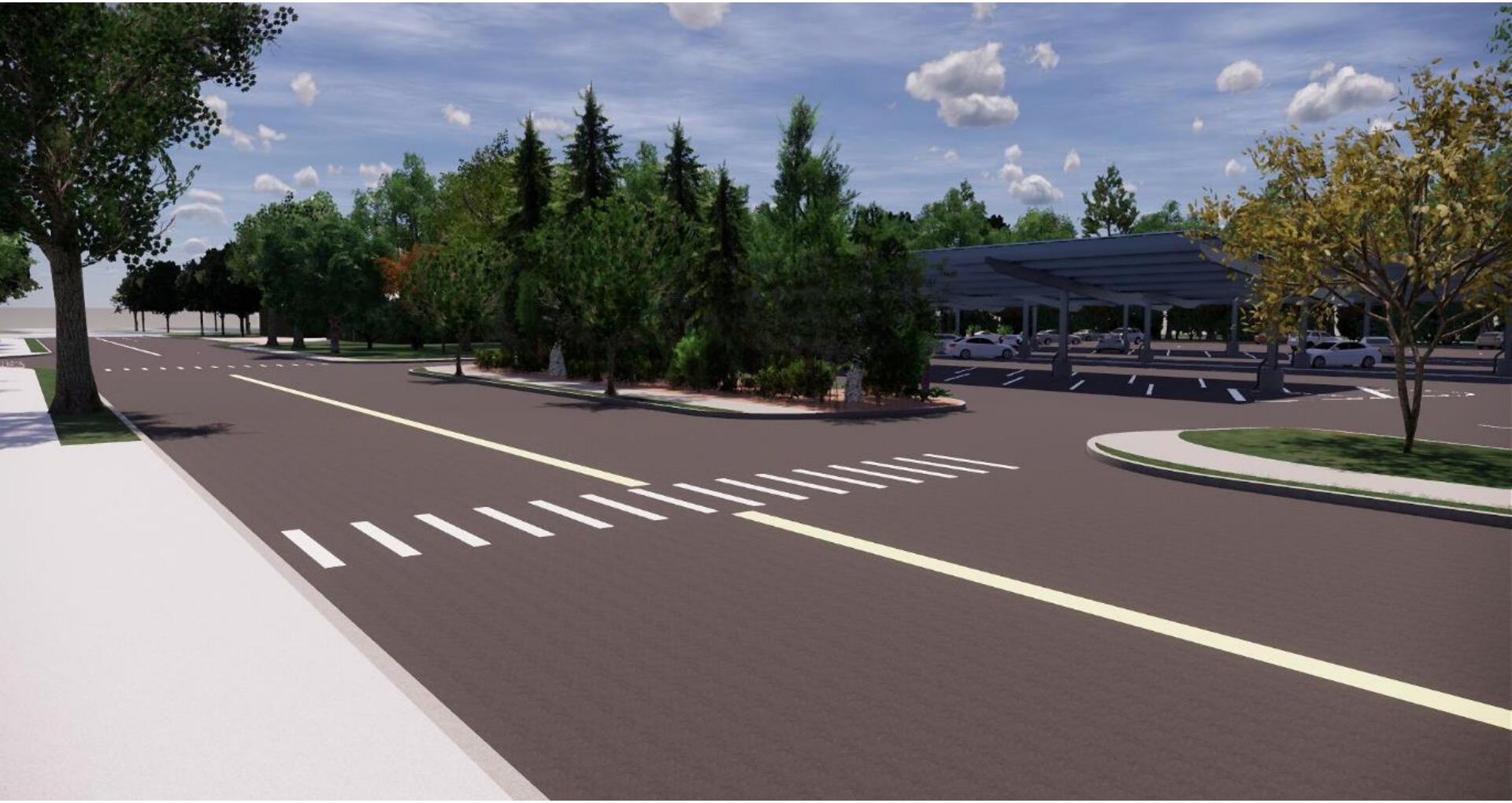
LIBRARY WITH 2 WALKWAYS +24 SPACES



LIBRARY CANOPIES



THANK YOU

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

AMERESCO
Green • Clean • Sustainable

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MACQUARIE

Newton Solar

Macquarie and HESP Solar
January 2019

Angier Elementary School

Cabot School

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Carr School


0 TREES
HESP SOLAR
PROJECT DETAIL
SYSTEM DESCRIPTION
SHEET INFORMATION
PV 0

Williams Elementary School

Ed Center Parking Lot

Ed Center Parking Lot

Ed Center Parking Lot

Pleasant Street Lot (Before)

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Pleasant Street Lot (After)

Pleasant Street Lot

Pleasant Street Lot

Memorial Spaulding

Memorial Spaulding

Memorial Spaulding

Mason Rice Elementary School Parking Lot (Before)

#3 19

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Mason Rice Elementary School Parking Lot (After)

#3119

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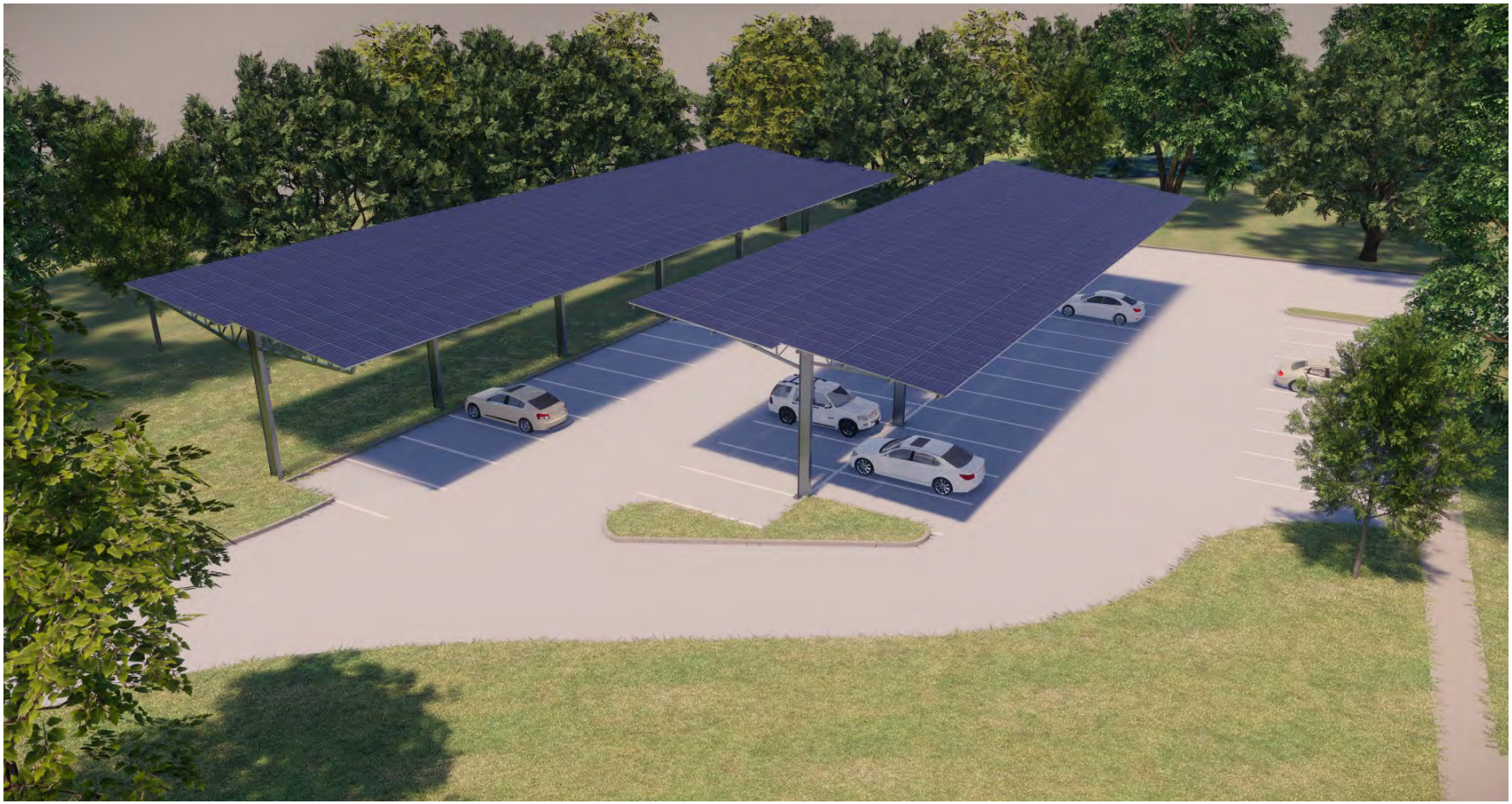
Mason Rice Elementary School Parking Lot



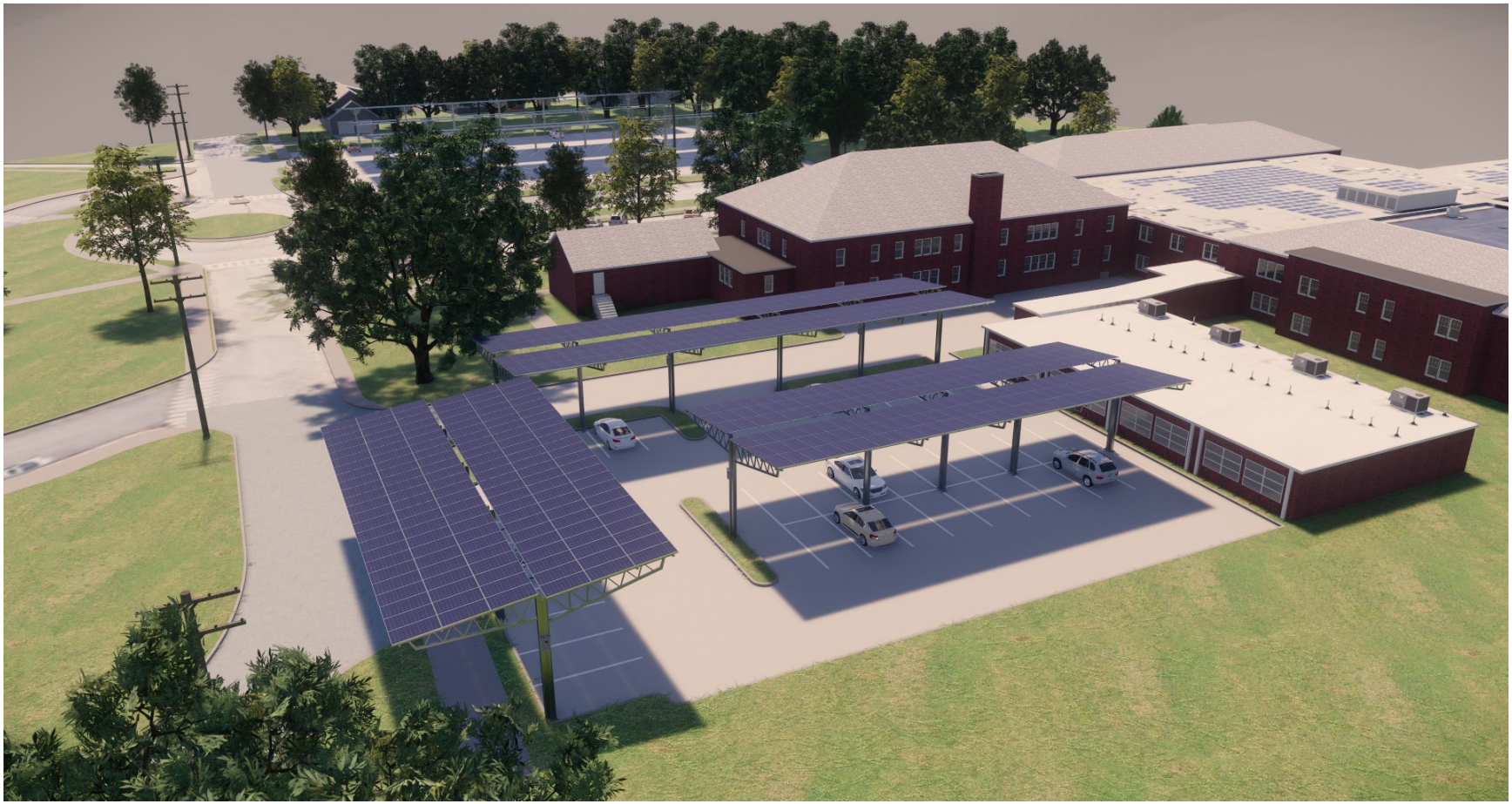
Mason Rice Elementary School Parking Lot

Oak Hill Middle School Parking Lot (Before)

Oak Hill Middle School Parking Lot (After)

Oak Hill Middle School Parking Lot

TO BE UPDATED



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Oak Hill Middle School Parking Lot

TO BE UPDATED

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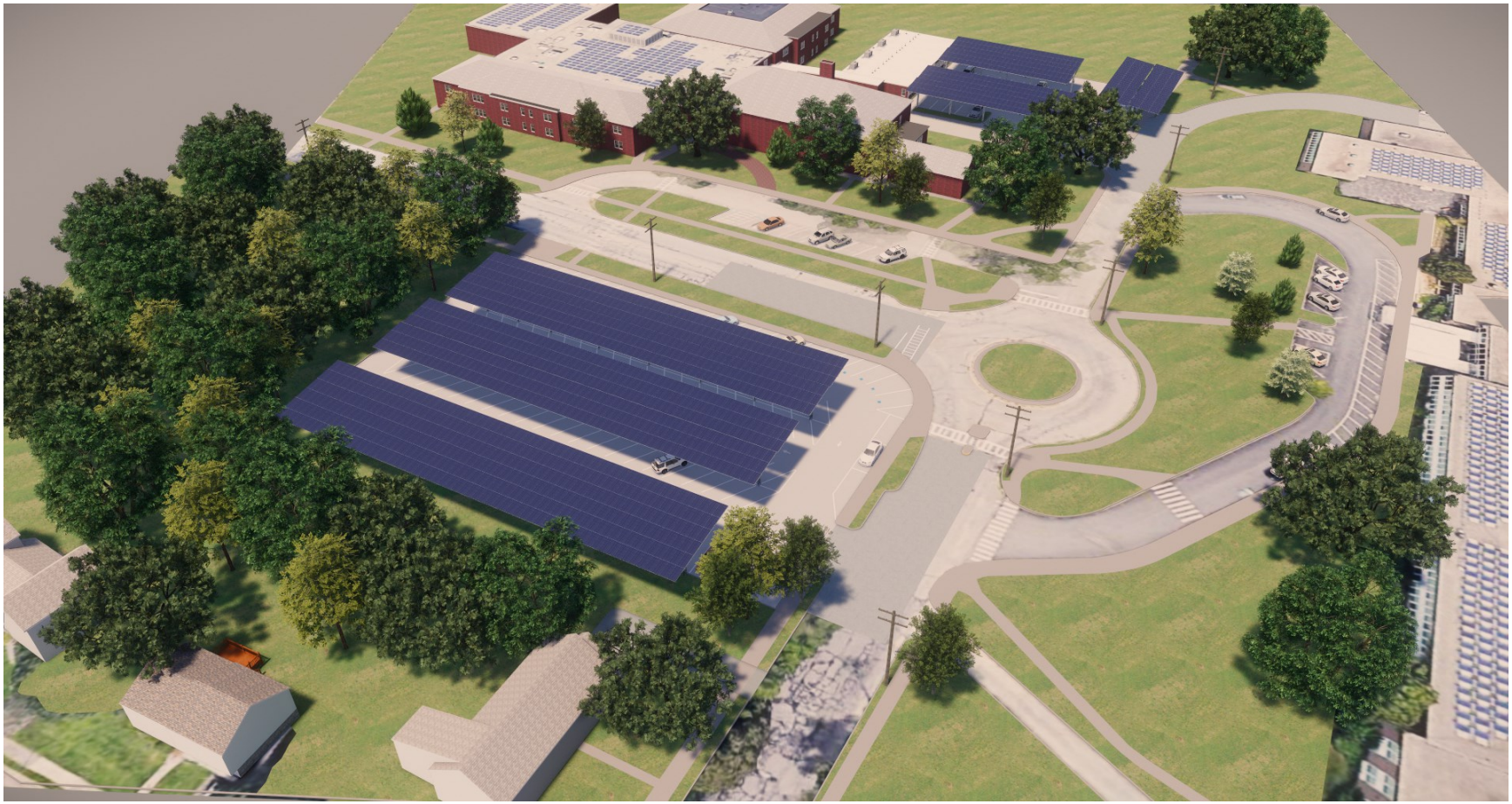
Brown Middle School Parking Lot (Before)

Brown Middle School Parking Lot (After)

Brown Middle School Parking Lot

TO BE UPDATED



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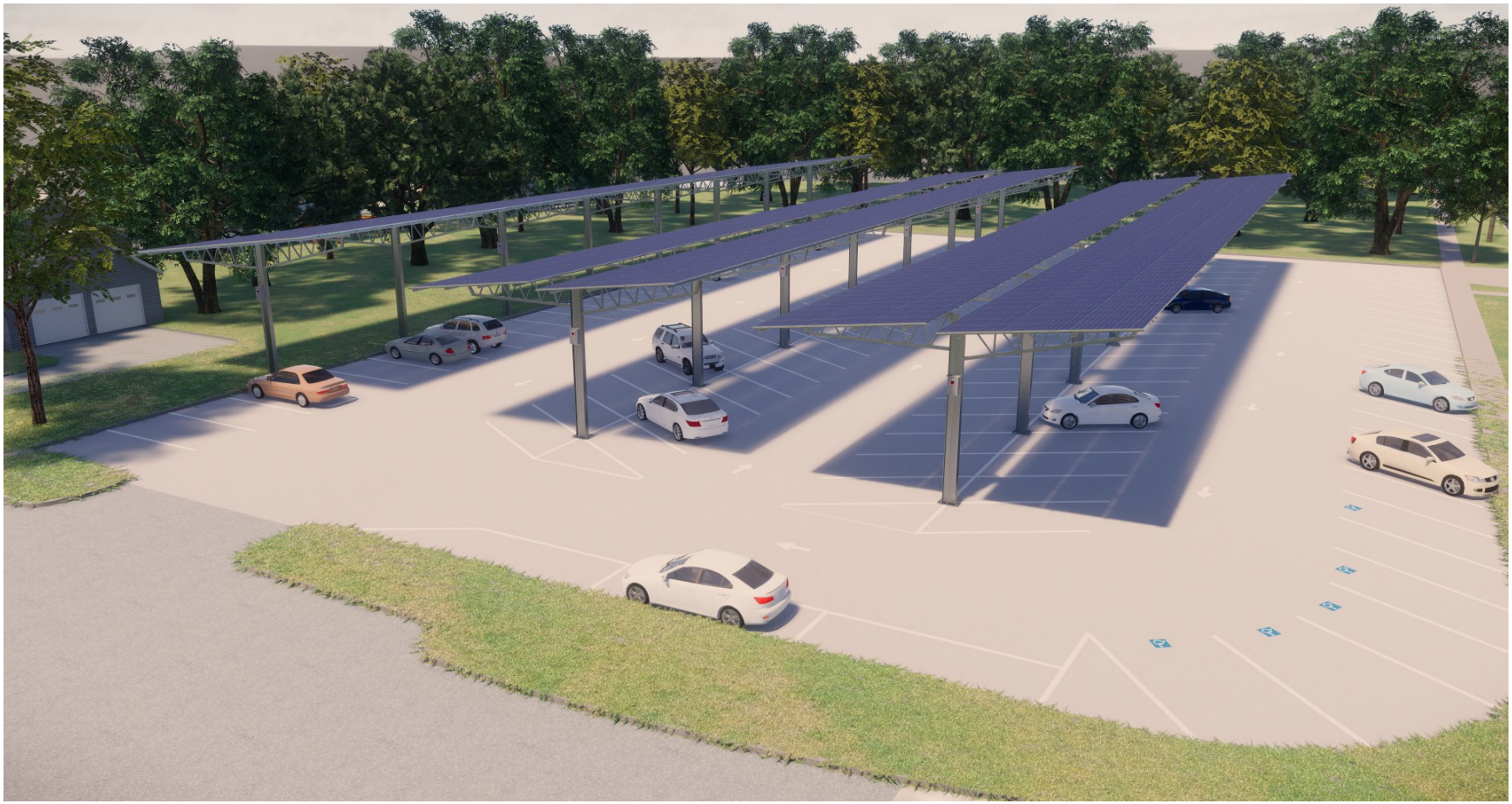
Brown Middle School Parking Lot

TO BE UPDATED



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Brown Middle School Parking Lot

TO BE UPDATED

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Auburndale Cove (Before)

Auburndale Cove (After)

Auburndale Cove

Auburndale Cove

Angier Elementary School

Trim One Tree

#23-19

Williams Elementary School

Trim Four Trees

#23-19

Mason Rice

Remove Two Trees, Trim One Tree

#23-19

Pleasant Street

Remove Two Trees, Trim Four Trees

#23-19

Oak Hill

Redesigning to Avoid Removing One Tree

#23-19

Memorial Spaulding
Remove One Tree

#23-19

Brown Middle School

Remove One Tree

#23-19

Solar Phase 3 Carbon Emissions Impacts

Expected Energy Generation Year 1	Tree Removal		Avoided CO_2 Emissions	Equal to	
MWh/year	Number of Potential Trees Removed	Annual Carbon Sequestration Lost (tons CO_2)	Tons CO_2/year	Sequestration by U.S. Forest in One Year	Emissions from Miles Driven by an Average Passenger Vehicle
4,333	13	1.63	2,192	2,340	4,861,978

Cadmus conducted an analysis of the Carbon Dioxide Emissions impacts of the Solar Phase 3 Sites. The team utilized the EPA's Avoided Emissions and Generation Tool (AVERT) to calculate regional avoided emissions based on kW capacity (AC). The team utilized the USDA's CUFR Tree Carbon Calculator for carbon sequestration potential of removed trees (using developer assumptions). The team utilized the EPA's Greenhouse Gas Equivalencies Calculator to generate equivalencies.

Rooftop Sites

Site Information		Tree Removal			Annual Avoided CO_2 Emissions	Equal to	
Site	Expected First Year Generation (MWh/year)	Trees slated for removal	CO_2 Stored per year (lbs/tree/year)	Total CO_2 Stored Per Year (tons)	Annual Avoided CO_2 Emissions (tons)	Sequestration by U.S. Forests in One Year (acres)	Emissions from Miles Driven by an Average Passenger Vehicle
Ed Center	96	0	-	-	46	49	102,281
Fire Station 3	77	0	-	-	46	49	102,281
Zervas ES	216	0	-	-	100	107	222,349
F.A. Day MS	303	0	-	-	150	160	333,524
Angier ES	102	0	-	-	30	32	66,705
Cabot	76	0	-	-	30	32	66,542
Carr	76	0	-	-	30	32	66,542
Williams ES	153	0	-	-	50	53.4	111,175

Cadmus conducted an analysis of the Carbon Dioxide Emissions impacts of the Solar Phase 3 Sites. The team utilized the EPA's Avoided Emissions and Generation Tool (AVERT) to calculate regional avoided emissions based on kW capacity (AC). The team utilized the USDA's CUFR Tree Carbon Calculator for carbon sequestration potential of removed trees (using developer assumptions). The team utilized the EPA's Greenhouse Gas Equivalencies Calculator to generate equivalencies.

Parking Lot Canopy Sites

Site Information		Tree Removal			Annual Avoided CO_2 Emissions	Equal to	
Site	Expected First Year Generation (MWh/year)	Trees slated for removal	CO_2 Stored per year (lbs/tree/year)	Total CO_2 Stored Per Year (tons)	Annual Avoided CO_2 Emissions (tons)	Sequestration by U.S. Forests in One Year (acres)	Emissions from Miles driven by an average passenger vehicle
Ed Center	334	0	-	-	180	192	400,229
Oak Hill MS	192	0	-	-	100	107	222,349
Memorial Spaulding ES	197	0	-	-	90	96	200,114
Pleasant Street	122	2	404.1	0.20	60	64	133,410
Mason Rice ES	196	2	736.8	0..37	90	96	200,114
Newton North HS Lowell Avenue	589	0	-	-	290	310	644,813
Newton North HS Walnut St.	320	0	-	-	140	150	311,289
Brown MS	448	1	64.2	0.03	250	267	555,873
Auburndale Cove	421	1	785.4	0.39	220	235	489,168
Newton Free Library	415	7	1,275.8	0.64	200	214	443,611

Cadmus conducted an analysis of the Carbon Dioxide Emissions impacts of the Solar Phase 3 Sites. The team utilized the EPA's Avoided Emissions and Generation Tool (AVERT) to calculate regional avoided emissions based on kW capacity (AC). The team utilized the USDA's CUFR Tree Carbon Calculator for carbon sequestration potential of removed trees (using developer assumptions). The team utilized the EPA's Greenhouse Gas Equivalencies Calculator to generate equivalencies.

CITY OF NEWTON SOLAR PHASE 3 - REVISED PROJECT TREE PLAN

January 2019

Macquarie Sites

Location	Trees Removed in Original Proposal	Trees Cut in Revised Plan	Trees Moved in Revised Plan	Trees Trimmed	Replacement Trees To Be Planted	Notes	Tree Condition	Tree Plan
Angier School Gym Roof	1	0	0	1		42" oak	good	trim
Williams School roof	4	0	0	4			good	possibly trim
Oak Hill School canopy	1	0	0	0			NA	
Ed Center canopy	0	0	0	0			NA	no trees effected
Memorial Spaulding canopy	0	0	1	0		move 2.5" linden	good	move one tree on grounds
Brown Middle School canopy	15	1	0	0	7	10" tulip tree	good	move or replace on grounds
Mason Rice canopy	3	2	0	1	29	remove 1 - 32" 3 trunk norway maple,	good	replace in park area with 16 trees
						remove 1 - 11" crab apple	poor to fair	replace in park area with 6 trees
						trim 1 yellowwood	good	trim
Pleasant Street canopy	4	2	0	4	12	remove 1 - 10" honey locust	good	replace in area with 7 trees
						remove 1 - 8" honey locust	good	replace in area with 5 trees
						trim 4 honey locusts	good	trim
Bigelow canopy	10	0	0	0		project removed from list	NA	
250 Albermarle canopy	26	0	0	0		project removed from list	NA	
Auburndale Cove canopy	6	1	0	0	24	remove 1 - 36" oak	fair to good	replace with 24 trees in park
Total Macquarie	**70**	**6**	**1**	**10**	**72**			

Ameresco Sites

North High School-Walnut Street	8	0	7	0	0	7 - 4", (8th tree dead). Japanese Zelkovas.	good	relocate on site
North High School-Lowell Ave.	4	0	2	0	0	2 - 4 " London Planetree.	good	relocate on site
Library	12	7	5	0	68	2 poor,2 fair,5 good, 3 very good. 8 - 8" or less. 4 - 10" to 30". Detailed inventory available.	poor to very good	replace 3 to 4 on site and remainder 64 trees in area
Total Ameresco	**24**	**7**	**14**	**0**	**68**			

SUMMARY	Trees Removed original Proposal	Trees Cut/Moved in Revised Plan	Trees Cut in Revised Plan	Trees Moved in Revised Plan	Trees Trimmed	New Trees Planted
Grand Total All Locations	**94**	**28**	**13**	**15**	**10**	**140**

Solar Generation as a % of Use

Solar Project Meeting Building Demand	FY 2018		
Facility	kWh	Solar kWh	%
Newton North HS canopies	3,896,363	908,893	23%
Brown Middle School canopies	464,764	447,572	96%
Education Center roof and canopies	802,013	429,616	54%
Main Library canopies	839,940	415,000	49%
F A Day MS roof	1,198,428	303,215	25%
Zervas New School roof	543,408	216,094	40%
Memorial Spaulding ES canopies	237,760	197,303	83%
Mason-Rice ES canopies	224,760	195,822	87%
Oak Hill MS canopies	620,468	192,208	31%
Williams ES roof	174,440	152,891	88%
Angier Elementray School roof	450,672	102,448	23%
FD 3# and HQ New roof	484,200	77,395	16%
Carr School roof	260,560	75,651	29%
Cabot New School roof	463,606	75,582	16%
Total	10,661,382	3,789,690	36%

Solar Project Offsetting City Demand

Pleasant St canopy		121,725	
Auburndale Cove Canopy		420779	

From: Jonathan Yeo
To: City Council
Cc: Ann G. Berwick; William Ferguson; Shawna Sullivan; MayorsOffice
Subject: January Revisions to Solar Phase 3 Project for 1/16 Public Presentation and Hearing
Date: Thursday, January 10, 2019 9:38:23 PM

Councilors:
In advance of the Solar Phase 3 presentation and public meeting next Wednesday, the City's project consultants and Sustainability team have completed revisions to the proposal. The "January Updates and Revisions" section at http://www.newtonma.gov/gov/building/solar_phase_3.asp has nine attachments for your review. They are:

"January Project Update Sustainability Office" is an overview of project revisions:
www.newtonma.gov/civicax/filebank/documents/94535
"January Update The Basics" is summary of the program:
www.newtonma.gov/civicax/filebank/documents/94536
"kWh-KW Phase 3 Sites Rev" shows the electric production by site:
www.newtonma.gov/civicax/filebank/documents/94538
"Solar kWh as %" shows the site electric production as a % of facility use:
www.newtonma.gov/civicax/filebank/documents/94540
"Carbon Analysis Update" shows the carbon emissions impacts:
www.newtonma.gov/civicax/filebank/documents/94534
"Phase 3 Tree Plan 1-10-19" shows the greatly changed impacts on trees:
www.newtonma.gov/civicax/filebank/documents/94539
"January Update Ameresco" shows details on their site deployments:
www.newtonma.gov/civicax/filebank/documents/94537
"January Update Macquarie Part 1" shows details on their site deployments:
www.newtonma.gov/civicax/filebank/documents/94541
"January Update Macquarie Part 2" shows details on sites plus all the tree impact photos:
www.newtonma.gov/civicax/filebank/documents/94542

The revisions represent changes made to the December proposal as a result of comments at three well-attended public meetings, public emails, site visits, and further consultant engineering and analysis. Two sites were eliminated (Albemarle and Bigelow), solar canopies were moved at several parking lots, and many trees were left intact as a result. There were originally estimated to be 94 trees impacted and the new proposal has reduced that to 28. Of those, 15 will be moved and only 13 cut. Based on the sizes of the cut trees, there will be about 140 new replacement trees planted as part of the contract with Ameresco and Macquarie. The City Forester Marc Welch will determine where the new trees will be planted. The electrical generation from these sites will be significant for the City, both from a local generation standpoint (36% of the local site demand) and from a carbon emissions impact perspective (2,192 tons of CO_2 per year avoided).

Please let us (myself, Bill Ferguson, Ann Berwick) know if you have any questions,

Jonathan