



Ocean County Board of Commissioners

OFFICE OF THE
OCEAN COUNTY COMMISSIONERS

Director John P. Kelly
Deputy Director Frank Sadeghi
Commissioner Robert S. Arace
Commissioner Jennifer Bacchione
Commissioner Virginia E. Haines

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

Board Meeting Agenda

Date: August 20, 2025 - 4:00 PM
Location: Administration Building
Room 119
101 Hooper Avenue
Toms River, NJ 08754

Agenda: Awarding Contracts for the furnishing and delivery of SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM to Eberl Iron Works, Inc. and Traffic and Parking Control Co., LLC, the lowest qualified bidders. (B2025-114)

Official Resolution#	2025001213
Meeting Date	08/20/2025
Introduced Date	08/20/2025
Adopted Date	08/20/2025
Agenda Item	I-3
CAF #	
Purchase Req. #	B2025-114
Result	Adopted

COUNTY COMMISSIONER	PRES.	ABS.	MOVE	SEC	AYE	NAY	ABST.
Kelly	✓				✓		
Sadeghi	✓			✓	✓		
Arace	✓				✓		
Bacchione	✓				✓		
Haines	✓		✓		✓		

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

Clerk Of The Board

RESOLUTION

August 20, 2025

WHEREAS, on July 1, 2025, 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 for the County of Ocean; and

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

<u>Name and Address of Bidder</u>	<u>Name and Address of Bidder</u>
Eberl Iron Works, Inc. 128 Sycamore Street Buffalo, NY 14204 (716) 854-7633	Traffic and Parking Control Co., LLC 5100 W. Brown Deer Road Brown Deer, WI 53223 (262) 814-7000
National Highway Products, Inc. 301 Riverside Drive Millville, NJ 08332 (856) 692-7572	Traffic Engineering Services DE LLC 7121 Dorsey Run Road Elkridge, MD 21075 (301) 549-1950

; and

WHEREAS, after the receipt and examination of same, the County Purchasing Agent has now recommended to this Board that the lowest qualified bids, according to specifications, in each instance, namely that of, EBERL IRON WORKS, INC., and TRAFFIC AND PARKING CONTROL CO., LLC be accepted.

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 contracts for the furnishing and delivery of SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM for the County of Ocean, for the contract period shall be for one (1) year from date of award, 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. EBERL IRON WORKS, INC for one (1) item, to wit:

ITEM NO. 3.

For a Total Lump Sum Award (Item No. 3) of \$46,809.00.

This vendor has extended this contract to County Cooperative Contract System Participants, Identifier CK-02-OC.

B. TRAFFIC AND PARKING CONTROL CO., LLC for twenty-eight (28) 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 and 2M.

For a Total Lump Sum Award (Item Nos. 1 - 1M) of \$18,502.86.

For a Total Lump Sum Award (Item Nos. 2 - 2M) of \$72,153.60.

This vendor has extended this contract to County Cooperative Contract System
Participants, Identifier No. CK-02-OC.

2. Payments for the materials and services to be acquired by these contracts 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 materials or services described herein shall be made available through operating and expense (O&E) accounts, trust accounts, grant accounts, or capital accounts maintained by, but not limited to, the following departments:
Engineering.

4. Payments for the materials to be acquired by these contracts 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.

5. The contract number must be placed on all papers, documents, invoices and vouchers pertaining to said contract, the number being B2025-114.

BE IT FURTHER RESOLVED that certified copies of this Resolution shall be made available to the County Auditor, Department of Purchasing, Department of Finance, Engineering and the successful bidders.

[EBERL IRON WORKS] RESPONSE DOCUMENT REPORT

Bid No. TBD

SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
3	Curve Warning System, As Specified or Equal	20	EA	\$2,340.45	\$46,809.00				
TOTAL					\$46,809.00				

Introduced on: August 20, 2025

Adopted on: August 20, 2025

Official Resolution#: 2025001213

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid No. TBD
 SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

PRICE TABLES

ITEM #1 - SOLAR CHEVRON RADAR SIGN, 24" X 30", AS SPECIFIED OR EQUAL

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 1	Solar Chevron Radar Sign, 24" X 30", As Specified or Equal	2	EA	\$4,333.18	\$8,666.36		TAPCO		Pricing include full sign assembly with solar panel, controller, radios, and all hardware; mounting brackets and poles
OPTIONS									
✓ 1A	Sign Assembly, As Specified or Equal	2	EA	\$693.00	\$1,386.00		TAPCO		
✓ 1B	Cabinet, As Specified or Equal	2	EA	\$303.55	\$607.10		TAPCO		
✓ 1C	Round Pole Banding Bracket, As Specified or Equal	2	EA	\$119.60	\$239.20		TAPCO		
✓ 1D	Square Pole Bolt-Through Bracket, As Specified or Equal	2	EA	\$119.60	\$239.20		TAPCO		

Introduced on: August 20, 2025

Adopted on: August 20, 2025
 Official Resolution#: 2025001213

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid No. TBD
 SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 1E	Multi-Purpose Bracket, As Specified or Equal	2	EA	\$119.60	\$239.20		TAPCO		
✓ 1F	Controller, As Specified or Equal	2	EA	\$516.60	\$1,033.20		TAPCO		
✓ 1G	Wireless Radio, As Specified or Equal	2	EA	\$349.80	\$699.60		TAPCO		
✓ 1H	Solar Panel, As Specified or Equal	2	EA	\$406.20	\$812.40		TAPCO		
✓ 1I	Top-of-Pole Bracket, As Specified or Equal	2	EA	\$70.00	\$140.00		TAPCO		
✓ 1J	Side-of-Pole Bracket, As Specified or Equal	2	EA	\$44.65	\$89.30		TAPCO		
✓ 1K	Battery, As Specified or Equal	2	EA	\$196.90	\$393.80		TAPCO		
✓ 1L	Radar Detection, As Specified or Equal	2	EA	\$1,407.25	\$2,814.50		TAPCO		

Introduced on: August 20, 2025

Adopted on: August 20, 2025
 Official Resolution#: 2025001213
 [TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid No. TBD
 SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 1M	Heavy Duty Pole Package with Anchor Bolts, As Specified or Equal	2	EA	\$571.50	\$1,143.00		TAPCO		
TOTAL					\$18,502.86				

ITEM #2 - SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 2	Solar Chevron Radar Sign, 24" X 30", Ruggedized, As Specified or Equal	6	EA	\$5,858.20	\$35,149.20		TAPCO		Pricing include full sign assembly with solar panel, controller, radios, and all hardware; mounting brackets and poles
OPTIONS									
✓ 2A	Sign Assembly, As Specified or Equal	6	EA	\$1,965.60	\$11,793.60		TAPCO		
✓ 2B	Cabinet, As Specified or Equal	6	EA	\$280.20	\$1,681.20		TAPCO		
✓ 2C	Round Pole Banding Bracket, As Specified or Equal	6	EA	\$119.60	\$717.60		TAPCO		

Introduced on: August 20, 2025
 Adopted on: August 20, 2025
 Official Resolution#: 2025001213

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid No. TBD
 SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 2D	Square Pole Bolt-Through Bracket, As Specified or Equal	6	EA	\$119.60	\$717.60		TAPCO		
✓ 2E	Multi-Purpose Bracket, As Specified or Equal	6	EA	\$119.60	\$717.60		TAPCO		
✓ 2F	Controller, As Specified or Equal	6	EA	\$516.60	\$3,099.60		TAPCO		
✓ 2G	Wireless Radio, As Specified or Equal	6	EA	\$349.80	\$2,098.80		TAPCO		
✓ 2H	Solar Panel, As Specified or Equal	6	EA	\$406.20	\$2,437.20		TAPCO		
✓ 2I	Top-of-Pole Bracket, As Specified or Equal	6	EA	\$70.00	\$420.00		TAPCO		
✓ 2J	Side-of-Pole Bracket, As Specified or Equal	6	EA	\$44.55	\$267.30		TAPCO		
✓ 2K	Battery, As Specified or Equal	6	EA	\$196.90	\$1,181.40		TAPCO		

[TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid No. TBD
 SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
✓ 2L	Radar Detection, As Specified or Equal	6	EA	\$1,407.25	\$8,443.50		TAPCO		
✓ 2M	Heavy Duty Pole Package with Anchor Bolts, As Specified or Equal	6	EA	\$571.50	\$3,429.00		TAPCO		
TOTAL					\$72,153.60				

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

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	No Bid	Mfr./Make/Model	Delivery A.R.O.	Comments
3	Curve Warning System, As Specified or Equal		EA	No Bid	No Bid	X			
TOTAL					\$0.00				

Introduced on: August 20, 2025

Adopted on: August 20, 2025
 Official Resolution#: 2025001213
 [TRAFFIC AND PARKING CONTROL CO., LLC] RESPONSE DOCUMENT REPORT
 Bid - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24” X 30”, 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 24” W X 30” 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 24” W x 30” 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30" 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 - SOLAR CHEVRON RADAR SIGN, 24" X 30", AS SPECIFIED OR EQUAL (CONT'D)

COMPLIANCE

YES NO

RADAR DETECTION: (CONT'D)

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

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 ¾" bolt and nut set.

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

- Schedule 40 aluminum pole.
- 4 ¼" 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 bolt shall be:

- (4X) ¾" 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", AS SPECIFIED OR EQUAL (CONT'D)

COMPLIANCE
YES **NO**

OPTIONS:

1A – 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 24" W X 30" 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.

1B – 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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.

Introduced by: August 20, 2025
Adopted on: August 20, 2025
Official Resolution#: 2025001213

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", 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 ½" 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", AS SPECIFIED OR EQUAL (CONT'D)

COMPLIANCE
YES **NO**

OPTIONS: (CONT'D)

1L – 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

1M – 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

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 ¾" bolt and nut set.

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

- Schedule 40 aluminum pole.
- 4 ¼" outer diameter
- One end threaded

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #1 – SOLAR CHEVRON RADAR SIGN, 24" X 30", AS SPECIFIED OR EQUAL (CONT'D)

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) ¾" 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL

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 24" W x 30" 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.

Introduced on: August 20, 2025
Adopted on: August 20, 2025
Official Resolution#: 2025001213

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

CONTROLLER: (CONT'D)

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 checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The controller shall have dimmable which will be:

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<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"/>
-------------------------------------	--------------------------

The controller shall be capable of automatic brightness control.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The controller shall include an internal temperature monitor.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

WIRELESS RADIO:

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The radio shall have 1 digital input, micro USB.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The radio shall be FCC and ISED compliant.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The radio shall have optional outdoor antennas:

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

SOLAR PANEL:

The solar panel shall be 55W.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The nominal voltage shall be 12V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The open circuit voltage shall be 22.1V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The short circuit current shall be 3.31A.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The maximum power voltage shall be 18.18V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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 6.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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

☑

☑

☑

☑

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR
EQUAL (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 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).

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 24" W x 30" 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

COMPLIANCE
YES **NO**

OPTIONS: (CONT'D)

2E – 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.

2F – 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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.

COMPLIANCE PGS: – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 29A of 33

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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 checked="" type="checkbox"/> | <input 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 checked="" type="checkbox"/> | <input type="checkbox"/> |
| The dimensions of the radar shall not exceed 1.9"W x 2.1"H x 0.9"D | <input checked="" type="checkbox"/> | <input 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 checked="" type="checkbox"/> | <input 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"/> |

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 31A of 33

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 24" X 30", RUGGEDIZED, AS SPECIFIED OR
EQUAL (CONT'D)

COMPLIANCE
YES **NO**

OPTIONS: (CONT'D)

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

The pedestal base shall be:

- | | | |
|--|-------------------------------------|--------------------------|
| • Cast Aluminum | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Threaded Collar | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Have an aluminum access door. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • FHWA Certified | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • Meets or exceeds AASHTO break-away requirements. | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

The bent anchor bolt shall be:

- | | | |
|--|-------------------------------------|--------------------------|
| • (4X) 3/4" x 18", galvanized steel bent anchor (foundation bolt), nut and washer (for frost free areas). | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| • (4X) 1" x 42", galvanized steel bent anchor (foundation bolt), nut and washer (for frost or snow-covered areas). | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #3 – CURVE WARNING SYSTEM, AS SPECIFIED OR EQUAL

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 24” X 30” 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/M², 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

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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)

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS
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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 2 of 34

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

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
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)

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

SOLAR PANEL:

The solar panel shall be 55W.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The nominal voltage shall be 12V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The open circuit voltage shall be 22.1V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The short circuit current shall be 3.31A.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The maximum power voltage shall be 18.18V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The maximum power current shall be 3.1 A.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The solar panel shall have tempered glass.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The frame shall be anodized aluminum.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The solar panel shall weigh 14 lbs.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The solar panel shall be IP67 rated.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'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 1/2" 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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 7 of 34

The pickup distance shall be up to 300 feet.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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°.

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

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 ¾" bolt and nut set.

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

- Schedule 40 aluminum pole.
- 4 ¼" 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 bolt shall be:

- (4X) ¾" x 18", galvanized steel bent anchor (foundation bolt), nut and washer

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

(for frost free areas).

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

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

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.

1B – Cabinet

NEMA 3R type certification.

The cabinet shall be made of 0.080" aluminum.

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

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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. -

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 10 of 34

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

There shall be 2 brackets per cabinet.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 12 of 34

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

Page 13 of 34

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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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 ½" 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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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.

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

1M – 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

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 ¾" bolt and nut set.

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

- Schedule 40 aluminum pole.
- 4 ¼" outer diameter
- One end threaded

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The bent anchor bolt shall be:

- (4X) ¾" 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).

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 - SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR EQUAL

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

- 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30" X 36", RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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 1/2" outer diameter pole
- (3X) 1/4" x 1/2" square head machine screws

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The pedestal base shall be:

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

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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).

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

OPTIONS:

2A - Sign Assembly

Sign assembly shall be compatible with TAPCO® BlinkerSign interconnectivity.

<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	-------------------------------------

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #2 – SOLAR CHEVRON RADAR SIGN, 30” X 36”, RUGGEDIZED, AS SPECIFIED OR EQUAL (CONT'D)

COMPLIANCE
YES **NO**

OPTIONS: (CONT'D)

2E – 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.

2F – 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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

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.

<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	-------------------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

OPTIONS: (CONT'D)

2G – Wireless Radio (Cont'd)

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

<input type="checkbox"/>	<input checked="" type="checkbox"/>
--------------------------	-------------------------------------

The radio shall be FCC and ISED compliant.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The radio shall have optional outdoor antennas:

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

2H – Solar Panel

The solar panel shall be 55W.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The nominal voltage shall be 12V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The open circuit voltage shall be 22.1V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The short circuit current shall be 3.31A.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The maximum power voltage shall be 18.18V.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The maximum power current shall be 3.1A.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

The solar panel shall have tempered glass.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
-------------------------------------	--------------------------

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.

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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 1/2" 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.

COMPLIANCE PGS. - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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).

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

COMPLIANCE
YES **NO**

OPTIONS: (CONT'D)

2L - 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

2M - Heavy Duty Pole Package With Anchor Bolts

The domed pole cap shall be:

- Cast Aluminum
- Zinc Plated
- Fits 4 1/2" outer diameter pole

COMPLIANCE PGS. - SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

- (3X) 1/4" x 1/2" 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.
- (2X) 5/16" x 5/8" bolt and nut set.
- (2X) 5/16" x 1 3/4" bolt and nut set.

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<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.
- 4 1/4" outer diameter
- One end threaded

<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

<u>COMPLIANCE</u>	
<u>YES</u>	<u>NO</u>

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.

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

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).

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)
ITEM #3 – CURVE WARNING SYSTEM, AS SPECIFIED OR EQUAL

COMPLIANCE
YES **NO**

DESCRIPTION:

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

SIGN RETROFIT: (New Signs)

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/M², 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.

COMPLIANCE PGS. – SOLAR POWERED LED CHEVRON RADAR SIGNS AND CURVE WARNING SYSTEM

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

SECTION I - SOLAR POWERED LED CHEVRON RADAR SIGNS (CONT'D)

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

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)

