

# BLUE WAVE

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Town of Brookline Solar Initiative  
Metropolitan Area Planning Council Regional Solar Initiative

June 30, 2016

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# BROOKLINE SOLAR INITIATIVE UPDATE AGENDA

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## 1. Update on MAPC-BlueWave Regional Solar Initiative

- MAPC Regional Solar Initiative updates
- RSI partner updates: Financing, EPC
- Timeline moving forward

## 2. Review Work Completed to Date

## 3. Review and Update on Brookline Projects

- Update to project design, capacity, and yield

## 4. Next Steps & Timing



# BLUEWAVE-MAPC REGIONAL SOLAR INITIATIVE UPDATE

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## 1. MAPC Regional Solar Initiative updates

- MAPC Projects are moving forward in Quarters 3 & 4, 2016 in Brookline, Melrose, Sherborn, Lincoln, and Winthrop Massachusetts
- MAPC continues to work with Communities and BlueWave to provide guidance and oversight on agreements, Financing and EPC partners, and RSI progress

## 2. RSI partner updates: Financing and EPC Services

- Financing and long term O&M for Brookline's projects will be provided by SunPower and IGS Solar
- Engineering, Procurement and Construction Services for Brookline's projects will be provided by a SunPower's master dealer and partner Blue Selenium Solar
- BlueWave is in active negotiations to finalize the agreement – bringing best available materials, financing, and installation expertise to the projects

## 3. Timeline moving forward

- Finalize Project Design: Quarter 2-3, 2016
- Finalize Agreements: Quarter 2-3, 2016
- Break Ground: Quarter 3-4, 2016
- Mechanical Completion: Quarter 3-4, 2016

# BROOKLINE SOLAR INITIATIVE

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## Regional Solar Initiative Work to Date in Brookline:

- **Site Assessments:** Assessed roof age, condition, and availability of suitable ground, roof, and/or parking lots. Projects moving forward in this initial stage (2016) include:
  - **The Runkle School**
  - **Soule Recreation Center Gym**
  - **The Public Library of Brookline Main Library**
  - **Kirrane Aquatics Center**
- **LOI Execution:** BWC & Brookline executed a Letter of Intent for Short and Long Term projects.
- **PPA Rate Calculations<sup>1</sup>:** The Power Purchase Agreement price, based project costs, anticipated solar energy, and long-term O&M costs for the solar facility.
- **Interconnection Applications:** Initial system design and engineering<sup>1</sup> was completed to advance an application for interconnection with the local electrical utility.

## Next Steps:

- **Finalize Net Metering Credit Purchase Agreement:** BlueWave will work with the Town to finalize the NMCPA.
- **Finalize System Designs:** BlueWave will work with Brookline staff and the local utility to finalize the system design and request building and electrical permits needed to commence construction.
- **Construction & Operations:** BlueWave anticipates construction will occur later this summer, with operations commencing during Fall, 2016.

*\*Final system sizes will be refined based on customer feedback, compliance with SREC 2 requirements and are subject to additional engineering and design verification.*

# BROOKLINE UPDATED SYSTEM SUMMARY

## Key Updates:

- Each Site included in the 2016 portfolio were reviewed by Blue Selenium and updated to SunPower specifications
- Components were updated to SunPower's best-in-class materials: SunPower's 60-Watt SPR-E20-327 COM and HST Panels
  - **> 20% Efficiency:** Captures more sunlight and generates more power than conventional panels.
  - **High Performance:** Delivers excellent performance in real-world conditions, such as high temperatures, clouds and low light.
- Additional 20 KW identified and an additional 32,231 KWH of generation during the first year.

Site	Type	Original Size KW DC	Updated Size KW DC	Updated Size KW AC	Original Est. Yield (KWH/KW/Year)	Updated Est. Yield (KWH/KW/Year)	Original Year 1 Est. Generation (KWH)	Updated Year 1 Est. Generation (KWH)
Runkle School	Rooftop	72	108.56	89	1,276	1,284	91,872	139,410
Kirrane Aquatic Center	Rooftop	66	52.32	48	1,244	1,242	82,104	64,956
Main Library	Rooftop	34	31.39	27	1,228	1,289	41,752	40,468
Soule Rec Center & Gym	Rooftop	30	30.08	24	1,245	1,345	37,350	40,475
<b>Total</b>		<b>202</b>	<b>222.36</b>	<b>188</b>			<b>253,078</b>	<b>285,309</b>



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## APPENDIX 1 – SITE LAYOUTS



# APPENDIX 1.1 – PRELIMINARY SITE LAYOUT

\*Proprietary and Confidential Information. Disclosure without prior consent of Blue Solar, LLC is prohibited.\*

REVISIONS:			
NO.	DATE	BY	CHK #

**COMMERCIAL SOLAR PHOTOVOLTAIC INSTALLATION:**

JOHN D. RUNKLE SCHOOL  
50 DRUCE ST.,  
BROOKLINE, MA 02445

MODULES:  
SUNPOWER SPR-E20-327-COM  
HELIX HST

SOUTH WEST FACING  
ARRAY 1 - 2 - 3 - 4:  
PANEL TILT = 10 DEG  
ROOF AZIMUTH = 212 DEG

SYSTEM SIZE:  
272 MODULE x 327W = 88.94 KW  
TOTAL EST PROD = 114,308 KWH/YR  
(PV SIM 3% SHADE ASSUMED)

SOUTH WEST FACING  
ARRAY 5:  
PANEL TILT = 10 DEG  
ROOF AZIMUTH = 140 DEG

SYSTEM SIZE:  
60 MODULE x 327W = 19.62 KW  
TOTAL EST PROD = 25,102 KWH/YR  
(PV SIM 3% SHADE ASSUMED)

TOTAL SYSTEM SIZE:  
332 MODULE x 327W = 108.564 KW  
TOTAL EST PROD = 139,410 KWH/YR

AVERAGE TSRF = 90% ASSUMED

INVERTER:  
1 x SMA STP24000TL-US-10  
1 x SMA STP20000TL-US-10  
3 x SMA STP15000TL-US-10

BROOKLINE, MA  
RECORD LOW = -34 DEG C  
AVERAGE HIGH = 28 DEG C  
RECORD HIGH = 40 DEG C  
WIND SPEED = 100 MPH  
SNOW LOAD = 40 PSF



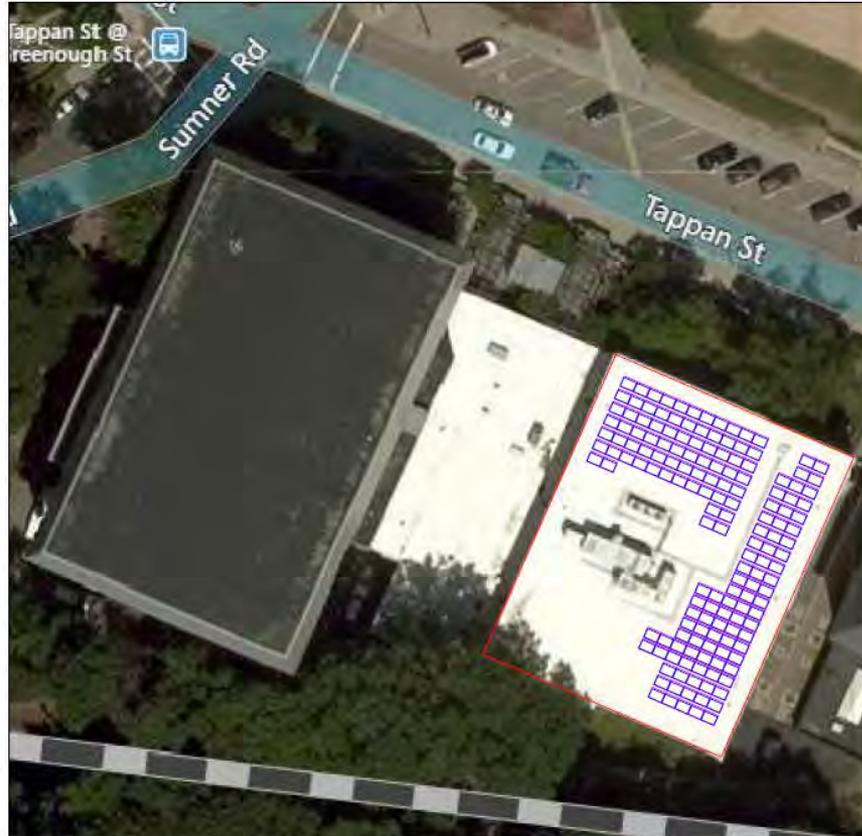
	<b>BLUESOL COMMERCIAL SOLAR, INC</b> <small>17 JAN SEBASTIAN DRIVE, SUITE 12, SANDWICH, MA 02863          600 WEST CUMMINGS PARK, SUITE 4200, WICKBURN, MA 01901          PHONE (781) 281-6130, WWW.BLUESOL.COM</small>			
	<small>DRAWN BY: OC</small>	<small>DATE: 06-01-16</small>	<small>SCALE: N/A</small>	<small>SHEET: 1 OF 1</small>
<small>NAME:</small> <b>JOHN D. RUNKLE SCHOOL</b>				<small>DWG. NUMBER-REV</small> <b>03663-01</b>

## BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL

# APPENDIX 1.2 – PRELIMINARY SITE LAYOUT

"Proprietary and Confidential Information  
Disclosure without prior consent of  
Blue Solar, LLC is prohibited"

REVISIONS:			
NO.	DATE	BY	ENR #



**COMMERCIAL SOLAR  
PHOTOVOLTAIC INSTALLATION:**

66 TAPPAN ST.,  
BROOKLINE, MA 02455

**MODULES:**  
SUNPOWER SPR-E20-327-COM HST

SOUTH WEST FACING  
FLAT ROOF ROOF;  
PANEL TILT = 10 DEG  
AZIMUTH = 204 DEG

**TOTAL SYSTEM SIZE:**  
160 MODULE x 327W = 52.32 KW  
TOTAL EST PROD = 64,956 KWH/YR  
(PV SIM 7% SHADE ASSUMED)

AVERAGE TSRF = 88% ASSUMED

**INVERTER:**  
2 x SMA STP24000TL-US-10

BROOKLINE, MA  
RECORD LOW = -34 DEG C  
AVERAGE HIGH = 28 DEG C  
RECORD HIGH = 40 DEG C  
WIND SPEED = 105 MPH  
SNOW LOAD = 40 PSF

	<b>BLUESEAL COMMERCIAL SOLAR, INC</b> <small>17 JAN SEBASTIAN DRIVE, SUITE 12, SANDWICH MA 02563          600 WEST CUMMINGS PARK, SUITE 4200, WOBURN, MA 01801          PHONE (781) 281-8130, WWW.BLUESEAL.COM</small>			
	<small>DRAWN BY: DC</small>	<small>DATE: 06-16-18</small>	<small>SCALE: N/A</small>	<small>SHEET: 1 OF 1</small>
<small>NAME:</small> 66 TAPPAN ST.				<small>DWG NUMBER-REV</small> 03712-01

## BROOKLINE 66 TAPPAN ST: KIRRANE AQUATICS CENTER

# APPENDIX 1.3 – PRELIMINARY SITE LAYOUT

\*Preliminary and Confidential Information.  
Disclosure without prior consent of  
Blue Selesium Solar, LLC is prohibited\*

REVISIONS:			
NO.	DATE	BY	ECH #

**COMMERCIAL SOLAR  
PHOTOVOLTAIC INSTALLATION:**

361 WASHINGTON ST.,  
BROOKLINE, MA 02445

MODULES:  
SUNPOWER SPR-E20-327-COM  
HELIX HST

SOUTH WEST FACING  
FLAT RUBBER ROOF:  
PANEL TILT = 10 DEG  
AZIMUTH = 212 DEG

ARRAY 1.1 & 1.2:

SYSTEM SIZE:  
60 MODULE x 327W = 19.62 KW  
EST PROD = 25,022 KWH/YR  
(PV SIM 3% SHADE ASSUMED)

ARRAY 2:

SYSTEM SIZE:  
36 MODULE x 327W = 11,772 KW  
EST PROD = 15,446 KWH/YR  
(PV SIM 1% SHADE ASSUMED)

TOTAL SYSTEM SIZE:  
96 MODULE x 327W = 31.392 KW  
EST PROD = 40,468 KWH/YR

AVERAGE TSRF = 93% ASSUMED

INVERTER:  
1 x SMA STP 12000TL-US-10  
1 x SMA STP 15000TL-US-10  
w/ RAPID SHUTDOWN INTERFACE

BROOKLINE, MA  
RECORD LOW = -28 DEG C  
AVERAGE HIGH = 28 DEG C  
RECORD HIGH = 40 DEG C  
WIND SPEED = 100 MPH  
SNOW LOAD = 40 PSF



	<b>BLUESEEL COMMERCIAL SOLAR, INC</b> 17 JAN STRASTIAN DRIVE, SUITE 12, SANDWICH, MA 02563 600 WEST CLAMMINGS PARK, SUITE 4200, WOBURN, MA 01801 PHONE: (781) 281-8130, WWW.BLUESEEL.COM
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DRAWN BY: OC	DATE: 06-15-18	SCALE: N/A	SHEET: 1 OF 1	BORDER: C
NAME: 361 WASHINGTON ST. - BROOKLINE			DWG NUMBER-REV 03725-01	

## BROOKLINE 361 MAIN STREET: MAIN LIBRARY

# APPENDIX 1.4 – PRELIMINARY SITE LAYOUT

"Proprietary and Confidential Information. Disclosure without prior consent of Blue Selexium Solar, LLC is prohibited"

REVISIONS:			
NO.	DATE	BY	ECN #



**COMMERCIAL SOLAR PHOTOVOLTAIC INSTALLATION:**

652 HAMMOND ST.,  
BROOKLINE, MA 02467

MODULES:  
SUNPOWER SPR-E20-327-COM

SOUTH EAST FACING ROOF:  
ROOF TILT = 37 DEG  
AZIMUTH = 174 DEG

TOTAL SYSTEM SIZE:  
92 MODULE x 327W = 30.084 KW  
EST PROD = 40,475 KWH/YR  
(PV SIM 5% SHADE ASSUMED)

AVERAGE TSRF = 96% ASSUMED

INVERTER:  
1 x SMA STP 24000TL-US-10  
w/ RAPID SHUTDOWN INTERFACE

BROOKLINE, MA  
RECORD LOW = -32 DEG C  
AVERAGE HIGH = 28 DEG C  
RECORD HIGH = 39 DEG C  
WIND SPEED = 105 MPH  
SNOW LOAD = 50 PSF

	<b>BLUESEL COMMERCIAL SOLAR, INC</b> <small>17 JAN SEBASTIAN DRIVE, SUITE 12, SANDWICH, MA 02563          600 WEST CUMMINGS PARK, SUITE 4200, WOBURN, MA 01801          PHONE: (781) 261-8130, WWW.BLUESEL.COM</small>			
	<small>DRAWN BY: OC</small>	<small>DATE: 06-02-16</small>	<small>SCALE: N/A</small>	<small>SHEET: 1 OF 1</small>
<small>NAME: 652 HAMMOND ST.</small>				<small>DWG NUMBER-REV: 03718-00</small>

## BROOKLINE 652 HAMMOND ST: SOULE RECREATION CENTER AND GYM



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## APPENDIX 2 – SITE RENDERINGS



# APPENDIX 2.1 – PRELIMINARY SITE LAYOUT



## BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL

# APPENDIX 2.2 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL**

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# APPENDIX 2.3 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL**

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# APPENDIX 2.4 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL**

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# APPENDIX 2.5 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL**

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# APPENDIX 2.6 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 50 DRUCE STREET: RUNKLE SCHOOL**

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# APPENDIX 2.7 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 66 TAPPAN ST: KIRRANE AQUATICS CENTER**

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# APPENDIX 2.8 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 66 TAPPAN ST: KIRRANE AQUATICS CENTER**

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# APPENDIX 2.9 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 66 TAPPAN ST: KIRRANE AQUATICS CENTER**

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# APPENDIX 2.10 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 361 MAIN STREET: MAIN LIBRARY**

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# APPENDIX 2.11 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 361 MAIN STREET: MAIN LIBRARY**

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# APPENDIX 2.12 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 361 MAIN STREET: MAIN LIBRARY**

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# APPENDIX 2.13 – PRELIMINARY SITE LAYOUT

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## BROOKLINE 361 MAIN STREET: MAIN LIBRARY

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# APPENDIX 2.14 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 361 MAIN STREET: MAIN LIBRARY**

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# APPENDIX 2.15 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 652 HAMMOND STREET: SOULE GYM**

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# APPENDIX 2.16 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 652 HAMMOND STREET: SOULE GYM**

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## APPENDIX 2.17 – PRELIMINARY SITE LAYOUT

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**BROOKLINE 652 HAMMOND STREET: SOULE GYM**

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