



## Ocean County Board of Commissioners

OFFICE OF THE  
OCEAN COUNTY COMMISSIONERS

Director Barbara Jo Crea  
Deputy Director Gary Quinn  
Commissioner Virginia E. Haines  
Commissioner John P. Kelly  
Commissioner Frank Sadeghi

101 Hooper Avenue  
Toms River, New Jersey  
08754-2191  
(732)929-2005  
(732)505-1918

### Board Meeting Agenda

Date: March 20, 2024 - 4:00 PM  
Location: Administration Building  
Room 119  
101 Hooper Avenue  
Toms River, NJ 08754

Agenda: Awarding a Contract for the furnishing and delivery of SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II to National Highway Products, Inc., the sole qualified bidder. (B2024-44)

<b>Official Resolution#</b>		<b>2024000385</b>					
Meeting Date		03/20/2024					
Introduced Date		03/20/2024					
Adopted Date		03/20/2024					
Agenda Item		k-1					
CAF #							
Purchase Req. #		B2024-44					
Result		Adopted					
COUNTY COMMISSIONER	PRES.	ABS.	MOVE	SEC	AYE	NAY	ABST.
Crea	✓				✓		
Quinn	✓			✓	✓		
Haines	✓		✓		✓		
Kelly	✓				✓		
Sadeghi	✓				✓		

I HEREBY CERTIFY THAT THIS DOCUMENT IS A TRUE, COMPLETE AND ACCURATE COPY OF THIS RESOLUTION, ADOPTED BY OCEAN COUNTY BOARD OF COMMISSIONERS, NJ AT THE MEETING REFERENCED THEREON

*Michelle I. Gunther*

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Clerk Of The Board

CONTRACT NO. MUST BE ON ALL PAPERS, DOCUMENTS, INVOICES, VOUCHERS  
NO. B2024-44

RESOLUTION

March 20, 2024

WHEREAS, on February 13, 2024, pursuant to legal advertisements therefor, sealed bids were received for the furnishing and delivery of SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II for the County of Ocean; and

WHEREAS, at the advertised time, responses were received from the following bidder:

<u>Name of Bidder</u>	<u>Address of Bidder</u>
National Highway Products, Inc.	301 Riverside Drive Millville, NJ 08332 (856) 692-7572

; and

WHEREAS, after receipt and examination of same, the County Purchasing Agent has now recommended to this Board that the sole qualified bid, according to specifications, be accepted namely that of NATIONAL HIGHWAY PRODUCTS, INC.

NOW, THEREFORE, BE IT RESOLVED by the BOARD OF COMMISSIONERS of the COUNTY OF OCEAN, STATE OF NEW JERSEY, as follows:

1. The Director and Clerk of this Board are hereby authorized and directed to enter into a contract for the furnishing and delivery of Solar Powered LED Chevron Radar Signs and Curve Warning System No. II for the County of Ocean, from date of award through March 19, 2025, a period of one (1) year, OR until delivery is complete unless otherwise stated. The County reserves the right to extend the term of the contract pursuant to N.J.S.A. 40A:11-15.

A. NATIONAL HIGHWAY PRODUCTS, INC. for twenty nine (29) items, to wit:

ITEM NOS. 1, 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L, 1M, 2, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2I, 2J, 2K, 2L, 2M and 3.

For a Total Lump Sum Award Item 1 (Item #'s 1 - 1M) of \$31,988.00.

For a Total Lump Sum Award Item 2 (Item #'s 2 - 2M) of \$79,970.00.

For a Total Lump Sum Award Item 3 (Item #3) of \$27,150.00.

This vendor has extended this contract to County Cooperative Contract System Participants.

2. Payments for the equipment to be acquired by this contract shall be made upon the approval of vouchers submitted by the successful bidders in accordance with the requirements of the Board of Commissioners and subject to the Board of Commissioners customary procedures. Delivery shall be made upon receipt of a Purchase Order issued by the Ocean County Department of Purchase, upon which delivery locations and needed quantities shall be indicated.

3. Funds for the equipment shall be available within the following funding Source: Engineering Department O.E.

4. The contract number must be placed on all papers, documents, invoices and vouchers pertaining to said contract, the number being B2024-44.

BE IT FURTHER RESOLVED that certified copies of this Resolution shall be made available to the County Auditor, County Department of Purchasing, Department of Finance, County Engineer, and National Highway Products, Inc., the successful bidder.

PROPOSAL DOCUMENT REPORT

Bid No. TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

**11. Submission of Bid Package\***

By submitting a response to this solicitation, the Vendor understands and acknowledges that all required documents to this solicitation must be submitted and that failure to do so may be cause for rejection.

Bidder also understands that only one (1) bid submission shall be considered. Please DO NOT Submit a manual bid response. Submitting a manual response in addition to the electronic response is cause for rejection of your bid.

Confirmed

**PRICE TABLES**

**ITEM #1 - SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL**

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
1	Solar Chevron Radar Sign, 30" X 36", As Specified or Equal	4	EA	\$3,890.00	\$15,560.00		trafficalm			
<b>OPTIONS</b>										
1A	Sign Assembly, As Specified or Equal	4	EA	\$735.00	\$2,940.00		trafficalm			
1B	Cabinet, As Specified or Equal	4	EA	\$200.00	\$800.00		trafficalm			
1C	Round Pole Banding Bracket, As Specified or Equal	4	EA	\$1.00	\$4.00		trafficalm			

Introduced on: March 20, 2024

Adopted on: March 20, 2024

Official Resolution#: 2024005385

Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

PROPOSAL DOCUMENT REPORT

Bid No. TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
✓ 1D	Square Pole Bolt-Through Bracket, As Specified or Equal	4	EA	\$1.00	\$4.00		trafficalm			
✓ 1E	Multi-Purpose Bracket, As Specified or Equal	4	EA	\$1.00	\$4.00		trafficalm			
✓ 1F	Controller, As Specified or Equal	4	EA	\$900.00	\$3,600.00		trafficalm			
✓ 1G	Wireless Radio, As Specified or Equal	4	EA	\$155.00	\$620.00		trafficalm			
✓ 1H	Solar Panel, As Specified or Equal	4	EA	\$487.00	\$1,948.00		trafficalm			
✓ 1I	Top-of-Pole Bracket, As Specified or Equal	4	EA	\$123.00	\$492.00		trafficalm			
✓ 1J	Side-of-Pole Bracket, As Specified or Equal	4	EA	\$153.00	\$612.00		trafficalm			
✓ 1K	Battery, As Specified or Equal	4	EA	\$135.00	\$540.00		trafficalm			

Introduced on: March 20, 2024

Adopted on: March 20, 2024

Official Resolution #: 2024-00535

Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

PROPOSAL DOCUMENT REPORT

Bid No..TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
✓ 1L	Radar Detection, As Specified or Equal	4	EA	\$456.00	\$1,824.00		trafficalm			
✓ 1M	Heavy Duty Pole Package with Anchor Bolts, As Specified or Equal	4	EA	\$760.00	\$3,040.00		trafficalm			
<b>TOTAL</b>					<b>\$31,988.00</b>					

ITEM #2 - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR EQUAL

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
✓ 2	Solar Chevron Radar Sign, 30" X 36", Ruggedized, As Specified or Equal	10	EA	\$3,890.00	\$38,900.00		trafficalm			
<b>OPTIONS</b>										
✓ 2A	Sign Assembly, As Specified or Equal	10	EA	\$735.00	\$7,350.00		trafficalm			
✓ 2B	Cabinet, As Specified or Equal	10	EA	\$200.00	\$2,000.00		trafficalm			

Introduced on: March 20, 2024

Adopted on: March 20, 2024

Official Resolution #: 2024006385

Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

PROPOSAL DOCUMENT REPORT

Bid No. TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
✓ 2C	Round Pole Banding Bracket, As Specified or Equal	10	EA	\$1.00	\$10.00		trafficalm			
✓ 2D	Square Pole Bolt-Through Bracket, As Specified or Equal	10	EA	\$1.00	\$10.00		trafficalm			
✓ 2E	Multi-Purpose Bracket, As Specified or Equal	10	EA	\$1.00	\$10.00		trafficalm			
✓ 2F	Controller, As Specified or Equal	10	EA	\$900.00	\$9,000.00		trafficalm			
✓ 2G	Wireless Radio, As Specified or Equal	10	EA	\$155.00	\$1,550.00		trafficalm			
✓ 2H	Solar Panel, As Specified or Equal	10	EA	\$487.00	\$4,870.00		trafficalm			
✓ 2I	Top-of-Pole Bracket, As Specified or Equal	10	EA	\$123.00	\$1,230.00		trafficalm			
✓ 2J	Side-of-Pole Bracket, As Specified or Equal	10	EA	\$153.00	\$1,530.00		trafficalm			

Introduced on: March 20, 2024

Adopted on: March 20, 2024  
 Official Resolution#: 202400585

Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

PROPOSAL DOCUMENT REPORT

Bid No. TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
2K	Battery, As Specified or Equal	10	EA	\$135.00	\$1,350.00		trafficalm			
2L	Radar Detection, As Specified or Equal	10	EA	\$456.00	\$4,560.00		trafficalm			
2M	Heavy Duty Pole Package with Anchor Bolts, As Specified or Equal	10	EA	\$760.00	\$7,600.00		trafficalm			
<b>TOTAL</b>					<b>\$79,970.00</b>					

ITEM #3 - CURVE WARNING SYSTEM, AS SPECIFIED OR EQUAL

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model:	Warranty:	Delivery, A.R.O.:	Comments:
3	Curve Warning System, As Specified or Equal	10	EA	\$2,715.00	\$27,150.00		trafficalm	5 years	10 weeks aro	
<b>TOTAL</b>					<b>\$27,150.00</b>					

Introduced on: March 20, 2024

Adopted on: March 20, 2024

Official Resolution # 202400585

PROPOSAL DOCUMENT REPORT

Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM NO. II



✓ ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30” X 36”, AS SPECIFIED OR EQUAL

COMPLIANCE  
YES      NO

DESCRIPTION:

Solar-powered sign assembly which alerts traffic to upcoming roadway curvature, including illuminated LEDs activated via radar detection.

    

SIGN ASSEMBLY:

Sign assembly shall be compatible with TAPCO® BlinkerSign interconnectivity.

    

Sign assembly shall conform to TAPCO-Integrated BlinkerSign® or equal and shall conform to TAPCO® drawing number 2180-00225DF, except the sign size shall be 30” W X 36” H.

    

Sign shall conform to Section 2A.08 of the Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition (MUTCD), as it relates to retroreflectivity and illumination.

    

Sign face shall conform to designation W1-8L or W1-8R as described in Section 2C.09 of the MUTCD, except for 10 holes situated along the outline of the black chevron, of a size and shape appropriate for the display of light-emitting diodes (LEDs).

    

Sign shall measure 30” W x 36” H in accordance with MUTCD Table 2C-2.

    

Sign blanks shall be aluminum, with a thickness of 0.080”.

    

Sheeting used shall be 3M DG3 diamond grade, or approved equal, with anti-graffiti overlay.

    

Sign assembly shall include an LED string with 10 amber LEDs and 18” leads, fastened to the rear of the sign blank with aluminum wire channels, arranged in such a way that each LED can be seen through its own hole in the sign blank. This arrangement shall conform to TAPCO® drawing number 2180-00225DF.

    

All electronic wiring shall be protected with liquid-tight conduit, and all connections shall conform to an Ingress Protection rating of IP-65 or better.

    

CABINET:

NEMA 3R type certification.

    

The cabinet shall be made of 0.080” aluminum.

    

The cabinet shall have two tamper-resistant stainless steel hinges.

    

The cabinet shall have four stainless steel studs for various mounting bracket options including banding, U-bolt, wall-mount, square pole, and wood post.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**CABINET: (CONT'D)**

The cabinet shall have replaceable #2 traffic lock with keys.

The cabinet shall have screened vents on the side and door.

The cabinet shall have screened drainage holes on the bottom.

The cabinet shall have UV resistant labels applied to the exterior of the cabinet outlining model number, serial number, and date of manufacture, as well as any applicable regulatory information.

All circuit components of the cabinet are attached or connected to a removable control panel for maintenance.

The cabinet shall have a door mounted pouch containing system documents.

The enclosure dimensions of the cabinet shall not exceed 12.5"W x 15"H x 9.9"D.

**ROUND POLE BANDING BRACKET:**

The bracket shall be made of aluminum.

The bracket shall fit 2 3/8" and larger, round poles.

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.

The hardware needed to mount to the bracket to a pole shall be banding up to 3/4" width (customer supplied). Worm drive clamp shall be included to assist in installation.

There shall be 2 brackets per cabinet.

The dimensions of the bracket shall not exceed 6.8"W x 3.7"H x 1.1"D.

**SQUARE POLE BOLT-THROUGH BRACKET:**

The bracket shall be made of aluminum.

The bracket shall fit 2" to 6" square poles.

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.

There shall be 2 brackets per cabinet.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**MULTI-PURPOSE BRACKET:**

- The bracket shall be made of aluminum.
- The bracket shall fit a 2 3/8" to 4 1/2" round pole, square wood post or wall mount.
- The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.
- The hardware needed to mount to the bracket to a pole will be included:
  - Stainless steel U-bolts for round pole mount
  - Lag bolts for square wood mount
- There shall be 2 brackets per cabinet.
- The dimensions of the bracket shall not exceed 7"W x 7.2"H x 0.7"D.

**CONTROLLER:**

- The controller shall be an IBM® Workload Scheduler controller.
- The controller shall be 6V and 12VDC with a power indicator light.
- The controller shall have 2 digital inputs.
- The controller shall have 2 two-channel outputs (able to drive two warnings per output).
- The controller shall be programmable locally using a serial input (RS232) or remotely using a cellular modem.
- The controller shall have 24/7, Dusk 'til Dawn, BlinkLink® Scheduling, Time Clock, and Custom input program activation options.
- The Controller shall have LED-Warning Control compatibility with BlinkerSign®, BlinkerBeacon™, and RRFB-XL2™.
- The controller shall have dimmable which will be:
  - Auto-adjustable via solar panel (6V systems)
  - Auto-adjustable via photocell sensor (12V systems)
- The controller shall include an internal system clock (with on-board battery backup) and provide options for activation scheduling, including user-programmable adjustments for Daylight Saving Time.
- The controller shall be capable of automatic brightness control.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**CONTROLLER: (CONT'D)**

The controller shall include an internal temperature monitor.

The controller shall be capable of operation within the temperature range of -40°F to 176°F (-40°C to 80°C).

The controller enclosure shall be conform to an Ingress Protection rating of IP-67 or better.

The dimensions of the controller enclosure shall not exceed 3.2"W x 3.7"H x 2.5"D.

**WIRELESS RADIO:**

The sign assembly shall include a BlinkerBeam® wireless radio for interconnectivity.

The radio shall be 6V and 12VDC with a power indicator light.

The radio shall have 1 digital input, micro USB.

The radio shall have 2 digital output lines, host serial lines for over the air serial.

The radio shall be programmable locally using USB port or front-mounted joystick.

The radio shall have a backlit LCD display with 4 lines at 21 characters per line.

The radio types for this radio shall be:

- Low Power Device Radio.
- Low Power Activation Radio.
- Standard Low Power Radio.
- Standard Medium Power Radio.
- Standard High Power Radio.

The radio shall have a connectivity to up to 16 devices on one network.

The frequency of the radio shall be license free 900 MHz frequency hopping spread spectrum with 10 different RF patterns to prevent interference between collocated radio systems.

The radio shall have a range up to 900 feet standard, or longer with optional antennas.

The color of the status LEDs shall be red, green, yellow, and amber.

The radio shall be FCC and ISED compliant.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36" AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES**      **NO**

**WIRELESS RADIO: (CONT'D)**

The radio shall have optional outdoor antennas:

- Omni Whip
- Omni Dome
- Omni Base Station
- Yagi (for specific applications)

The radio shall operate in temperatures ranging from -40°F to 176°F (-40°C to 80°C) and in less than 90% relative humidity.

The dimensions of the radio shall not exceed 3.2"W x 3.7"H x 2.5"D.

**SOLAR PANEL:**

The solar panel shall be 55W.

The nominal voltage shall be 12V.

The open circuit voltage shall be 22.1V.

The short circuit current shall be 3.31A.

The maximum power voltage shall be 18.18V.

The maximum power current shall be 3.1A.

The solar panel shall have tempered glass.

The frame shall be anodized aluminum.

The solar panel shall be constructed with silicon cells encapsulated in double-layer EVA with a white polymer backing.

The solar panel shall weigh 14 lbs.

The solar panel shall be IP67 rated.

The solar panel shall have various options available for mounting hardware.

The operating temperature shall be -40°F to 194°F (-40°C to 90°C).

The dimensions of the solar panel shall not exceed 25"W x 26"H x 1.5"D.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**TOP-OF-POLE BRACKET:**

- The bracket shall be aluminum.
- The bracket shall fit a 4 ½" or 3" round pole.
- The brackets hardware shall be set screws.

**SIDE-OF-POLE BRACKET:**

- The bracket shall be aluminum.
- The bracket is universal.
- The bracket shall have mounting hardware that includes banding, U-Bolt, or bolt.

**BATTERY:**

- The voltage of the battery shall be 12V.
- The capacity at C/100 shall be 50Ah.
- The vent of the battery shall be valve regulated.
- The terminal type shall be I6.
- The battery shall be non-spillable as defined by the Department of Transportation, International Commercial Airline Organization and International Airline Transport Association definitions.
- The battery weight shall not exceed 32.23 lbs.
- The dimensions of the battery shall not exceed 7.75"L x 6.49"W x 6.69"H.
- The battery shall operate in a temperature range of -40°F to 176°F (-40°C to 80°C).

**RADAR DETECTION:**

- The power input shall be 6 to 18V DC.
- The Icc@ 12V DC shall be 4.5 mA (0.054 watts).
- The radar RF out shall be 5 mW maximum.
- The radar F center shall be 24.125 GHz or 24.200 GHz.
- The pickup distance shall be up to 300 feet.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**RADAR DETECTION: (CONT'D)**

- The beam angle shall be 38° x 45°.  YES  NO
- The operating temperature shall be -40°F to 185°F (-40°C to 85°C).  YES  NO
- The beam polarization shall be linear.  YES  NO
- The serial port shall be RS232.  YES  NO
- The FCC ID shall be TIASS300.  YES  NO
- The dimensions of the radar shall not exceed 1.9"W x 2.1"H x 0.9"D  YES  NO

**HEAVY DUTY POLE PACKAGE WITH ANCHOR BOLTS:**

The domed pole cap shall be:

- Cast Aluminum  YES  NO
- Zinc Plated  YES  NO
- Fits 4 ½" outer diameter pole  YES  NO
- (3X) ¼" x ½" square head machine screws  YES  NO

The mounting brackets shall have:

- (2X) Z-bracket single sided round pole mounting bracket made of aluminum.  YES  NO
- (2X) 5/16" x 5/8" bolt and nut set.  YES  NO
- (2X) 5/16" x 1 ¼" bolt and nut set.  YES  NO

The round aluminum pole shall be: (10' 373-10, 13' 373-13, 15' 373-15)

- Schedule 40 aluminum pole.  YES  NO
- 4 ¼" outer diameter  YES  NO
- One end threaded  YES  NO

The pedestal base shall be:

- Cast Aluminum  YES  NO
- Threaded Collar  YES  NO
- Have an aluminum access door.  YES  NO
- FHWA Certified  YES  NO
- Meets or exceeds AASHTO break-away requirements.  YES  NO

The bent anchor volt shall be:

- (4X) ¾" x 18", galvanized steel bent anchor (foundation bolt), nut and washer (for frost free areas).  YES  NO
- (4X) 1" x 42", galvanized steel bent anchor (foundation bolt), nut and washer (for frost or snow covered areas).  YES  NO

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**OPTIONS:**

**1A – Sign Assembly**

Sign assembly shall be compatible with TAPCO® BlinkerSign interconnectivity.  YES  NO

Sign assembly shall conform to TAPCO-Integrated Blinkersign® or equal and shall conform to TAPCO® drawing number 2180-00225DF, except the sign size shall be 30" W X 36" H.  YES  NO

Sign shall conform to Section 2A.08 of the Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition (MUTCD), as it relates to retroreflectivity and illumination.  YES  NO

Sign face shall conform to designation W1-8L or W1-8R as described in Section 2C.09 of the MUTCD, except for 10 holes situated along the outline of the black chevron, of a size and shape appropriate for the display of light-emitting diodes (LEDs).  YES  NO

Sign shall measure 30" W x 36" H in accordance with MUTCD Table 2C-2.  YES  NO

Sign blanks shall be aluminum, with a thickness of 0.080".  YES  NO

Sheeting used shall be 3M DG3 diamond grade, or approved equal, with anti-graffiti overlay.  YES  NO

Sign assembly shall include an LED string with 10 amber LEDs and 18" leads, fastened to the rear of the sign blank with aluminum wire channels, arranged in such a way that each LED can be seen through its own hole in the sign blank. This arrangement shall conform to TAPCO® drawing number 2180-00225DF.  YES  NO

All electronic wiring shall be protected with liquid-tight conduit, and all connections shall conform to an Ingress Protection rating of IP-65 or better.  YES  NO

**1B – Cabinet**

NEMA 3R type certification.  YES  NO

The cabinet shall be made of 0.080" aluminum.  YES  NO

The cabinet shall have two tamper-resistant stainless steel hinges.  YES  NO

The cabinet shall have four stainless steel studs for various mounting bracket options including banding, U-bolt, wall-mount, square pole, and wood post.  YES  NO

The cabinet shall have replaceable #2 traffic lock with keys.  YES  NO



**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**OPTIONS: (CONT'D)**

**1B – Cabinet (Cont'd)**

- The cabinet shall have screened vents on the side and door.
- The cabinet shall have screened drainage holes on the bottom.
- The cabinet shall have UV resistant labels applied to the exterior of the cabinet outlining model number, serial number, and date of manufacture, as well as any applicable regulatory information.
- All circuit components of the cabinet are attached or connected to a removable control panel for maintenance.
- The cabinet shall have a door mounted pouch containing system documents.
- The enclosure dimensions of the cabinet shall not exceed 12.5"W x 15"H x 9.9"D.

**1C – Round Pole Banding Bracket**

- The bracket shall be made of aluminum.
- The bracket shall fit 2 3/8" and larger, round poles.
- The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.
- The hardware needed to mount to the bracket to a pole shall be banding up to 3/4" width (customer supplied). Worm drive clamp shall be included to assist in installation.
- There shall be 2 brackets per cabinet.
- The dimensions of the bracket shall not exceed 6.8"W x 3.7"H x 1.1"D.

**1D – Square Pole Bolt-Through Bracket**

- The bracket shall be made of aluminum.
- The bracket shall fit 2" to 6" square poles.
- The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.
- There shall be 2 brackets per cabinet.

**ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**OPTIONS: (CONT'D)**

**1E – Multi-Purpose Bracket**

- The bracket shall be made of aluminum.
- The bracket shall fit a 2 3/8" to 4 1/2" round pole, square wood post or wall mount.
- The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.
- The hardware needed to mount to the bracket to a pole will be included:
  - Stainless steel U-bolts for round pole mount
  - Lag bolts for square wood mount
- There shall be 2 brackets per cabinet.
- The dimensions of the bracket shall not exceed 7"W x 7.2"H x 0.7"D.

**1F – Controller**

- The controller shall be an IBM® Workload Scheduler controller.
- The controller shall be 6V and 12VDC with a power indicator light.
- The controller shall have 2 digital inputs.
- The controller shall have 2 two-channel outputs (able to drive two warnings per output).
- The controller shall be programmable locally using a serial input (RS232) or remotely using a cellular modem.
- The controller shall have 24/7, Dusk 'til Dawn, BlinkLink® Scheduling, Time Clock, and Custom input program activation options.
- The Controller shall have LED-Warning Control compatibility with BlinkerSign®, BlinkerBeacon™, and RRFB-XL2™.
- The controller shall have dimmable which will be:
  - Auto-adjustable via solar panel (6V systems)
  - Auto-adjustable via photocell sensor (12V systems)
- The controller shall include an internal system clock (with on-board battery backup) and provide options for activation scheduling, including user-programmable adjustments for Daylight Saving Time.

✓ **ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**OPTIONS: (CONT'D)**

✓ **1F – Controller (Cont'd)**

The controller shall be capable of automatic brightness control.

The controller shall include an internal temperature monitor.

The controller shall be capable of operation within the temperature range of -40°F to 176°F (-40°C to 80°C).

The controller enclosure shall be conform to an Ingress Protection rating of IP-67 or better.

The dimensions of the controller enclosure shall not exceed 3.2"W x 3.7"H x 2.5"D.

✓ **1G – Wireless Radio**

The sign assembly shall include a BlinkerBeam® wireless radio for interconnectivity.

The radio shall be 6V and 12VDC with a power indicator light.

The radio shall have 1 digital input, micro USB.

The radio shall have 2 digital output lines, host serial lines for over the air serial.

The radio shall be programmable locally using USB port or front-mounted joystick.

The radio shall have a backlit LCD display with 4 lines at 21 characters per line.

The radio types for this radio shall be:

- Low Power Device Radio.
- Low Power Activation Radio.
- Standard Low Power Radio.
- Standard Medium Power Radio.
- Standard High Power Radio.

The radio shall have a connectivity to up to 16 devices on one network.

The frequency of the radio shall be license free 900 MHz frequency hopping spread spectrum with 10 different RF patterns to prevent interference between collocated radio systems.

The radio shall have a range up to 900 feet standard, or longer with optional antennas.

The color of the status LEDs shall be red, green, yellow, and amber.

✓ **ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**  
**YES NO**

**OPTIONS: (CONT'D)**

✓ **1G – Wireless Radio (Cont'd)**

The radio shall be FCC and ISED compliant.

The radio shall have optional outdoor antennas:

- Omni Whip
- Omni Dome
- Omni Base Station
- Yagi (for specific applications)

The radio shall operate in temperatures ranging from -40°F to 176°F (-40°C to 80°C) and in less than 90% relative humidity.

The dimensions of the radio shall not exceed 3.2"W x 3.7"H x 2.5"D.

✓ **1H – Solar Panel**

The solar panel shall be 55W.

The nominal voltage shall be 12V.

The open circuit voltage shall be 22.1V.

The short circuit current shall be 3.31A.

The maximum power voltage shall be 18.18V.

The maximum power current shall be 3.1A.

The solar panel shall have tempered glass.

The frame shall be anodized aluminum.

The solar panel shall be constructed with silicon cells encapsulated in double-layer EVA with a white polymer backing.

The solar panel shall weigh 14 lbs.

The solar panel shall be IP67 rated.

The solar panel shall have various options available for mounting hardware.

The operating temperature shall be -40°F to 194°F (-40°C to 90°C).

Introduced on: March 20, 2024  
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Official Resolution#: 2024000385

✓ **ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**

**YES**      **NO**

**OPTIONS: (CONT'D)**

✓ **1H – Solar Panel (Cont'd)**

The dimensions of the solar panel shall not exceed 25"W x 26"H x 1.5"D.

    

✓ **1I – Top-Of-Pole Bracket**

The bracket shall be aluminum.

    

The bracket shall fit a 4 1/2" or 3" round pole.

    

The brackets hardware shall be set screws.

    

✓ **1J – Side-Of-Pole Bracket**

The bracket shall be aluminum.

    

The bracket is universal.

    

The bracket shall have mounting hardware that includes banding, U-Bolt, or bolt.

    

✓ **1K – Battery**

The voltage of the battery shall be 12V.

    

The capacity at C/100 shall be 50Ah.

    

The vent of the battery shall be valve regulated.

    

The terminal type shall be I6.

    

The battery shall be non-spillable as defined by the Department of Transportation, International Commercial Airline Organization and International Airline Transport Association definitions.

    

The battery weight shall not exceed 32.23 lbs.

    

The dimensions of the battery shall not exceed 7.75"L x 6.49"W x 6.69"H.

    

The battery shall operate in a temperature range of -40°F to 176°F (-40°C to 80°C).

    

Introduced on: March 20, 2024

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✓ **ITEM #1 – SOLAR CHEVRON RADAR SIGN, 30" X 36", AS SPECIFIED OR EQUAL (CONT'D)**

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

**1L – Radar Detection**

The power input shall be 6 to 18V DC.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The icc@ 12V DC shall be 4.5 mA (0.054 watts).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The radar RF out shall be 5 mW maximum.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The radar F center shall be 24.125 GHz or 24.200 GHz.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The pickup distance shall be up to 300 feet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The beam angle shall be 38° x 45°.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The operating temperature shall be -40°F to 185°F (-40°C to 85°C).	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The beam polarization shall be linear.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The serial port shall be RS232.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
The FCC ID shall be TIASS300.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
The dimensions of the radar shall not exceed 1.9"W x 2.1"H x 0.9"D	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**1M – Heavy Duty Pole Package With Anchor Bolts**

The domed pole cap shall be:

• Cast Aluminum	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• Zinc Plated	<input type="checkbox"/>	<input checked="" type="checkbox"/>
• Fits 4 ½" outer diameter pole	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• (3X) ¼" x ½" square head machine screws	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The mounting brackets shall have:

• (2X) Z-bracket single sided round pole mounting bracket made of aluminum.	<input type="checkbox"/>	<input type="checkbox"/>
• (2X) 5/16" x 5/8" bolt and nut set.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• (2X) 5/16" x 1 ¾" bolt and nut set.	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The round aluminum pole shall be: (10' 373-10, 13' 373-13, 15' 373-15)

• Schedule 40 aluminum pole.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• 4 ¼" outer diameter	<input checked="" type="checkbox"/>	<input type="checkbox"/>
• One end threaded	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Introduced on: March 20, 2024  
 Adopted on: March 20, 2024  
 Official Resolution#: 2024000385

**COMPLIANCE**  
**YES NO**

**OPTIONS: (CONT'D)**

**1M – Heavy Duty Pole Package With Anchor Bolts (Cont'd)**

The pedestal base shall be:

- Cast Aluminum
- Threaded Collar
- Have an aluminum access door.
- FHWA Certified
- Meets or exceeds AASHTO break-away requirements.

The bent anchor bolt shall be:

- (4X) 3/4" x 18", galvanized steel bent anchor (foundation bolt), nut and washer (for frost free areas).
- (4X) 1" x 42", galvanized steel bent anchor (foundation bolt), nut and washer (for frost or snow-covered areas).

**COMPLIANCE**

**YES NO**

**DESCRIPTION:**

Ruggedized solar-powered sign assembly which alerts traffic to upcoming roadway curvature, including illuminated LEDs activated via radar detection.

**SIGN ASSEMBLY:**

Sign assembly shall be compatible with TAPCO® Blinkersign interconnectivity.

Sign assembly shall conform to TAPCO-Integrated Blinkersign® - Ruggedized specifications or equal and shall conform to TAPCO® drawing number 30R011 except the sign size shall be 30" W x 36" H.

Sign shall conform to Section 2A.08 of the Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition (MUTCD), as it relates to retroreflectivity and illumination.

Sign face shall conform to designation W1-8L or W1-8R as described in Section 2C.09 of the MUTCD, except for 10 holes situated along the outline of the black chevron, of a size and shape appropriate for the display of light-emitting diodes (LEDs).

Sign shall measure 30" W x 36" H in accordance with MUTCD Table 2C-2.

Sign substrate shall consist of extra thick 0.10" aluminum front plate and standard 0.080" aluminum back plate. An extra thick 0.750" HDPE substrate with routed enclosure channels High Density Polyethylene substrate shall be between the front and back plates.

Sheeting used shall be 3M DG3 diamond grade, or approved equal, with anti-graffiti overlay.

Sign shall have environmentally sealed, high power 1 watt LEDs which have a life expectancy of 100,000 hours.

Sign assembly shall include an LED string with 10 amber LEDs and 18" leads, fastened to the rear of the sign blank with aluminum wire channels, arranged in such a way that each LED can be seen through its own hole in the sign blank. This arrangement shall conform to TAPCO® drawing number 30R011.

All electronic wiring shall be protected with liquid-tight conduit, and all connections shall conform to an Ingress Protection rating of IP-65 or better.

Sign shall be visible for more than 1,000 feet in the daytime and for more than 1 mile in the nighttime.

Sign shall have Z-bar standard, single post and double post mounting brackets.

Introduced on: March 20, 2024

**APPROVED - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONTD)**



**COMPLIANCE**

**YES**      **NO**

**SIGN ASSEMBLY: (CONT'D)**

Sign shall be capable of operating in temperature that range from -40°F to 122°F (-40°C to 50°C).

    

**CABINET:**

NEMA 3R type certification.

    

The cabinet shall be made of 0.080" aluminum.

    

The cabinet shall have two tamper-resistant stainless steel hinges.

    

The cabinet shall have four stainless steel studs for various mounting bracket options including banding, U-bolt, wall-mount, square pole, and wood post.

    

The cabinet shall have replaceable #2 traffic lock with keys.

    

The cabinet shall have screened vents on the side and door.

    

The cabinet shall have screened drainage holes on the bottom.

    

The cabinet shall have UV resistant labels applied to the exterior of the cabinet outlining model number, serial number, and date of manufacture, as well as any applicable regulatory information.

    

All circuit components of the cabinet are attached or connected to a removable control panel for maintenance.

    

The cabinet shall have a door mounted pouch containing system documents.

    

The enclosure dimensions of the cabinet shall not exceed 12.5"W x 15"H x 9.9"D.

    

**ROUND POLE BANDING BRACKET:**

The bracket shall be made of aluminum.

    

The bracket shall fit 2 3/8" and larger, round poles.

    

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.

    

The hardware needed to mount to the bracket to a pole shall be banding up to 3/4" width (customer supplied). Worm drive clamp shall be included to assist in installation.

    

**ITEM #2: - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

Adopted on: March 20, 2024  
 Official File Number: 2024000385

**EQUAL (CONT'D)**

**COMPLIANCE**  
**YES**      **NO**

**ROUND POLE BANDING BRACKET: (CONT'D)**

There shall be 2 brackets per cabinet.      

The dimensions of the bracket shall not exceed 6.8"W x 3.7"H x 1.1"D.      

**SQUARE POLE BOLT-THROUGH BRACKET:**

The bracket shall be made of aluminum.      

The bracket shall fit 2" to 6" square poles.      

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.      

There shall be 2 brackets per cabinet.      

**MULTI-PURPOSE BRACKET:**

The bracket shall be made of aluminum.      

The bracket shall fit a 2 3/8" to 4 1/2" round pole, square wood post or wall mount.      

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.      

The hardware needed to mount to the bracket to a pole will be included:

- Stainless steel U-bolts for round pole mount
- Lag bolts for square wood mount

There shall be 2 brackets per cabinet.      

The dimensions of the bracket shall not exceed 7"W x 7.2"H x 0.7"D.      

**CONTROLLER:**

The controller shall be an IBM® Workload Scheduler controller.      

The controller shall be 6V and 12VDC with a power indicator light.      

The controller shall have 2 digital inputs.      

The controller shall have 2 two-channel outputs (able to drive two warnings per output).

**COMPLIANCE**  
**YES**      **NO**

**CONTROLLER: (CONT'D)**

The controller shall be programmable locally using a serial input (RS232) or remotely using a cellular modem.      

The controller shall have 24/7, Dusk 'til Dawn, BlinkLink® Scheduling, Time Clock, and Custom input program activation options.      

The Controller shall have LED-Warning Control compatibility with BlinkerSign®, BlinkerBeacon™, and RRFB-XL2™.      

The controller shall have dimmable which will be:

- Auto-adjustable via solar panel (6V systems)
- Auto-adjustable via photocell sensor (12V systems)

The controller shall include an internal system clock (with on-board battery backup) and provide options for activation scheduling, including user-programmable adjustments for Daylight Saving Time.      

The controller shall be capable of automatic brightness control.      

The controller shall include an internal temperature monitor.      

The controller shall be capable of operation within the temperature range of -40°F to 176°F (-40°C to 80°C).      

The controller enclosure shall be conform to an Ingress Protection rating of IP-67 or better.      

The dimensions of the controller enclosure shall not exceed 3.2"W x 3.7"H x 2.5"D.      

**WIRELESS RADIO:**

The sign assembly shall include a BlinkerBeam® wireless radio for interconnectivity.      

The radio shall be 6V and 12VDC with a power indicator light.      

The radio shall have 1 digital input, micro USB.      

The radio shall have 2 digital output lines, host serial lines for over the air serial.      

The radio shall be programmable locally using USB port or front-mounted joystick.      

The radio shall have a backlit LCD display with 4 lines at 21 characters per line.

**COMPLIANCE**

**YES      NO**

**WIRELESS RADIO: (CONT'D)**

The radio types for this radio shall be:

- Low Power Device Radio.
- Low Power Activation Radio.
- Standard Low Power Radio.
- Standard Medium Power Radio.
- Standard High Power Radio.

The radio shall have a connectivity to up to 16 devices on one network.

The frequency of the radio shall be license free 900 MHz frequency hopping spread spectrum with 10 different RF patterns to prevent interference between collocated radio systems.

The radio shall have a range up to 900 feet standard, or longer with optional antennas.

The color of the status LEDs shall be red, green, yellow, and amber.

The radio shall be FCC and ISED compliant.

The radio shall have optional outdoor antennas:

- Omni Whip
- Omni Dome
- Omni Base Station
- Yagi (for specific applications)

The radio shall operate in temperatures ranging from -40°F to 176°F (-40°C to 80°C) and in less than 90% relative humidity.

The dimensions of the radio shall not exceed 3.2"W x 3.7"H x 2.5"D.

**SOLAR PANEL:**

The solar panel shall be 55W.

The nominal voltage shall be 12V.

The open circuit voltage shall be 22.1V.

The short circuit current shall be 3.31A.

The maximum power voltage shall be 18.18V.

Introduced on: March 20, 2024

**ITEM #2 - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

**EQUAL (CONT'D)**

Official Resolution #: 2024000385

**COMPLIANCE**

**YES**      **NO**

**SOLAR PANEL: (CONT'D)**

- The maximum power current shall be 3.1A.
- The solar panel shall have tempered glass.
- The frame shall be anodized aluminum.
- The solar panel shall be constructed with silicon cells encapsulated in double-layer EVA with a white polymer backing.
- The solar panel shall weigh 14 lbs.
- The solar panel shall be IP67 rated.
- The solar panel shall have various options available for mounting hardware.
- The operating temperature shall be -40°F to 194°F (-40°C to 90°C).
- The dimensions of the solar panel shall not exceed 25"W x 26"H x 1.5"D.

**TOP-OF-POLE BRACKET:**

- The bracket shall be aluminum.
- The bracket shall fit a 4 ½" or 3" round pole.
- The brackets hardware shall be set screws.

**SIDE-OF-POLE BRACKET:**

- The bracket shall be aluminum.
- The bracket is universal.
- The bracket shall have mounting hardware that includes banding, U-Bolt, or bolt.

**BATTERY:**

- The voltage of the battery shall be 12V.
- The capacity at C/100 shall be 50Ah.
- The vent of the battery shall be valve regulated.
- The terminal type shall be I6.

**ITEM #3 - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

Adopted on: March 20, 2024  
 Council Resolution: 202400385

**COMPLIANCE**

**YES      NO**

**BATTERY: (CONT'D)**

The battery shall be non-spillable as defined by the Department of Transportation, International Commercial Airline Organization and International Airline Transport Association definitions.

    

The battery weight shall not exceed 32.23 lbs.

    

The dimensions of the battery shall not exceed 7.75”L x 6.49”W x 6.69”H.

    

The battery shall operate in a temperature range of -40°F to 176°F (-40°C to 80°C).

    

**RADAR DETECTION:**

The power input shall be 6 to 18V DC.

    

The icc@ 12V DC shall be 4.5 mA (0.054 watts).

    

The radar RF out shall be 5 mW maximum.

    

The radar F center shall be 24.125 GHz or 24.200 GHz.

    

The pickup distance shall be up to 300 feet.

    

The beam angle shall be 38° x 45°.

    

The operating temperature shall be -40°F to 185°F (-40°C to 85°C).

    

The beam polarization shall be linear.

    

The serial port shall be RS232.

    

The FCC ID shall be TIASS300.

    

The dimensions of the radar shall not exceed 1.9”W x 2.1”H x 0.9”D

    

**HEAVY DUTY POLE PACKAGE WITH ANCHOR BOLTS:**

The domed pole cap shall be:

- Cast Aluminum
- Zinc Plated
- Fits 4 ½” outer diameter pole
- (3X) ¼” x ½” square head machine screws

    

    

    

    

✓ **ITEM #2 - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

Adopted on: March 20, 2024  
Official Resolution #: 2024000385

**BATTERY (CONT'D)**

**COMPLIANCE**  
YES      NO

**HEAVY DUTY POLE PACKAGE WITH ANCHOR BOLTS: (CONT'D)**

The mounting brackets shall have:

- (2X) Z-bracket single sided round pole mounting bracket made of aluminum.
- (2X) 5/16" x 5/8" bolt and nut set.
- (2X) 5/16" x 1 3/4" bolt and nut set.

The round aluminum pole shall be: (10' 373-10, 13' 373-13, 15' 373-15)

- Schedule 40 aluminum pole.
- 4 1/4" outer diameter
- One end threaded

The pedestal base shall be:

- Cast Aluminum
- Threaded Collar
- Have an aluminum access door.
- FHWA Certified
- Meets or exceeds AASHTO break-away requirements.

The bent anchor volt shall be:

- (4X) 3/4" x 18", galvanized steel bent anchor (foundation bolt), nut and washer (for frost free areas).
- (4X) 1" x 42", galvanized steel bent anchor (foundation bolt), nut and washer (for frost or snow-covered areas).

**OPTIONS:**

✓ **2A – Sign Assembly**

Sign assembly shall be compatible with TAPCO® Blinkersign interconnectivity.

Sign assembly shall conform to TAPCO-Integrated Blinkersign® - Ruggedized specifications or equal and shall conform to TAPCO® drawing number 30R011 except the sign size shall be 30" W x 36" H.

Sign shall conform to Section 2A.08 of the Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition (MUTCD), as it relates to retroreflectivity and illumination.

Sign face shall conform to designation W1-8L or W1-8R as described in Section 2C.09. of the MUTCD, except for 10 holes situated along the outline of the black chevron, of a size and shape appropriate for the display of light-emitting diodes (LEDs).

Sign shall measure 30" W x 36" H in accordance with MUTCD Table 2C-2.

**COMPLIANCE**

**YES      NO**

**OPTIONS:**

**2A – Sign Assembly (Cont'd)**

Sign substrate shall consist of extra thick 0.10” aluminum front plate and standard 0.080” aluminum back plate. An extra thick 0.750” HDPE substrate with routed enclosure channels High Density Polyethylene substrate shall be between the front and back plates.

    

Sheeting used shall be 3M DG3 diamond grade, or approved equal, with anti-graffiti overlay.

    

Sign shall have environmentally sealed, high power 1 watt LEDs which have a life expectancy of 100,000 hours.

    

Sign assembly shall include an LED string with 10 amber LEDs and 18” leads, fastened to the rear of the sign blank with aluminum wire channels, arranged in such a way that each LED can be seen through its own hole in the sign blank. This arrangement shall conform to TAPCO® drawing number 30R011.

    

All electronic wiring shall be protected with liquid-tight conduit, and all connections shall conform to an Ingress Protection rating of IP-65 or better.

    

Sign shall be visible for more than 1,000 feet in the daytime and for more than 1 mile in the nighttime.

    

Sign shall have Z-bar standard, single post and double post mounting brackets.

    

Sign shall be capable of operating in temperature that range from -40°F to 122°F (-40°C to 50°C).

    

**2B – Cabinet**

NEMA 3R type certification.

    

The cabinet shall be made of 0.080” aluminum.

    

The cabinet shall have two tamper-resistant stainless steel hinges.

    

The cabinet shall have four stainless steel studs for various mounting bracket options including banding, U-bolt, wall-mount, square pole, and wood post.

    

The cabinet shall have replaceable #2 traffic lock with keys.

    

The cabinet shall have screened vents on the side and door.

    

**ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30” X 36”, RUGGEDIZED, AS SPECIFIED OR**

**EQUAL (CONT'D)**  
Approved: March 20, 2024  
Official Resolution#: 2024000385

**COMPLIANCE**



YES      NO

**OPTIONS: (CONT'D)**

**2B – Cabinet (Cont'd)**

The cabinet shall have screened drainage holes on the bottom.      

The cabinet shall have UV resistant labels applied to the exterior of the cabinet outlining model number, serial number, and date of manufacture, as well as any applicable regulatory information.      

All circuit components of the cabinet are attached or connected to a removable control panel for maintenance.      

The cabinet shall have a door mounted pouch containing system documents.      

The enclosure dimensions of the cabinet shall not exceed 12.5"W x 15"H x 9.9"D.      

**2C – Round Pole Banding Bracket**

The bracket shall be made of aluminum.      

The bracket shall fit 2 3/8" and larger, round poles.      

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.      

The hardware needed to mount to the bracket to a pole shall be banding up to 3/4" width (customer supplied). Worm drive clamp shall be included to assist in installation.      

There shall be 2 brackets per cabinet.      

The dimensions of the bracket shall not exceed 6.8"W x 3.7"H x 1.1"D.      

**2D – Square Pole Bolt-Through Bracket**

The bracket shall be made of aluminum.      

The bracket shall fit 2" to 6" square poles.      

The hardware needed to mount the bracket to the cabinet shall be stainless steel and included.      

There shall be 2 brackets per cabinet.      

**ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)**

YES      NO

**OPTIONS: (CONT'D)**

✓ **2E – Multi-Purpose Bracket**

- |  |                                     |                          |
|--|-------------------------------------|--------------------------|
| The bracket shall be made of aluminum.   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| The bracket shall fit a 2 3/8" to 4 1/2" round pole, square wood post or wall mount.           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| The hardware needed to mount the bracket to the cabinet shall be stainless steel and included. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| The hardware needed to mount to the bracket to a pole will be included:                        |                                     |                          |
| • Stainless steel U-bolts for round pole mount   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Lag bolts for square wood mount  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| There shall be 2 brackets per cabinet.   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| The dimensions of the bracket shall not exceed 7"W x 7.2"H x 0.7"D.                            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

✓ **2F – Controller**

- |   |                                     |                                     |
|---|-------------------------------------|-------------------------------------|
| The controller shall be an IBM® Workload Scheduler controller.  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| The controller shall be 6V and 12VDC with a power indicator light.  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| The controller shall have 2 digital inputs.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The controller shall have 2 two-channel outputs (able to drive two warnings per output).  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The controller shall be programmable locally using a serial input (RS232) or remotely using a cellular modem.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The controller shall have 24/7, Dusk 'til Dawn, BlinkLink® Scheduling, Time Clock, and Custom input program activation options.   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The Controller shall have LED-Warning Control compatibility with BlinkerSign®, BlinkerBeacon™, and RRFB-XL2™.   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| The controller shall have dimmable which will be:   |                                     |                                     |
| • Auto-adjustable via solar panel (6V systems)  | <input type="checkbox"/>            | <input type="checkbox"/>            |
| • Auto-adjustable via photocell sensor (12V systems)  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The controller shall include an internal system clock (with on-board battery backup) and provide options for activation scheduling, including user-programmable adjustments for Daylight Saving Time. | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

✓ **ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

**EQUAL (CONT'D)**  
 Introduced on: March 20, 2024  
 Adopted on: March 20, 2024  
 Official Resolution#: 2024000385

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

✓ **2F – Controller (Cont'd)**

- The controller shall be capable of automatic brightness control.
- The controller shall include an internal temperature monitor.
- The controller shall be capable of operation within the temperature range of -40°F to 176°F (-40°C to 80°C).
- The controller enclosure shall be conform to an Ingress Protection rating of IP-67 or better.
- The dimensions of the controller enclosure shall not exceed 3.2"W x 3.7"H x 2.5"D.

✓ **2G – Wireless Radio**

- The sign assembly shall include a BlinkerBeam® wireless radio for interconnectivity.
- The radio shall be 6V and 12VDC with a power indicator light.
- The radio shall have 1 digital input, micro USB.
- The radio shall have 2 digital output lines, host serial lines for over the air serial.
- The radio shall be programmable locally using USB port or front-mounted joystick.
- The radio shall have a backlit LCD display with 4 lines at 21 characters per line.
- The radio types for this radio shall be:
  - Low Power Device Radio.
  - Low Power Activation Radio.
  - Standard Low Power Radio.
  - Standard Medium Power Radio.
  - Standard High Power Radio.
- The radio shall have a connectivity to up to 16 devices on one network.
- The frequency of the radio shall be license free 900 MHz frequency hopping spread spectrum with 10 different RF patterns to prevent interference between collocated radio systems.
- The radio shall have a range up to 900 feet standard, or longer with optional antennas.

✓ **ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

**ITEM #2 (CONT'D)** 20, 2024  
Adopted on: March 20, 2024  
Official Resolution#: 2024000385

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

✓ **2G – Wireless Radio (Cont'd)**

The color of the status LEDs shall be red, green, yellow, and amber.      

The radio shall be FCC and ISED compliant.      

The radio shall have optional outdoor antennas:

- Omni Whip
- Omni Dome
- Omni Base Station
- Yagi (for specific applications)

The radio shall operate in temperatures ranging from -40°F to 176°F (-40°C to 80°C) and in less than 90% relative humidity.      

The dimensions of the radio shall not exceed 3.2"W x 3.7"H x 2.5"D.      

✓ **2H – Solar Panel**

The solar panel shall be 55W.      

The nominal voltage shall be 12V.      

The open circuit voltage shall be 22.1V.      

The short circuit current shall be 3.31A.      

The maximum power voltage shall be 18.18V.      

The maximum power current shall be 3.1A.      

The solar panel shall have tempered glass.      

The frame shall be anodized aluminum.      

The solar panel shall be constructed with silicon cells encapsulated in double-layer EVA with a white polymer backing.      

The solar panel shall weigh 14 lbs.      

The solar panel shall be IP67 rated.      

The solar panel shall have various options available for mounting hardware.      

✓ **ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

**EQUAL (CONT'D)** 20, 2024  
 Adopted on: March 20, 2024  
 Official Resolution#: 2024000385

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

✓ **2H – Solar Panel (Cont'd)**

The operating temperature shall be -40°F to 194°F (-40°C to 90°C).      

The dimensions of the solar panel shall not exceed 25"W x 26"H x 1.5"D.      

✓ **2I – Top-Of-Pole Bracket**

The bracket shall be aluminum.      

The bracket shall fit a 4 ½" or 3" round pole.      

The brackets hardware shall be set screws.      

✓ **2J – Side-Of-Pole Bracket**

The bracket shall be aluminum.      

The bracket is universal.      

The bracket shall have mounting hardware that includes banding, U-Bolt, or bolt.      

✓ **2K – Battery**

The voltage of the battery shall be 12V.      

The capacity at C/100 shall be 50Ah.      

The vent of the battery shall be valve regulated.      

The terminal type shall be I6.      

The battery shall be non-spillable as defined by the Department of Transportation, International Commercial Airline Organization and International Airline Transport Association definitions.      

The battery weight shall not exceed 32.23 lbs.      

The dimensions of the battery shall not exceed 7.75"L x 6.49"W x 6.69"H.      

The battery shall operate in a temperature range of -40°F to 176°F (-40°C to 80°C).      

✓ **ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

**EQUAL** (CONT'D)  
Adopted on: March 20, 2024  
Official Resolution#: 2024000385

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

✓ **2L – Radar Detection**

- |  |                                     |                                     |
|--|-------------------------------------|-------------------------------------|
| The power input shall be 6 to 18V DC.                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The icc@ 12V DC shall be 4.5 mA (0.054 watts).                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The radar RF out shall be 5 mW maximum.                            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The radar F center shall be 24.125 GHz or 24.200 GHz.              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The pickup distance shall be up to 300 feet.                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The beam angle shall be 38° x 45°.                                 | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| The operating temperature shall be -40°F to 185°F (-40°C to 85°C). | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The beam polarization shall be linear.                             | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The serial port shall be RS232.                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| The FCC ID shall be TIASS300.                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| The dimensions of the radar shall not exceed 1.9"W x 2.1"H x 0.9"D | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

✓ **2M – Heavy Duty Pole Package With Anchor Bolts**

The domed pole cap shall be:

- |   |                                     |                                     |
|---|-------------------------------------|-------------------------------------|
| • Cast Aluminum                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| • Zinc Plated                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| • Fits 4 ½" outer diameter pole           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| • (3X) ¼" x ½" square head machine screws | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

The mounting brackets shall have:

- |   |                                     |                          |
|---|-------------------------------------|--------------------------|
| • (2X) Z-bracket single sided round pole mounting bracket made of aluminum. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • (2X) 5/16" x 5/8" bolt and nut set.                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • (2X) 5/16" x 1 ¾" bolt and nut set.                                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

The round aluminum pole shall be: (10' 373-10, 13' 373-13, 15' 373-15)

- |                              |                                     |                          |
|------------------------------|-------------------------------------|--------------------------|
| • Schedule 40 aluminum pole. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • 4 ¼" outer diameter        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • One end threaded           | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

✓ **ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR**

Introduced on: March 20, 2024  
 Approved by: March 20, 2024  
 Official Resolution#: 2024000385

**COMPLIANCE**

YES      NO

**OPTIONS: (CONT'D)**

**2M -- Heavy Duty Pole Package With Anchor Bolts (Cont'd)**

The pedestal base shall be:

- Cast Aluminum
- Threaded Collar
- Have an aluminum access door.
- FHWA Certified
- Meets or exceeds AASHTO break-away requirements.

The bent anchor bolt shall be:

- (4X) 3/4" x 18", galvanized steel bent anchor (foundation bolt), nut and washer (for frost free areas).
- (4X) 1" x 42", galvanized steel bent anchor (foundation bolt), nut and washer (for frost or snow-covered areas).

**ITEM #3 - CURVE WARNING SYSTEM, AS SPECIFIED OR EQUAL**

Adopted on: March 20, 2024  
Official Resolution#: 2024000385

**COMPLIANCE**  
YES      NO

**DESCRIPTION:**

Solar powered chevron sign retrofit that outlines the standard chevron sign legend with LEDs.

**SIGN RETROFIT:**

Sign retrofit shall conform to TrafficCalm® Curve Warning System, Flashing Sign System.

**FLUSH MOUNT LED FLASHER RINGS:**

Size – Standard Chevron Legend Size for 30” x 36” sign size. Reference MUTCD. 0.08” 5052 grade, black powder coated aluminum.

Mounting – Bolt-Mounting directly to sign and post.

LEDs – Amber (590 nm): 15 degree cone view; Rated 100,000 hours; 2.4K CDA/M<sup>2</sup>, Auto Dimming Employed

Power – 10V to 18V, OW standby or OFF (No power required)

Flash Patterns – 50 – 60 flashes per minute; 50% Duty Cycle. Additional alternative flash patterns available and are user programmable.

Dimming – 100 levels as determined by solar panel illumination or light sensor (AC).

**RADAR:**

3.75” W X 2.5” H X 2.25” D

Weatherproof NEMA 4 enclosure.

K-band (24.15GHz)

Average Range – 1,000’ / 305m

**CONTROLLER / COLLABATOR UNIT – SOLAR:**

Weight with Battery – 20W = 25 lbs (11.3 kg) 30 Watt = 28 lbs (12.7 kg) excluding poles

Voltage – 12VDC Nominal

Charger – Smart solar charger 14.6VDC, 28W temperature protected

**ITEM #3 – CURVE WARNING SYSTEM, AS SPECIFIED OR EQUAL**

Adopted on: March 20, 2024  
Official Resolution#: 2024000385

**COMPLIANCE**  
**YES NO**



**CONTROLLER / COLLABATOR UNIT – SOLAR: (CONT'D)**

Communications – Wireless Meshnet integration (device 2 device, +1,000ft range, repeatable signal, configurable network ID, AES-128 Encryption security, DSSS transmission on selectable channels)

Battery Reserve – 28 days at standard load (standard load = 25% activations per day with a single flasher ring) with no sunlight

Isolation Required – 2 hours of good sunlight each day at standard load

Panel Supplied – 20W, 30W, 50W, and 60W available

Outputs – 2 chevrons at 10W each

Enclosure Rating – NEMA 4

Mounting – Universal Pole Mount included (Optional Top of Pole and Side of Pole extension mounts available)

**SYSTEM OPERATING TEMPERATURE RANGE:**

Components: -40°C to +74°C

Battery: -40°C to +60°C (Low Temp “E” Variation required)