16-0859

Deborah Neuser

Pub. Safety 9-19-16

From: Justin Nickels
Sent: Thursday, September 08, 2016 10:35 AM
To: Jennifer Hudon; Deborah Neuser
Cc: Christopher Able - D3; Jason Sladky; Nick Reimer; Steve Corbeille
Subject: FW: Waldo Blvd. RRFB Quote, EBR Report, General Layout
Attachments: City of Manitowoc RRFB Waldo Blvd.pdf; R920 RRFB, Waldo Blvd and N 9th St, Manitowoc, WI, 31-Aug-16.pdf; Median Two-Way Road RRFB Set Up.pdf; Justin M Nickels.vcf

Jennifer/Deborah,

Please add this e-mail as an action item under the Public Safety Committee portion of the next Common Council agenda (September 19th) as a request from myself to purchase these pedestrian lights and install once council approves and mayor signs. Please add the supporting documents to Granicus as well.

The recommendation will be to approve funds from the Room Tax undesignated reserve fund to construct these pedestrian safety lights as quoted.

This has been discussed by the committee, but in lieu of the committee meeting prior to the next council meeting, I'd like to expedite the process. Per our council rules, I am able to add this to the agenda without prior committee approval.

Thanks.

- Justin

Justin M. Nickels
Mayor
City of Manitowoc, WI
(920) 686-6980 Work
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jnickels@manitowoc.org
900 Quay Street
www.manitowoc.org

Assistant: Heather L. Sohlden
hsohlden@manitowoc.org

From: Nick Reimer
Sent: Friday, September 02, 2016 2:32 PM
To: Justin Nickels
Subject: FW: Waldo Blvd. RRFB Quote, EBR Report, General Layout

Hello,

It looks like it will cost $8,514.88 for the flashing ped signs for N. 9th and Waldo BLVD.

Nick

From: Josh Kunz [mailto:JoshKunz@deckersupply.com]
Sent: Friday, September 02, 2016 1:28 PM
To: Mark DeZeeuw
Cc: Nick Reimer; Greg Minikel; Dan Koski; Chad Scheinoha
Subject: Waldo Blvd. RRFB Quote, EBR Report, General Layout

Hello again!

Attached you will find the quote for the RRFB Set up at Waldo Blvd. Please read the comments within the quote for explanation/clarification, and let me know if you have any questions/concerns. NOTE: Since this crosswalk is located in a School Zone, I provided pricing on "Flourescent Yellow Green" School Zone Sheeting. If you want me to change it back to the standard "Flourescent Yellow", please let me know.

The Energy Balanced Report is also attached for this location. This report provides you with site specific information regarding the solar power availability, etc. and also shows that the R920 System is suitable.

I have also included a general layout attachment, which will give you an idea of how the RRFB's will be set up. NOTE: I did not include the pricing for the Advance RRFB's. Carmanah did not feel it was necessary to have these, but you certainly could have them if you wanted. Obviously the price would increase with the advance systems in place. Please let me know if you want me to provide a new quote with these added.

Also, extending the Push Button Wiring to a "remote location" would not be an issue. Mark, we discussed doing this on the North and South Side of Waldo to make it more accessible to pedestrians. I have the wiring specs for this, please let me know if you would like them.

Please review the information and let me know if you have any questions/concerns, or if you would like for me to make any adjustments. I will plan on following up with you in 2 weeks regarding this information, unless I hear from you before then.

Thanks again for the opportunity, have a great Holiday weekend!

Josh Kunz
Outside Sales/Product Manager
Cell: 608-577-0900
www.deckersupply.com

Decker Supply Co Inc.
1115 O'Neill Ave
PO Box 8008
Madison WI 53708

QUOTATION

Quote Number: 471185
Quote Date: 09/02/16
Page: 1
Customer Phone:
Customer Fax: 920-686-6525

BILL
CITY OF MANITOWOC
2655 S. 35TH STREET
MANITOWOC, WI 54220

SHIP
CITY OF MANITOWOC POLICE DEPT.
910 JAY ST.
MANITOWOC, WI 54220
920-686-6573

ATTN: NICK REIMER

Entered By: JOSH
Location:
Account Cd: MANITCWI
Salesperson: 7250

RFQ Number: NOT YET
Ship Via: DROP SHIP DIRCT
Taxable: Y
Pmt Terms: NET 30

Line	Order Qty	Part Number	Description	Price	UM	Ext Price	Est Ship
			** WALDO BLVD LOCATION **				
1	3.00	R920-SOLAR	R920 RRFB SOLAR ENGINE * NATURAL - 72526 * - QTY. 2 SOLAR PANELS WILL BE POWERING 1 LIGHT BAR & 1 PB, QTY. 1 SOLAR PANEL WILL BE POWERING 2 LIGHT BARS & 1 PB	$1,451.0000	EA	$4,353.00	09/02/16
2	6.00	NP BATTERY R920	STANDARD TEMP BATTERY FOR R920 * 67620 * - QTY.2 FOR EACH SOLAR PANEL	$39.0000	EA	$234.00	09/02/16
3	3.00	R920 SIDE POST	R920 SIDE OF POST MOUNT FOR SOLAR PANEL. * NATURAL - 78139 *	$175.0000	EA	$525.00	09/02/16
4	4.00	R920 LIGHT BAR	R920 LIGHT BAR W/CONFIRMATION PEDESTRIAN LIGHTS. * BLACK - 76440 * - QTY. 1 LIGHT BAR WILL GO ON 2 POLES, 2 LIGHT BARS ON 1 PLE	$475.0000	EA	$1,900.00	09/02/16
5	3.00	PB-68319	CARMANAH: POLARA BULLDOG PB, YELLOW	$145.0000	EA	$435.00	09/02/16
6	3.00	PB-FRAME-9X12	9 X 12 PUSH BUTTON FRAME KIT, ***YELLOW-69978***	$122.0000	EA	$366.00	09/02/16
7	3.00	R10-25 S8PW0912	"PUSH BUTTON TO TURN ON".... SIGN PLACED INSIDE 9X12 FRAME	$9.0000	EA	$27.00	09/02/16

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910 JAY ST.
MANITOWOC, WI 54220
920-686-6573

ATTN: NICK REIMER

Entered By: JOSH
Location:
Account Cd: MANITCWI
Salesperson: 7250

RFQ Number: NOT YET
Ship Via: DROP SHIP DIRCT
Taxable: Y
Pmt Terms: NET 30

Line	Order Qty	Part Number	Description	Price	UM	Ext Price	Est Ship
			9" X 12" PHI/CS .080 (BLK/WH) * PRISMATIC H.I. *				
8	4.00	W11-2 S8FG30DI	PEDESTRIAN ADVANCE SYMBOL 30" X 30" DG/CS .080 (BL/FLYG) ** SCHOOL ZONE SHEETING **	$74.9500	EA	$299.80	09/02/16
9	2.00	W16-7L S8FG2412	DIAGONAL ARROW DOWN LEFT 24" X 12" DG/CS (BLK/FLYG) ** SCHOOL ZONE SHEETING **	$23.9500	EA	$47.90	09/02/16
10	2.00	W16-7R S8FG2412	DIAGONAL ARROW DOWN RIGHT 24" X 12" DG/CS (BLK/FLYG) ** SCHOOL ZONE SHEETING **	$23.9500	EA	$47.90	09/02/16
11	12.00	SNAP	SNAP LOCK ASSEMBLY	$2.6000	EA	$31.20	09/02/16
12	24.00	D021I	INDV #D021 FLARED LEG BRACKETS	$3.6700	EA	$88.08	09/02/16

- CUSTOMER TO PROVIDE SIGN POLES.
- INSTALLATION NOT INCLUDED.
- ADD FREIGHT, LISTED BELOW.
- SALESPERSON: JOSH

QUOTATION

Decker Supply Co Inc.
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PO Box 8008
Madison WI 53708

Quote Number: 471185
Quote Date: 09/02/16
Page: 3
Customer Phone:
Customer Fax: 920-686-6525

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910 JAY ST.
MANITOWOC, WI 54220
920-686-6573

ATTN: NICK REIMER

Entered By:	JOSH	RFQ Number:	NOT YET
Location:		Ship Via:	DROP SHIP DIRCT
Account Cd:	MANITCWI	Taxable:	Y
Salesperson:	7250	Pmt Terms:	NET 30

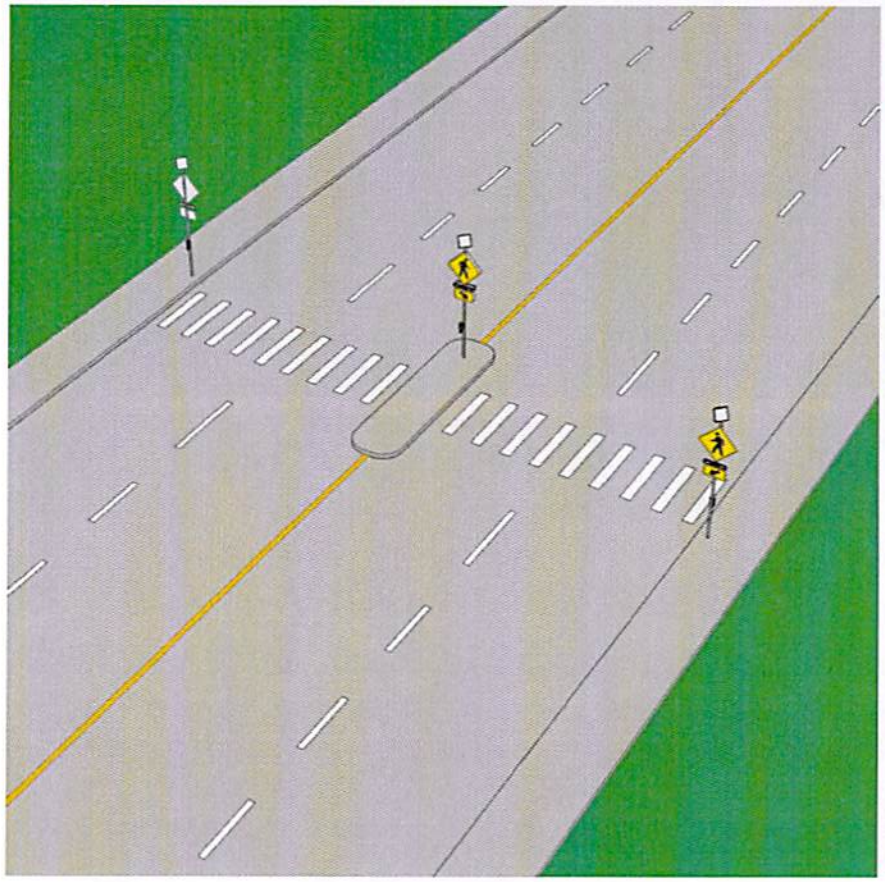
Line	Order Qty	Part Number	Description	Price	UM	Ext Price	Est Ship

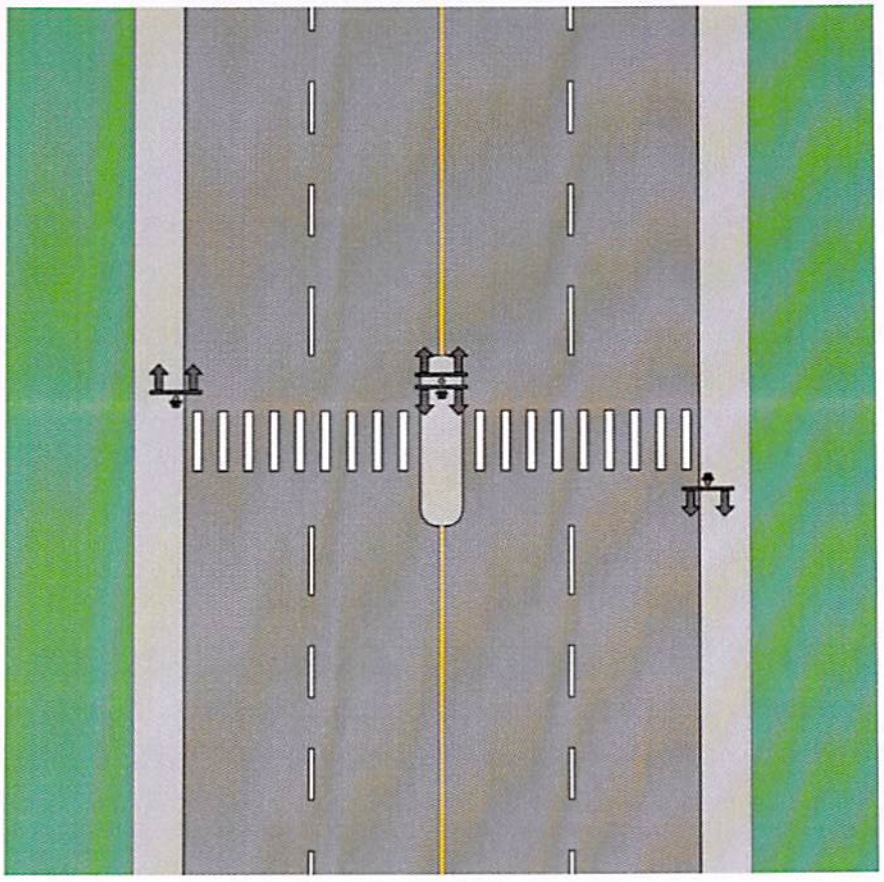
Thank you for the opportunity of quoting.

Prices are good for 45 days from quotation date.

Subtotal:	$8,354.88
Sales Tax:	$0.00
Freight:	$160.00
Total:	$8,514.88

Median Two-Way Road





carmanah®

Energy Balance Report

RECOMMENDED SYSTEM:
To meet the performance requirements at Waldo Boulevard and North 9th Street, Manitowoc, WI, Carmanah recommends the R920 RRFB system.

Key parameters considered:
- Maximum number of expected pedestrian activations (day and night, constant across months)
- The duration of the flashing signals following an activation
- Worst month** (the month with the least sunlight, coldest temperatures, and highest RRFB load over 24 hours)

**See glossary of terms on page 4 for clarification

System Summary

Recommended System: **R920**

Location: Waldo Boulevard and North 9th Street, Manitowoc, WI

System Configuration:

Solar Panel (Watts)	10
Battery Capacity (Amp-Hours)	14
Number of Light Bars	2
Number of Push Buttons	1
Flash Duration Setting (Seconds)	20
Push Button Model	Polara Bulldog

Weather Data:

Worst Month		December
Peak Sun Hours (during December)		2.13
Minimum Temperature	15.1 °F	-(9.4 °C)
NASA, No-Sun Days Value (per autonomy)		9.88

Additional Notes:

Battery Capacity Temperature De-rating	27%
Shade de-rating	15%

Performance Summary for Worst Month

1 Energy In (Watt-Hours)	14.08
2 Activations Per Day	300
3 Energy Out (Watt-Hours)	8.02
4 Autonomy (Days)	13.67
5 Array-to-load Ratio (ALR)	1.76
6 24-Hour Battery Usage - Depth of Cycle (%)	1.73%

*See page 3 for in-depth system details

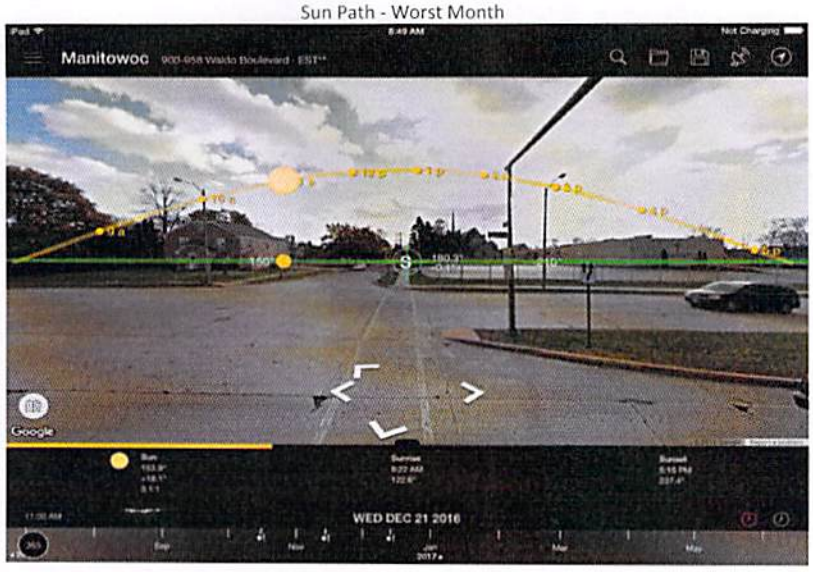
*NASA Recommended Autonomy (Days)	9.88
Minimum Recommended ALR	1.20

*eosweb.larc.nasa.gov

Energy Balance Report

Location: Waldo Boulevard and North 9th Street, Manitowoc, WI

Sun Path - Worst Month

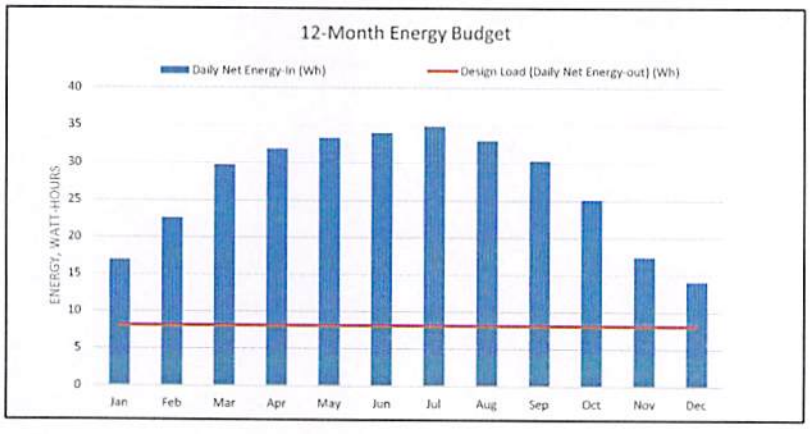


Sun Path and Shading

The image on the left depicts the sun's path during the worst month*. Both the sun's path and shading affect the amount of available energy and determines the size and performance of the system.

Solid objects such as buildings block most light, while the effect of other objects – like trees, depending on their type and time of year– varies.

Location Shade de-rating: 15%



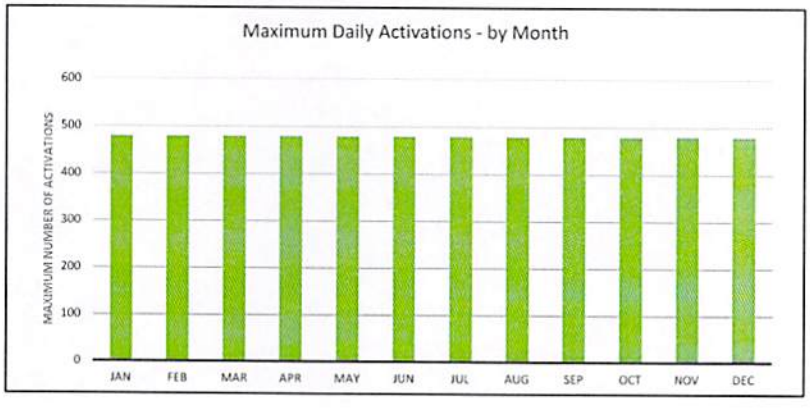
12-Month Energy Budget*

Blue bars: Energy available to run the system and charge the batteries (energy-in*).

Red line: system load (energy-out*) due to pedestrian activations.

Minimum Array-to-Load Ratio: 1.8

System: R920
Activations per day: 300
Flash Duration Setting: 20 seconds



Maximum Daily System Activations

Green bars: Maximum number of daily activations the system can support per month.

The red line on the chart above shows the simulation "design load". This is a value that is specified or, arbitrarily chosen to demonstrate typical system performance. This value remains static across all 12 months.

The chart to the left illustrates the "maximum" number of daily activations the system can sustain based on local shade-adjusted sunlight values and the conditions below:

The maximum number activations will be capped when either the mininimum array-to-load ratio (ALR) or, the minimum allowable autonomy value has been reached.

*See Glossary page 4

Energy Balance Report

SYSTEM DETAILS

ENERGY-IN CALCULATION:

	Rated Panel Wattage (Watts)	10.00	
	Worst Month Peak Sun Hours (Hours)	2.50	Sun Hours at 45° tilt angle worst month = December
	Effective Shading (%)	85%	100% is full sun. Based on worst month = December
	Peak Sun Hours Adjusted for Shading (Hours)	2.13	
	Solar Panel Energy Pre-Battery Charger (Watt-Hours)	21.26	
	Solar Panel Charge Efficiency (%)	92%	Value based on system MPPT capability
	Battery Charge Acceptance	72%	Value based on battery manufacturer's specifications
1	**Energy Into the Battery (Watt-Hours)**	**14.08**	

ENERGY-OUT CALCULATION:

	Light Bar Forward Voltage (Volts)	24.75	Operating specification
	Average Light Bar Power Based on Daytime Operation (Watts)	1.58	Operating specification
	Ambient Auto-Adjust Maximum (%)	100%	Operating specification
	Nightime Dimming (%)	30%	User-adjustable setting
	Percentage of Activations During Day (%)	90%	Input variable
	Average Light Bar Power with Night Dimming (Watts)	0.47	Calculated operating specification
	Number of Light Bars	2	Input variable
	LED Driver Efficiency (%)	95%	Lab-measured driver efficiency
2	**Activations Every 24 Hours**	**300**	Input variable per specification
	Activation Time (Seconds)	20	Input variable per specification
	Energy Management System Quiescent Current (Amps)	0.002	Operating specification
	Radio Module Quiescent Current (Amps)	0.008	Operating specification
	24-hour Quiescent Energy Consumption (Watt-Hours)	2.88	24 hours x 12V battery voltage x sum of quiescent currents
3	**Total 24-hour Energy Consumption (Watt-Hours)**	**8.02**	Quiescent, Light Bar and Pushbutton loads

SYSTEM AUTONOMY:

	Battery Capacity (Amp-Hours)	14	Operating specification - room temperature
	Battery Low Voltage Disconnect (%)	10%	Operating specification
	Battery Capacity (Watt-Hours)	151.2	Battery capacity (Ah) X 12 Volts X (1 - Battery LVD %)
	Battery Capacity Temperature De-rating Factor	73%	Reduced capacity due to temperature effects
	Temperature-Adjusted Battery Capacity (Watt-Hours)	109.7	Battery capacity X temperature de-rating factor
	Total Daily Energy Consumption (Watt-Hours)	8.02	Restated from above
4	**Autonomy (Days)**	**13.67**	Adjusted battery capacity / daily energy consumption

ARRAY TO LOAD RATIO:

	Energy Into the Battery (Watt-Hours)	14.08	Energy-in through the solar panel and EMS
	Total Daily Energy Consumption (Watt-Hours)	8.02	Energy-out through the system
5	**ALR (Energy In / Energy Out)**	**1.76**	Recommended minimum = 1.2

DAILY DEPTH OF DISCHARGE:

	Nominal Battery Capacity (Watt-Hours)	168	Battery capacity (Ah) x battery voltage (12V)
	Proportion of Daytime Energy drawn from Battery (Watt-Hours)	0.94	Energy-out through the system - daytime activations
	Nighttime Energy drawn from Battery (Watt-Hours)	1.97	Energy-out through the system - nighttime activations
	Energy Provided by Battery Only (Watt-Hours)	2.91	Total energy battery supplies system during a 24-hr cycle
6	**24-Hour Battery Usage - Depth of Cycle %**	**1.73%**	Daily Cyclical Battery Capacity Used

Glossary

12-Month Energy Budget: The amount of daily energy available during any month to run the system and charge the batteries plotted against the amount of daily energy used for a specified usage model - the "design load".

Activations per Day: The number of times a pedestrian activates the system for the pre-defined flash duration. This is the period when the system is using the most energy.

Array-to-Load Ratio (ALR): Defined as the total system energy consumption (Energy-Out) divided into the net energy available to the system (Energy In) on a day during the worst month. It is an accepted industry practice to specify a minimum ALR of 1.2:1 in order to account for variability of sunlight energy over time. Providing a sufficient ALR will help ensure that the batteries will return to a full-state of charge at the end of each charging day.

Autonomy/NASA No-Sun Days Value: The length of time (in days) that a system can function without sunlight (insolation). NASA provides guidelines for battery sizing and autonomous operation in the form of "No-Sun Days" values for a given location. "No-Sun Days" are not predictable periods of consecutive darkness and serve only as a guideline for battery sizing. For autonomy calculations, net battery capacity is adjusted for the effect of temperature (during the worst month of sunlight) and low-voltage-disconnect (LVD) (see LVD definition below).

Battery Depth of Cycle/Depth of Discharge: The percentage of battery capacity used on a daily basis. This value considers times when sunlight can power LED fixtures directly, eliminating the need to draw from the battery. For lead-acid batteries, reducing the depth of discharge dramatically improves battery life. **Note:** For a system activated during the daytime only, the battery will power the system during dawn and dusk when insolation levels are lowest.

Daily Quiescent Energy: The passive energy drawn (measured in watt-hours) by a system when it is idle. This includes the power draw of the main circuit board (EMS), radio communications, the push button system, and third-party device loads if present.

Energy-In: The total amount of useable energy collected by the solar panel during a 24-hour period. This value accounts for efficiencies between the solar panel and the battery, as well as shade de-rating. Efficiencies related to the charge controller and battery-charge acceptance are also factors.

Energy-Out: The total energy used by a system in a 24-hour period based on the stated number of activations per day. It includes Daily Quiescent Energy (see definition above)

Low-Voltage-Disconnect (LVD): The voltage at which the system will not flash when activated. LVD is a temporary state and is the result of too little sunlight or too many activations. LVD ensures that a minimal charge is retained in the battery to enable system recovery and to protect against permanent battery damage.

Location Shade De-Rating: Percentage of available sunlight blocked by buildings, trees and other objects. This factor is specific to the end user's site, which is why a system is always optimally sized when its exact final installation location is known or can be simulated.

Worst Month: The month with the least sunlight, coldest temperatures, and highest RRFB load over 24 hours.

Energy Management System (EMS): The control module inside the Carmanah RRFB responsible for all aspects of energy management and system control.

Maximum Power Point Tracking (MPPT): MPPT dynamically maximizes the amount of power the solar panel can produce by allowing the solar panel voltage to operate at its optimal point independentlof the battery voltage.