



The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

**Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.**

Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: "2015" Solar Tech Silent Sentinel

COST OF SPECIFIED EQUIPMENT: \$ 6995<sup>00</sup> each

EXPECTED DELIVERY DATE: 2 to 4 Weeks  
(Length of time after receipt of purchase order)

Submitted by:

Dave Opdyke  
Signature

Hammersmith Equipment  
Company Name

Dave Opdyke (Manager)  
Name and Title (Print)

2365 W South Airport Rd.  
Company Address

231-946-1100, 231-946-1101  
Phone Fax

Traverse City MI 49684  
City, State, Zip

Corporation  
Sole proprietorship/partnership/corporation

Michigan  
If corporation, state of corporation

**Bidder Proposes  
To Furnish**

**Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp  
Silent Sentinel Arrow Board. Please include all specifications at time  
of bid.**

**Year, Make and Model of unit bid:** 2015, Solar Tech, Silent Sentinel

Consists of an arrow display panel, a supporting structure for the display panel, photovoltaic array, a battery power supply and an electronic control console, all mounted on a heavy duty trailer frame.

yes

Shall have a high contrast arrow display panel with long life expectancy, high reliability LED lamp technology.

yes

Shall meet or exceed the standards for Arrow Boards as listed with the U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices.

yes

Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Delivery directly from a manufacturer's facility without inspection and prep by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty repairs, and shall provide on-site training on use and maintenance of all equipment.

yes

Length Overall - 100".

yes

Overall width - 96".

yes

Across Fenders - 74".

yes

Overall height in transport position - 92".

yes

Overall height in operating position - 134".

yes

Ground Clearance, minimum - 13 1/2".

yes

Weight approximately 1200# (please specify).

yes 1,180 LBS

Transport position maximum towing speed 70 MPH.

yes

Operating position @ max. height, outriggers in place 80 mph sustained wind.

yes

**Bidder Proposes  
To Furnish**

Electrical interference – unaffected by RFI and EMI.

yes

Trailer frame shall be constructed of a welded 3/16" CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16" structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.

yes

Trailer tongue shall consist of 2 1/2 x 2 1/2 x 3/16" structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.

yes

Trailer tongue shall be equipped with an adjustable height coupler with provisions for a 3" pintle ring.

yes

Trailer shall be equipped with 1/4" safety chains with snap type hooks.

yes

Paint shall consist of a polymide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.

yes

Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).

yes

Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.

yes

Trailer shall be equipped with a lighted license plate holder.

yes

Trailer wiring harness shall be completely sealed and water resistant.

yes

Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.

yes

Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16" x 6" wide steel foot plate.

yes

Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93", front to rear and 56" side to side to provide adequate stability of unit in high winds.

yes

Wheels shall be a 13" 5 lug pattern (4 1/2" bolt circle), white spoke with B78-13 load range C tires.

yes

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

yes

All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

yes

Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

yes

Winch shall be zinc plated to minimize corrosion.

yes

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

yes

Arrow panel to be an overall width of 96".

yes

Arrow board to have an overall height of 48".

yes

Arrow board to have an overall depth of 3".

yes

Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

yes

Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

yes

Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

yes

Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

yes

Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

yes

The arrow panel lamp housing shall be completely sealed to protect the Internal components from harsh environmental conditions.

yes

**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

yes

The color of the light produced by the lamps shall be amber.

yes

The lamps shall have a minimum life expectancy of 100,000 hours.

yes

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

yes

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

yes

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

yes

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

yes

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel, lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

yes

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

yes

Control module front panel shall be completely sealed to accommodate operation in all types of weather.

yes

**Bidder Proposes  
To Furnish**

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.

yes

Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.

yes

Control module operating firmware shall be field upgradeable.

yes

Operating voltage – 12 Volts DC nominal.

yes

Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.

yes

Batteries shall consist of (4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.

yes

Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.

yes

Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.

yes

Solar Array power output of 80 Watts.

yes

Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.

yes

Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.

yes

Solar power system shall include a solid state charge controller.

yes

**Bidder Proposes  
To Furnish**

Charge controller shall monitor battery voltage and ambient temperature.	<u>yes</u>
Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries.	<u>yes</u>
Shall have a standard "Bumper to Bumper" 5 year warranty.	<u>yes</u>
Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge.	<u>yes</u>
Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort.	<u>yes</u>
Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring.	<u>yes</u>
Trailer to be equipped with a Traffic Cone Carrier.	<u>yes</u>

The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.

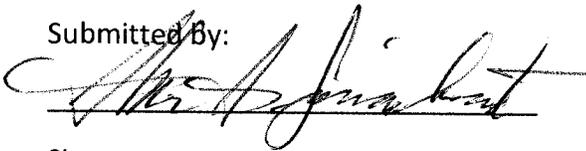
Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: **2015 National Signal, Inc. ARO LITE CURVE**

COST OF SPECIFIED EQUIPMENT: **\$ 6,425.00**

EXPECTED DELIVERY DATE: 3 Weeks (Length of time after receipt of purchase order)

Submitted By:



Signature

Alan A. Swinehart, Owner

Name and Title (Print)

989-239-1976, 989-892-8653

Phone

Fax

Municipal & Contractor Supplies

Company Name

1303 Sixth Street

Company Address

Bay City, MI 48708

City, State, Zip

Sole Proprietorship

Sole proprietorship/partnership/corporation

**Bidder Proposes  
To Furnish**

**Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp Silent Sentinel Arrow Board. Please include all specifications at time of bid.**

**Year, Make and Model of unit bid:** 2015 NATIONAL SIGNAL, INC. ARO LITE CURVE

Consists of an arrow display panel, a supporting structure for the display panel, photovoltaic array, a battery power supply and an electronic control console, all mounted on a heavy duty trailer frame.	✓ _____
Shall have a high contrast arrow display panel with long life expectancy, high reliability LED lamp technology.	✓ _____
Shall meet or exceed the standards for Arrow Boards as listed with the U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices.	✓ _____
Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Delivery directly from a manufacturer's facility without inspection and prep by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty repairs, and shall provide on-site training on use and maintenance of all equipment.	✓ _____
Length Overall - 100".	114" _____
Overall width – 96".	✓ _____
Across Fenders – 74".	75" _____
Overall height in transport position – 92".	89" _____
Overall height in operating position – 134".	139" _____
Ground Clearance, minimum – 13 ½".	✓ _____
Weight approximately 1200# (please specify).	1,100 _____
Transport position maximum towing speed 70 MPH.	✓ _____
Operating position @ max. height, outriggers in place 80 mph sustained wind.	145" _____

**Bidder Proposes  
To Furnish**

Electrical interference – unaffected by RFI and EMI.



Trailer frame shall be constructed of a welded 3/16” CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16” structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.

2" X 3" X 1/8 STEEL TUBE WITH  
(2) PC 1/8 THICK STEEL DECK

Trailer tongue shall consist of 2 ½ x 2 ½ x 3/16” structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.

3" X 3" X 3/8 WALL BOLTED WITH JACKS

Trailer tongue shall be equipped with an adjustable height coupler with provisions for a 3” pintle ring.



Trailer shall be equipped with ¼” safety chains with snap type hooks.



Paint shall consist of a polyimide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.

POWDER COAT (2) LAYERS  
CLEAR COAT (2) LAYERS

Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).

SEE ABOVE  
TRAILER TYPE LIGHTS WITH  
MARKERS MOUNTED HIGH FOR  
VISIBILITY

Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.

Trailer shall be equipped with a lighted license plate holder.



Trailer wiring harness shall be completely sealed and water resistant.



Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.

FORMED STEEL, POWDER  
COAT, BOLTED & REPLACEABLE

Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16” x 6” wide steel foot plate.



Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93”, front to rear and 56” side to side to provide adequate stability of unit in high winds.

FOOT PRINT AREA  
28.5 SQ FT

Wheels shall be a 13” 5 lug pattern (4 ½” bolt circle), white spoke with B78-13 load range C tires.

15" LOAD RANGE "C"

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

✓

All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

✓

Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

✓

Winch shall be zinc plated to minimize corrosion.

✓

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

✓

Arrow panel to be an overall width of 96".

✓

Arrow board to have an overall height of 48".

✓

Arrow board to have an overall depth of 3".

✓

Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

✓

Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

✓ POWDER COAT

Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

✓

Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

✓

Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

20 LED'S

The arrow panel lamp housing shall be completely sealed to protect the Internal components from harsh environmental conditions.

✓

**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

✓

The color of the light produced by the lamps shall be amber.

✓

The lamps shall have a minimum life expectancy of 100,000 hours.

✓

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

✓

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

✓

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

✓

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

✓

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel , lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

✓

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

MOUNTED IN LOCKABKE  
ALUMINUM POWDER COAT  
BOX MOUNT AT EYE LEVEL  
ON CURVE SIDE

Control module front panel shall be completely sealed to accommodate operation in all types of weather.

✓

**Bidder Proposes  
To Furnish**

AMBER LED'S FOR MODE,  
POWER, BRIGHTNESS AND  
BATTERY LEVEL

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.

Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.

Control module operating firmware shall be field upgradeable.

Operating voltage – 12 Volts DC nominal.

Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.

Batteries shall consist of (4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.

Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.

Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.

Solar Array power output of 80 Watts.

Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.

Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.

Solar power system shall include a solid state charge controller.



STEEL POWDER COAT



**Bidder Proposes  
To Furnish**

- Charge controller shall monitor battery voltage and ambient temperature.
- Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries.
- Shall have a standard "Bumper to Bumper" 5 year warranty.
- Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge.
- Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort.
- Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring.
- Trailer to be equipped with a Traffic Cone Carrier.

The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

**Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.**

Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: 2014 Eclipse 2220 APF 25-Lamp

COST OF SPECIFIED EQUIPMENT: \$4,918.50<sup>00</sup>

EXPECTED DELIVERY DATE: 14-21 Days  
(Length of time after receipt of purchase order)

Submitted by:

David R. Lightle  
Signature

Lightle Enterprises of Ohio, LLC  
Company Name

David R. Lightle Member  
Name and Title (Print)

P.O. Box 329  
Company Address

740-998-5363 740-998-5364  
Phone Fax

Frankfort OH 45628  
City, State, Zip

Partnership  
Sole proprietorship/partnership/corporation

\_\_\_\_\_  
If corporation, state of corporation

**Bidder Proposes  
To Furnish**

**Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp Silent Sentinel Arrow Board. Please include all specifications at time of bid.**

**Year, Make and Model of unit bid:** 2015 Allmand 2220 Eclipse 25 Lamp

Consists of an arrow display panel, a supporting structure for the display panel, photovoltaic array, a battery power supply and an electronic control console, all mounted on a heavy duty trailer frame.

Comply

Shall have a high contrast arrow display panel with long life expectancy, high reliability LED lamp technology.

Comply

Shall meet or exceed the standards for Arrow Boards as listed with the U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices.

Comply

Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Delivery directly from a manufacturer's facility without inspection and prep by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty repairs, and shall provide on-site training on use and maintenance of all equipment.

Comply

Length Overall - 100".

Comply

Overall width - 96".

Comply

Across Fenders - 74".

Comply

Overall height in transport position - 92".

Comply

Overall height in operating position - 134".

Comply

Ground Clearance, minimum - 13 1/2".

Comply

Weight approximately 1200# (please specify).

Comply

Transport position maximum towing speed 70 MPH.

Comply

Operating position @ max. height, outriggers in place 80 mph sustained wind.

40 MPH wind + 60 MPH Gust

**Bidder Proposes  
To Furnish**

Electrical interference – unaffected by RFI and EMI.

Comply

Trailer frame shall be constructed of a welded 3/16" CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16" structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.

Comply

Trailer tongue shall consist of 2 1/2 x 2 1/2 x 3/16" structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.

Comply

Trailer tongue shall be equipped with an adjustable height coupler with provisions for a 3" pintle ring.

Comply

Trailer shall be equipped with 1/4" safety chains with snap type hooks.

Comply

Paint shall consist of a polyimide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.

Comply

Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).

Safety Orange

Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.

Comply

Trailer shall be equipped with a lighted license plate holder.

Comply

Trailer wiring harness shall be completely sealed and water resistant.

Comply

Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.

Comply

Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16" x 6" wide steel foot plate.

Comply

Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93", front to rear and 56" side to side to provide adequate stability of unit in high winds.

Comply

Wheels shall be a 13" 5 lug pattern (4 1/2" bolt circle), white spoke with B78-13 load range C tires.

Painted Silver-not white

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

Comply

All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

Comply

Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

Comply

Winch shall be zinc plated to minimize corrosion.

Comply

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

Comply

Arrow panel to be an overall width of 96".

Comply

Arrow board to have an overall height of 48".

Comply

Arrow board to have an overall depth of 3".

Comply

Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

Comply

Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

Comply

Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

Comply

Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

Comply

Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

Comply

The arrow panel lamp housing shall be completely sealed to protect the Internal components from harsh environmental conditions.

Comply

**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

Comply

The color of the light produced by the lamps shall be amber.

Comply

The lamps shall have a minimum life expectancy of 100,000 hours.

Comply

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

Comply

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

Comply

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

Comply

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

Comply

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel , lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

Comply

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

Comply

Control module front panel shall be completely sealed to accommodate operation in all types of weather.

Comply

**Bidder Proposes  
To Furnish**

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.

Comply

Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.

Comply

Control module operating firmware shall be field upgradeable.

Comply

Operating voltage – 12 Volts DC nominal.

Comply

Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.

Comply

Batteries shall consist of (4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.

Quoting 8-0

Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.

25 Days

Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.

Comply

Solar Array power output of 80 Watts.

Comply

Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.

Comply

Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.

Comply

Solar power system shall include a solid state charge controller.

Comply

**Bidder Proposes  
To Furnish**

Charge controller shall monitor battery voltage and ambient temperature. Comply

Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries. Comply

Shall have a standard "Bumper to Bumper" 5 year warranty. 3 year warranty

Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge. Comply

Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort. Comply

Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring. Comply

Trailer to be equipped with a Traffic Cone Carrier. Comply

The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

**Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.**

Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: 2015 K&K AT254896

COST OF SPECIFIED EQUIPMENT: \$ 6,172.00

EXPECTED DELIVERY DATE: 30 DAYS  
(Length of time after receipt of purchase order)

Submitted by:

Tim Keith, Pres.  
Signature

Tim Keith, President  
Name and Title (Print)

888-414-3003                      662-566-2025  
Phone                                      Fax

K & K SYSTEMS, INC.  
Company Name

687 PALMETTO RD.  
Company Address

TUPELO                                      MS                                      38801  
City,                                      State,                                      Zip

CORPORATION  
Sole proprietorship/partnership/corporation

MISSISSIPPI  
If corporation, state of corporation

**Bidder Proposes  
To Furnish**

**Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp Silent Sentinel Arrow Board. Please include all specifications at time of bid.**

**Year, Make and Model of unit bid:** 2015 K&K AT254896

Consists of an arrow display panel, a supporting structure for the display panel, photovoltaic array, a battery power supply and an electronic control console, all mounted on a heavy duty trailer frame.	YES
Shall have a high contrast arrow display panel with long life expectancy, high reliability LED lamp technology.	YES
Shall meet or exceed the standards for Arrow Boards as listed with the U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices.	YES
Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Delivery directly from a manufacturer's facility without inspection and prep by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty repairs, and shall provide on-site training on use and maintenance of all equipment.	N/A
Length Overall - 100".	104 3/4" with tongue
Overall width -- 96".	YES
Across Fenders -- 74".	68 1/2"
Overall height in transport position -- 92".	YES
Overall height in operating position -- 134".	YES
Ground Clearance, minimum -- 13 1/2".	16 1/2"
Weight approximately 1200# (please specify).	1100#
Transport position maximum towing speed 70 MPH.	YES
Operating position @ max. height, outriggers in place 80 mph sustained wind.	YES

**Bidder Proposes  
To Furnish**

Electrical interference – unaffected by RFI and EMI.

YES

Trailer frame shall be constructed of a welded 3/16” CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16” structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.

YES

Trailer tongue shall consist of 2 ½ x 2 ½ x 3/16” structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.

YES

Trailer tongue shall be equipped with an adjustable height coupler with provisions for a 3” pintle ring.

YES OPTION

Trailer shall be equipped with ¼” safety chains with snap type hooks.

YES

Paint shall consist of a polyimide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.

YES

Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).

WE CAN DO EITHER

Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.

YES

Trailer shall be equipped with a lighted license plate holder.

N/A

Trailer wiring harness shall be completely sealed and water resistant.

YES

Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.

STEEL FENDERS CLOSED

Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16” x 6” wide steel foot plate.

YES

Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93”, front to rear and 56” side to side to provide adequate stability of unit in high winds.

FRONT TO REAR - 58”  
SIDE TO SIDE - 68”

Wheels shall be a 13” 5 lug pattern (4 ½” bolt circle), white spoke with B78-13 load range C tires.

YES

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

YES

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All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

YES

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Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

YES

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Winch shall be zinc plated to minimize corrosion.

YES

---

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

YES

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Arrow panel to be an overall width of 96".

YES

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Arrow board to have an overall height of 48".

YES

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Arrow board to have an overall depth of 3".

YES

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Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

YES

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Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

YES

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Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

YES

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Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

YES

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Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

YES

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The arrow panel lamp housing shall be completely sealed to protect the internal components from harsh environmental conditions.

YES

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**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

YES

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The color of the light produced by the lamps shall be amber.

YES

---

The lamps shall have a minimum life expectancy of 100,000 hours.

YES

---

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

YES

---

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

YES

---

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

YES OPTION

---

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

N/A

---

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel , lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

YES

---

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

YES STEEL

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Control module front panel shall be completely sealed to accommodate operation in all types of weather.

YES

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**Bidder Proposes  
To Furnish**

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.	YES
Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.	YES
Control module operating firmware shall be field upgradeable.	N/A YES
Operating voltage – 12 Volts DC nominal.	
Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.	YES
Batteries shall consist of (4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.	YES OPTION
Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.	YES
Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.	STEEL
Solar Array power output of 80 Watts.	YES OPTION
Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.	YES
Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.	YES
Solar power system shall include a solid state charge controller.	YES

**Bidder Proposes  
To Furnish**

Charge controller shall monitor battery voltage and ambient temperature.	YES
Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries.	YES
Shall have a standard "Bumper to Bumper" 5 year warranty.	YES
Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge.	YES OPTION
Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort.	YES OPTION
Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring.	YES OPTION
Trailer to be equipped with a Traffic Cone Carrier.	YES OPTION

**K&K Systems**

Systems

**QUOTATION**

687 Palmetto Road

Tupelo, MS 38801

[www.k-systems.com](http://www.k-systems.com)email: [ali@k-systems.com](mailto:ali@k-systems.com)

Phone: 662-566-2025

Fax: 662-566-7123 TollFree: 888-414-3003

Quotation #: Q150331AB-MI-TRAVERSE CITY

Customer Contact: JULIE DALTON

Quotation Date: 31-Mar-2015

Quote Valid: 45 days

Customer Type: Retail

Prepared by: Ali Bingham

Bill To:	Ship To:
Name: Julie Dalton, Purchasing Agent	(Update if different than Bill To address)
Company Name: The City of Traverse City	Name: Julie Dalton, Purchasing Agent
Street Address: 400 Boardman Ave.	Company Name: The City of Traverse City
Address 2: 2nd Floor	Street Address: 400 Boardman Ave.
City, ST ZIP Code Traverse City, MI 49684	Address 2: 2nd Floor
Tel:	City, ST ZIP Code Traverse City, MI 49684
Cell:	Tel:
Fax:	Cell:
email:	Fax:
	email:

**Product**

Model #	Description	Base Price
AT254896	Solar Powered, 25 Lamp (LED) Arrow Board. Sign dimensions are 48" x 96" all aluminum fabrication with flat black powder coat finish to give smooth look, 40 watt solar panel, solar regulator with LVD to protect batteries from over discharge. 100 amps of battery backup, (4)-four swivel type jacks, one on each corner of trailer.	\$4,475.61

**Packaging**

K&amp;K Delivers

**Options and Accessories - PER UNIT**

QTY per Unit	Item #	Description	Price Each	Price per Unit
1	TBPR	Pintle ring hitch coupler & adjustable height channel.	\$91.80	\$91.80
1	A3BL	Three small amber indicator lights added to the back of display.	\$74.39	\$74.39
1	ADD40W	Additional 40 watt solar panel	\$288.07	\$288.07
1	BCH-1260-I	60 amp battery charger - installed.	\$292.81	\$292.81
1	OTS	Traffic Cone Carrier	\$50.00	\$50.00

**Special Notes****Terms of Purchase**

FOB: Tupelo, MS 38801  
 Delivery (weeks): 4-6 Weeks  
 Warranty: 1 year limited warranty, Factory Depot

Per System Total: \$5,272.68  
 Total QTY of Systems: 1 \$5,272.68  
 Total Shipping Costs: \$900.00  
 Taxes: 7.00%  
 GRAND TOTAL: \$6,172.68

Sales Person Signature:

Work Order#

Sales Manager Signature:

Client PO#

Please note: The above specifications and quotation does not include shipping, permits, or taxes unless otherwise stated. The freight charge is an approximate estimate for your reference; the actual charge may vary.

\*Lead-time committed is based on the date Purchase Order is received by K&K Systems and deposit made and/or credit approved. Lead time is not based on the date quoted.

The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

**Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.**

Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: SolarTech 2015 Silent Sentinel

COST OF SPECIFIED EQUIPMENT: \$ 6,720.50 ea.

EXPECTED DELIVERY DATE: 1 month ARO  
(Length of time after receipt of purchase order)

Submitted by:

Larry Booth  
Signature

Give 'Em A Brake Safety  
Company Name

Larry Booth / Estimator  
Name and Title (Print)

2610 Sanford Av. SW.  
Company Address

616 531 8705      616 531 8703  
Phone                      Fax

Grandville Mi. 49418  
City,                      State,                      Zip

E-mail: lbooth@gebsafety.com

Corporation  
Sole proprietorship/partnership/corporation

Michigan  
If corporation, state of corporation

Bidder Proposes  
To Furnish

Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp  
Silent Sentinel Arrow Board. Please include all specifications at time  
of bid.

Year, Make and Model of unit bid: 2015 Silent Sentinel

Consists of an arrow display panel, a supporting structure for the display  
panel, photovoltaic array, a battery power supply and an electronic control  
console, all mounted on a heavy duty trailer frame. ✓

Shall have a high contrast arrow display panel with long life expectancy,  
high reliability LED lamp technology. ✓

Shall meet or exceed the standards for Arrow Boards as listed with the  
U.S. Federal Highway Administration Manual on Uniform Traffic  
Control Devices. ✓

Manufacturer shall have a factory authorized service center located  
within 150 miles of point of delivery. Delivery directly from a  
manufacturer's facility without inspection and prep by an authorized  
service center shall not be permitted. Additionally, authorized service  
center shall be capable of performing warranty repairs, and shall provide  
on-site training on use and maintenance of all equipment. ✓

Length Overall - 100". ✓

Overall width – 96". ✓

Across Fenders – 74".

Overall height in transport position – 92". ✓

Overall height in operating position – 134". ✓

Ground Clearance, minimum – 13 ½". ✓

Weight approximately 1200# (please specify). 1180 lbs

Transport position maximum towing speed 70 MPH. ✓

Operating position @ max. height, outriggers in place 80 mph  
sustained wind. ✓

	<b>Bidder Proposes To Furnish</b>
Electrical interference – unaffected by RFI and EMI.	✓ _____
Trailer frame shall be constructed of a welded 3/16" CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16" structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.	✓ _____
Trailer tongue shall consist of 2 1/2 x 2 1/2 x 3/16" structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.	✓ _____
Trailer tongue shall be equipped with an adjustable height coupler with provisions for a <u>3" pintle ring</u> .	3" Pintle only _____
Trailer shall be equipped with 1/4" safety chains with snap type hooks.	✓ _____
Paint shall consist of a polyimide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.	✓ _____
Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).	✓ _____
Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.	✓ _____
Trailer shall be equipped with a lighted license plate holder.	✓ _____
Trailer wiring harness shall be completely sealed and water resistant.	✓ _____
Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.	✓ _____
Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16" x 6" wide steel foot plate.	✓ _____
Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93", front to rear and 56" side to side to provide adequate stability of unit in high winds.	✓ _____
Wheels shall be a 13" 5 lug pattern (4 1/2" bolt circle), white spoke with B78-13 load range C tires.	✓ _____

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

✓

All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

✓

Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

✓

Winch shall be zinc plated to minimize corrosion.

✓

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

✓

Arrow panel to be an overall width of 96".

✓

Arrow board to have an overall height of 48".

✓

Arrow board to have an overall depth of 3".

✓

Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

✓

Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

✓

Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

✓

Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

✓

Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

✓

The arrow panel lamp housing shall be completely sealed to protect the Internal components from harsh environmental conditions.

✓

**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

✓

The color of the light produced by the lamps shall be amber.

✓

The lamps shall have a minimum life expectancy of 100,000 hours.

✓

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

✓

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

✓

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

✓

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

✓

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel , lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

✓

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

✓

Control module front panel shall be completely sealed to accommodate operation in all types of weather.

✓

**Bidder Proposes  
To Furnish**

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.	✓
Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.	✓
Control module operating firmware shall be field upgradeable.	✓
Operating voltage – 12 Volts DC nominal.	✓
Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.	✓
Batteries shall consist of <u>(4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.</u>	✓
Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.	✓
Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.	✓
Solar Array power output of <u>80 Watts.</u>	✓
Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.	✓
Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.	✓
Solar power system shall include a solid state charge controller.	✓

**Bidder Proposes  
To Furnish**

Charge controller shall monitor battery voltage and ambient temperature.

✓

Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries.

✓

Shall have a standard "Bumper to Bumper" 5 year warranty.

✓

Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge.

✓

Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort.

✓

Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring.

✓

Trailer to be equipped with a Traffic Cone Carrier.

✓

The City may require an in house equipment demonstration for your bid to be considered.

Bidder agrees that the bid may not be withdrawn for a period of thirty (30) days from the actual date of the opening of the bid.

**Please direct ALL questions to: Dave Courtad, Garage Superintendent, City of Traverse City, at 231-922-4900, ext. 111.**

Price quoted shall include title fee, any documentation fee, and all transportation (delivery) charges fully prepaid to the City Garage, 625 Woodmere Ave. Traverse City, MI 49686

YEAR MAKE AND MODEL OF EQUIPMENT BID: 2015 Wanco WTSP

COST OF SPECIFIED EQUIPMENT: \$ 4912.00

EXPECTED DELIVERY DATE: 3 to 4 weeks lead time  
(Length of time after receipt of purchase order)

Submitted by:

Butch Cone  
Signature

Butch Cone, President  
Name and Title (Print)

888-603-5506      231-549-3555  
Phone                      Fax

Truck & Trailer Specialties of Boyne Falls, Inc.  
Company Name

P.O. Box 473, 00399 US 131  
Company Address

Boyne Falls, MI 49713  
City,                      State,                      Zip

Corporation  
Sole proprietorship/partnership/corporation

Michigan  
If corporation, state of corporation

**Bidder Proposes  
To Furnish**

**Specifications: Based on a Solar Tech Trailer-mounted 25 Lamp Silent Sentinel Arrow Board. Please include all specifications at time of bid.**

**Year, Make and Model of unit bid:** 2015 Wanco WTSP

Consists of an arrow display panel, a supporting structure for the display panel, photovoltaic array, a battery power supply and an electronic control console, all mounted on a heavy duty trailer frame.	<u>COMPLY</u>
Shall have a high contrast arrow display panel with long life expectancy, high reliability LED lamp technology.	<u>COMPLY</u>
Shall meet or exceed the standards for Arrow Boards as listed with the U.S. Federal Highway Administration Manual on Uniform Traffic Control Devices.	<u>COMPLY</u>
Manufacturer shall have a factory authorized service center located within 150 miles of point of delivery. Delivery directly from a manufacturer's facility without inspection and prep by an authorized service center shall not be permitted. Additionally, authorized service center shall be capable of performing warranty repairs, and shall provide on-site training on use and maintenance of all equipment.	<u>COMPLY</u>
Length Overall - 100".	<u>EXCEPTION 119"</u>
Overall width – 96".	<u>COMPLY</u>
Across Fenders – 74".	<u>EXCEPTION 75"</u>
Overall height in transport position – 92".	<u>EXCEPTION 91"</u>
Overall height in operating position – 134".	<u>EXCEPTION 136"</u>
Ground Clearance, minimum – 13 ½".	<u>COMPLY</u>
Weight approximately 1200# (please specify).	<u>COMPLY 1250# tested to 57mpr</u>
Transport position maximum towing speed 70 MPH.	<u>EXCEPTION</u>
Operating position @ max. height, outriggers in place 80 mph sustained wind.	<u>COMPLY</u>

	<b>Bidder Proposes To Furnish</b>
Electrical interference – unaffected by RFI and EMI.	<u>COMPLY</u>
Trailer frame shall be constructed of a welded 3/16" CNC formed steel plate and structural steel tubing with a 3 x 3 x 3/16" structural steel tubing receiver for the tongue, reinforced and welded to the front crossmember.	<u>COMPLY</u>
Trailer tongue shall consist of 2 ½ x 2 ½ x 3/16' structural steel tubing. The tongue shall bolt into the receiver to facilitate ease of removal. Also to be equipped with a swivel type screw jack with a formed foot pad.	3"x3"x3/16 removable <u>EXCEPTION</u>
Trailer tongue shall be equipped with an adjustable height coupler with provisions for a 3" pintle ring.	<u>COMPLY</u>
Trailer shall be equipped with ¼" safety chains with snap type hooks.	<u>COMPLY</u>
Paint shall consist of a polyimide epoxy primer with a minimum dry thickness of 2.5 mils or comparable please specify.	oven baked powder coat <u>EXCEPTION</u>
Final color to be a high gloss acrylic urethane finish and applied to a dry film thickness of 2.5 mils safety orange or yellow acceptable (specify).	oven baked powder coat orange <u>EXCEPTION</u>
Trailer shall be equipped with sealed flush mounted stop, turn, tail lights.	<u>COMPLY</u>
Trailer shall be equipped with a lighted license plate holder.	<u>COMPLY</u>
Trailer wiring harness shall be completely sealed and water resistant.	<u>COMPLY</u>
Trailer shall be equipped with unbreakable, molded, solid color fenders completely closed on the inside. Fenders shall be mounted with a zinc or stainless hardware.	removable steel 16ga. <u>EXCEPTION</u>
Trailer shall be equipped with four telescoping jacks consisting of 2 x 2 x 12 gauge galvanized steel tubing with a 3 x 3 x 3/16" x 6" wide steel foot plate.	1-3/4" 12 ga. 4"x6" foot plate <u>EXCEPTION</u>
Jack stands shall be configured such that, when in operating position, they create a footprint of at least 93", front to rear and 56" side to side to provide adequate stability of unit in high winds.	75"x74" <u>EXCEPTION</u>
Wheels shall be a 13" 5 lug pattern (4 ½" bolt circle), white spoke with B78-13 load range C tires.	15" ST205/75D15 D Range <u>EXCEPTION</u>

**Bidder Proposes  
To Furnish**

Trailer superstructure shall provide complete support of the arrow panel in the transport (down) position. Cantilevered support of the arrow panel is unacceptable.

cantilevered  
**EXCEPTION**

All aluminum to steel attachments shall be made with stainless steel hardware and stainless or nylon spacers to minimize corrosion.

**COMPLY**

Arrow panel lifting mechanism shall consist of a minimum 1,000 pound capacity, automatic brake type winch with 1/4 " wire rope capable of holding the arrow panel in any position from full upright to down.

**COMPLY**

Winch shall be zinc plated to minimize corrosion.

**COMPLY**

Winch shall be designed for handle removal for security while not interfering with the automatic brake operation.

tools required  
**EXCEPTION**

Arrow panel to be an overall width of 96".

**COMPLY**

Arrow board to have an overall height of 48".

**COMPLY**

Arrow board to have an overall depth of 3".

**COMPLY**

Arrow panel frame including braces shall consist of 3 x 1 x 1/8" aluminum alloy channel, welded at corners and internal braces.

**COMPLY**

Front and rear surfaces shall consist of a .063" aluminum alloy sheet with a baked matte black enamel finish.

**COMPLY**

Arrow panel shall be equipped with a light sensing device to monitor ambient light and provide information to the control module to regulate the intensity of the arrow lamps.

**COMPLY**

Arrow panel shall be equipped with 25 lamps, approximately 5" in diameter.

**COMPLY**

Arrow panel lamps shall consist of an array of at least 21 LEDs mounted in a weather resistant high impact polycarbonate housing.

**COMPLY**

The arrow panel lamp housing shall be completely sealed to protect the Internal components from harsh environmental conditions.

**COMPLY**

**Bidder Proposes  
To Furnish**

The lamps shall provide an Approximate Initial Maximum Beam Candlepower of 1000 candela typical, 750 candela minimum, over an operating range of 10.7 to 16.0 VDC. The lamp intensity shall remain constant over the entire operating voltage range.

COMPLY

The color of the light produced by the lamps shall be amber.

COMPLY

The lamps shall have a minimum life expectancy of 100,000 hours.

COMPLY

Arrow panel lamps shall be secured to the arrow panel by a black, molded impact resistant shroud, approximately 5" in diameter and approximately 4" high. Lamp shroud shall mount to the panel with stainless screws through keyholes such that the shroud and the lamp can be removed from the panel without the need to remove the screws from the panel.

COMPLY

Arrow panel lamps shall be keyed to the shroud and the shroud shall be keyed to the front panel so lamps are secured to front panel with proper lamp orientation.

COMPLY

The rear of the arrow panel shall be equipped with three ultra-bright LEDs, in water tight housings, to indicate the arrow panel pattern currently being displayed to provide a visual indication to individuals in the work zone that the arrow board is functioning properly.

COMPLY

Arrow panel to be equipped with a watertight connector to allow "quick" detach for serviceability. Cable shall be suitable for outdoor use and completely sealed against moisture. Arrow panel control cable connector shall be equipped with gold flash pins to provide maximum conductivity.

COMPLY

Control module shall consist of a totally solid state fully integrated device which provides control of the arrow sign panel , lamp pattern generation, battery status monitoring and indication, solar electric charge control, low battery voltage disconnect, high battery voltage disconnect, reverse battery polarity and surge protection.

COMPLY

Control module shall be enclosed in a weather protected, lockable, and molded High density Polyethylene enclosure secured to the trailer chassis.

aluminum enclosure  
EXCEPTION

Control module front panel shall be completely sealed to accommodate operation in all types of weather.

COMPLY

**Bidder Proposes  
To Furnish**

Control module shall be equipped with multi colored LED indicators for monitoring battery charge level, solar charger activity, and lamp intensity control settings.

COMPLY

Control module power consumption, not including lamps, shall be less than 0.5 Watts to optimize overall energy consumption.

COMPLY

Control module operating firmware shall be field upgradeable.

not upgradeable  
EXCEPTION

Operating voltage – 12 Volts DC nominal.

8 vdc  
EXCEPTION

Main power switch shall be unnecessary, when arrow pattern selection switch is in the OFF position, the control module shall automatically shut down all unnecessary operations to reduce energy consumption to less than 0.05 Watts. Solar generator charge controller shall operate automatically, as required, during daylight hours and shut down completely at night.

COMPLY

Batteries shall consist of (4) four 6-Volt Gel-Cel Heavy Duty Deep Cycle.

(2) 12 volt  
EXCEPTION

Shall have 520 Amp-Hours energy capacity to operate the arrow panel, displaying a single flashing arrow for more than 30 days, without any energy input from the solar array.

75 amp hours, meets federal  
standard for run time  
EXCEPTION

Battery/Equipment Compartments to be constructed of High Molecular Weight Polyethylene.

metal  
EXCEPTION

Solar Array power output of 80 Watts.

COMPLY

Entire unit shall tilt back and rest on jack stands for ease of cleaning and maintenance.

board does not rest on jack  
stands for ease of cleaning  
EXCEPTION

Solar array energy output shall be sufficient to operate the arrow sign, under normal operating conditions, with the solar array in a flat, horizontal position. It shall not be necessary to tilt or rotate the solar array to provide sufficient energy output from the solar array to operate the arrow panel continuously.

COMPLY

Solar power system shall include a solid state charge controller.

COMPLY

**Bidder Proposes  
To Furnish**

Charge controller shall monitor battery voltage and ambient temperature. COMPLY

Charge controller shall regulate energy flow from the solar array into the battery bank so as to avoid over charging of the batteries. COMPLY

Shall have a standard "Bumper to Bumper" 5 year warranty. COMPLY

Charger type- Switching regulator, constant voltage with automatic switch to maintenance or trickle charge. COMPLY

Shall be a 110 Volt, 45 Amp battery charger that shall install in the field with minimal effort. 2 amp  
EXCEPTION

Adjustable height coupler shall accept a 2" ball coupler or a 3" pintle ring. COMPLY

Trailer to be equipped with a Traffic Cone Carrier. \* not available  
EXCEPTION

\*Traffic cone carrier not available from Weco. Truck & Trailer will supply. Sent loose.