



# Blue Springs, Missouri

## Public Works Department

### SECTION 2850 – TRAFFIC SIGNALS

#### CITY OF BLUE SPRINGS, MISSOURI CONSTRUCTION SPECIFICATIONS

The City of Blue Springs hereby adopts Sections 902, 1050, 1062, 1092 of the Missouri Department of Transportation's (MoDOT) 2017 Specification Book for Highway Construction, latest edition. The following additions, deletions and/or revisions are adopted as a part of Section 902, 1050, 1062, 1092 for use within the City of Blue Springs. Text in bold italics indicates revisions or additions to the MoDOT standard and Manual on Uniform Traffic Control Devices (MUTCD).

Throughout Section 902, 1050, 1062, 1092

Replace "engineer" with "***City Engineer***".

Replace "commission" with "***City of Blue Springs Public Works Department***".

#### Section 902.2 General

Add the following paragraphs prior to Section 902.2:

***“902.2.a These Specifications may be modified or deleted by appropriate items in the Project Special Provisions or by written authorization by the City Engineer.***

***902.2.b Work incidental to traffic signal installation that is not covered in these Specifications shall be performed in accordance with the City of Blue Springs specifications and standards. All incidental parts, which are not shown on the Plans or specified in the Specifications and which are necessary to complete the traffic signal installation, shall be supplied and installed by the Contractor to the satisfaction of the City Engineer. No additional payments will be made for incidental work or parts. All systems shall be complete and in operation to the satisfaction of the City Engineer at the time of acceptance.***

***902.2.c All appurtenances shall be installed as shown on the Plans, or as specified in the Project Special Provisions. Any deviations must be established by the Contractor and authorized by the City Engineer.***

***902.2.d The Contractor shall contact the Public Works Department before any project work begins to notify the City Engineer of the construction schedule and to request project inspections. The Contractor is responsible for obtaining all necessary permits from the City, and is responsible for all associated costs, before any work can begin.***



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***902.2.e The Contractor is responsible for obtaining a sealed letter from a licensed engineer in the State of Missouri stating that the traffic signal is ready and safe to be energized. The City Inspector will obtain an address for the power supply, which the Contractor shall use when dealing with the electrical utility company.***

***902.2.f The Contractor is responsible for contacting the electrical utility company (KCP&L: 816-471-KCPL) in advance to schedule the installation of the power cables to the power supply. The contractor shall provide a sealed letter confirming the traffic signals are ready to be energized per KCP&L standards. The Contractor shall be billed for all electrical utility service charges until the test period is successfully completed, at which time service can be transferred to the City.”***

### Section 902.16 Conduit Systems

Add the following section:

***“902.16.3.a Conduit may be installed by plowing in unpaved areas. The equipment used for plowing conduit is designed specifically for that purpose with the power and versatility to easily and accurately bury the various sizes of conduit under all normal soil conditions. This equipment places the conduit without twisting, kinking, or damaging the material in any way. The vibrating unit shall be attached to a tractor unit in such a manner that the tractor does not dampen the vibration. The cable way and guides shall be smooth, free of obstructions and sharp edges and shall not cause bending of the conduit at shorter than the minimum bending radius recommended by the manufacturer, nor cause excessive strain to the conduit. Conduit reels may be mounted on the tractor or conduit unreeled along the proposed route before plowing in such a manner to allow as direct a line as possible to the trench to avoid unnecessary bending of the conduit or rubbing of the conduit against the reel. The plow shall not be backed onto the conduit. If an underground obstruction is encountered, the plow shall be lifted out of the ground and the obstruction removed. Conduit may be installed utilizing the pull plow method if approved by the City Engineer. After installation of conduit by plowing, the disturbed earth shall be leveled and, if necessary, compacted by a device approved by the City Engineer. Ends of conduit shall be capped immediately after cutting to prevent moisture and debris from entering the conduit. Red burial tape imprinted with "CAUTION - BURIED CABLE BELOW" shall be installed in all trenches at approximately 1/3 to 1/2 of the depth of the trench. All disturbed areas shall be restored to the satisfaction of the City Inspector.”***

### 902.21 Test Period

Modify the first paragraph as follows:

***“After the project is open to normal traffic, the Contractor shall notify the City Engineer in writing the date the signal or signal system will be ready for testing. Upon concurrence from the City Engineer, the Contractor shall place the signal or signal system in operation***



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*for a 15 consecutive day test period. The signal turn-on shall be performed by the Contractor, City personnel shall be present at the activation. The signal turn-on shall not occur on Fridays, holidays or weekends and shall be completed between the hours of 9:00 a.m. and 2:00 p.m., unless otherwise noted in the Plans or directed by the City Engineer. At locations without previous traffic signal control, the new traffic signal shall flash for a period of three business days prior to full signal system turn-on. A signal operated independently of other signals or signal systems shall be tested as a single installation. A signal operated as part of a system shall not be tested until all signals in the system are ready to be tested. A system shall be tested as a unit. Any failure or malfunction of equipment during the test period shall be corrected at the Contractor's expense, and the signal or signal system tested for an additional 15 consecutive day period. This procedure shall be repeated until the signal equipment has operated to the City Engineer's satisfaction for 15 consecutive days. The Contractor shall, in the presence of the City Engineer or designee, demonstrate the proper action of the controller's monitor as part of the testing system, if applicable.”*

### 902.22 Maintenance Information

Modify the last sentence as follows:

*“If this option is invoked, the entire cost of the work performed by City personnel or the third party will be computed and deducted from the payments due the Contractor.”*

Add the following section:

*“902.22.a As-Built Drawings (also known as Record Drawings) marked up to reflect changes to public infrastructure during the construction process shall be prepared and submitted to the Public Works Department in both electronic and hard copy versions. Prior to acceptance of the work, the Contractor shall submit marked-up plans showing in detail all construction changes, especially the location and depth of conduit.”*

### 902.23 Final Clean Up

Replace the existing language with the following:

*“Before final acceptance, the Contractor shall restore to a condition equal to or better than that existing prior to construction, for all property, both public and private, within, adjacent to and beyond the limits of construction that have been disturbed or damaged while executing the work. This includes, but not limited to, existing curb and gutter, sidewalk, pavement, drainage structures, irrigation systems, street lighting, and traffic signal equipment. All unpaved areas damaged during construction shall be restored to the original condition. Unless otherwise directed, grassy areas, which were originally sodded, shall be re-sodded. Restoration work shall be at the Contractor's expense. All restoration work shall be acceptable to the City Inspector.”*

### Section 1050.4.1 Electric Substation and Service Poles

Replace the existing language with the following:

***“For temporary traffic signals, the configuration and installation of equipment mounted on substation and service poles shall be in accordance with the requirements of the utility company furnishing electrical power.”***

### Section 1050.6 Timber Preservatives

Replace the existing language with the following:

***“1050.6.a Pentachlorophenol: Pentachlorophenol shall be in accordance with AWWA P8 in a hydrocarbon solvent meeting the requirements of AWWA P9, Type A.***

***1050.6.b Ammoniacal Copper Arsenate (ACA) or Chromated Copper Arsenate (CCA): Ammoniacal Copper Arsenate and Chromated Copper Arsenate shall be in accordance with AWWA P5.***

***1050.6.c Copper Naphthenate For Repair: Copper Naphthenate shall be prepared with a solvent in accordance with AWWA Standard P9. The preservative concentration shall contain a minimum of 2 percent copper metal.***

***1050.6.d Responsibility for Quality: The Contractor shall use preservatives that meet these specifications or the treated material will be subject to rejection, or to approved retreatment with an approved preservative.***

***1050.6.e Final Steaming: All substation, service and span wire poles; except material treated with ACQ or CCA, shall be cleaned by a final steam bath in accordance with AWWA C2, C4 or C5, as applicable. In lieu of steam cleaning, sign poles may be strip stacked and air-dried for a minimum of 60 days after treatment.”***

### 1050.7 Care After Treatment

Replace the last sentence with the following:

***“If damaged material is permitted for use by the City Engineer, or framing at site is required, such injuries, cuts or holes shall be liberally field-treated with the preservative of the same type used for the original treatment, or of copper naphthenate. A second coat shall not be applied until after the first coat has been absorbed. Holes shall be treated by plugging one end and filling with preservative.”***





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### Section 1062.3 Pull Box Covers

Replace the last 2 sentences in the section with the following:

***“Covers for pull boxes to be used for traffic signals, or a combination of traffic signals and street lighting, shall be embossed with "TRAFFIC SIGNALS". Covers for pull boxes to be used for fiber optics shall be embossed with “FIBER OPTICS”.”***

### 1092.2 Posts and Mast Arms

Add the following section:

#### ***“1092.2.4.5 Traffic Signal Post Painting***

***1092.2.4.5.1 Description: This work shall consist of painting new or existing traffic signal posts, mast arms, luminaire arms, pedestals and pedestal bases at locations shown on the plans and as described below.***

***The painting system shall be a top coating of a hot dip galvanized surface with either a high density urethane or triglycidyl isocyanurate (TGIC) polyester powder or a special polyester powder primer over coated with an aliphatic polyurethane liquid to obtain both the synergistic effect of the combined coatings as well as the beautifying effect of a colored top coat. The coating shall provide for the cathodic protection of a steel substrate under the specified performance characteristics when subjected to variable outdoor environmental conditions.***

***On new steel surfaces prior to application of the hot dip galvanized (zinc) coating, the steel substrate shall be properly cleaned and prepared by removal of excessive mill scale, where required, by shot blasting; degreased by immersion in a heated caustic solution; pickled by immersion in a heated sulfuric acid solution; rinsed clean from residual caustic and/or acid ammonium chloride solution. The hot dip galvanizing coating shall meet ASTMK standards and shall be applied by immersion in a molten bath of prime western grade zinc, coating both internal and external surfaces to a minimum thickness of 2.5 mils. Flux ash shall be skimmed from the molten zinc bath prior to product extraction to assure a debris free zinc coating. On poles with an existing galvanized surface, brushblast to a uniform dull appearance free of all shine and preheat, prior to prime painting. All cleaned assemblies shall be protected from moisture and other foreign materials prior to prime painting. Moisture, oil, grease, loose paint or other foreign material shall be removed prior to painting using a clean rag saturated with thinner or solvent.***

***The polyester powder top coat or powder primer is to be electrostatically sprayed on all visually exposed exterior zinc coated surfaces and heat cured to a minimum dry film thickness of 2/9 mils. The electrostatic application process assures a uniform, monolithic coating. An additional liquid coat of an aliphatic polyurethane is to be electrostatically sprayed over the powder primer and heat cured to a minimum dry film thickness of 1.5***



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*mils. Prior to applying the additional liquid coat, repair any surface imperfections such as sags or runs by light sanding to obtain a uniform surface. Also, reapply prime paint, as necessary, to any voids or areas having less than the required thickness. Application is to be with airless spray equipment.*

*The powder top coat and powder primer are to be thermosetting polyester materials. The powders shall be low molecular weight solid resins that, when subjected to elevated temperature up to 400°F, melt, flow and chemically cross-link within themselves (or with other reactive components) to form a higher molecular weight reaction product. The resulting coating is to have a different chemical structure than the basic resin, be heat stable and not regress to either a powder or liquid on further exposure to heat. Powder top coat and primers are to be the latest state-of-the-art, high density, variable gloss, polyester thermosetting resins available.*

*Either the powder top coat or the liquid overcoat shall provide the current ultimate in ultraviolet durability, gloss and color retention, chemical and abrasion resistance and overall weatherability. The liquid overcoat is to be a two (2) component, high solids, aliphatic polyurethane capable of being accelerated cured at elevated temperatures up to 225°F.*

*All new or existing traffic signal posts, mast arms, luminaire arms, pedestals and pedestal bases painted under this specification shall provide a ten (10) year limited warranty on products factory coated with the system, subject to the following:*

*The factory applied coatings will not fail to provide corrosion (electro-chemical reaction) protection of the steel substrate for a period of ten (10) years from the date of shipment (the "Warranty Period"). If during the Warranty Period, the steel substrate exhibits any visual and/or physical evidence of corrosion due to coating failure from normal atmospheric environmental conditions, the coating will be repaired or replaced at the discretion of the manufacturer and at no charge and/or cost to the City if the City notifies the manufacturer in writing and provides proof of purchase within 90 days of such failure becoming evident. Failure of the coating to provide the above described corrosion protection shall specifically exclude failure resulting from damage due to acts of God, act of war, civil disturbances, (falling objects, fire, explosion, external forces, radiation, riots, improper storage (includes failure to remove protective shipping packaging and failure to provide good drainage/ventilation during storage), improper handling/erection, misuse or abuse in application or any other occurrences beyond manufacturer's control. The liability of the manufacturer under this warranty, or for any loss or damage arising out of, or connected with, the design, application, sale or use of the coating, whether the claim is based on contract or negligence, shall not exceed the price allocable to the value of the original factory applied coating which gives rise to the claim and upon expiration of the Warranty Period all such liability shall terminate. Manufacturer will not be liable for any*



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*special or consequential damages including, but not limited to, cost of temporary substitute product or labor costs to repair or reinstall the product with failed coating or any product transportation cost to and from manufacturer's process plant if factory replacement of the effective coating is deemed necessary. This warranty is exclusive and in lieu of all other warranties whether express, implied, and/or written. This warranty constitutes the exclusive and sole remedy of the City and liability of manufacturer.*

### **1092.2.4.5.2 Materials:**

#### **Primer**

**Valmont Part No. 347277**

**Color: Gray**

**Manufacturer and #: Tnemec Series N69-A3977**

**Total Thickness (DFT): 2 mils**

**Thinner: Tnemec #4; Valmont Part No. TR#159047**

**Cure Temperature: 150°F**

#### **Liquid Overcoat (top coat)**

**All new pedestrian and traffic signal posts located along the Woods Chapel Road corridor shall have a top coat as follows:**

**Valmont Part No. 347243; Tnemec Series 1074-35GR**

**Color: Gloss Black**

**Total Thickness (DFT): 3 mils**

**Curing Time to Handle: 6 hours; Curing Time to Recoat: 8 Hours**

**Thinner: Tnemec #42; Valmont Part No. TR#X159120**

**All new pedestrian and traffic signal posts located along the Adams Dairy Road corridor or within the Adams Dairy Parkway Overlay District shall have a top coat as follows:**

**Color: Sherwin Williams Custom Manual Match**

<b>BAC COLORANT</b>	<b>02</b>	<b>32</b>	<b>64</b>	<b>128</b>
<b>G2 – New Green</b>	<b>12</b>	<b>25</b>	<b>-</b>	<b>-</b>
<b>R2 – Maroon</b>	<b>-</b>	<b>9</b>	<b>1</b>	<b>1</b>
<b>Y3 – Deep Gold</b>	<b>-</b>	<b>29</b>	<b>-</b>	<b>-</b>
<b>W1 - White</b>	<b>-</b>	<b>8</b>	<b>-</b>	<b>-</b>

**1092.2.4.5.3 Method of Measurement: No direct measurement will be made for “Traffic Signal Post or Mast Arm Painting”, completed in place in accordance with the plans and specifications and as accepted by the Public Works Department.**

**1092.2.4.5.4 Basis of Payment: No direct payment will be made for “Traffic signal Post Painting”. Payment for “Traffic Signal Post Painting” shall be subsidiary to other traffic**

*signal bid items, and shall be full compensation for the furnishing of all materials, labor, equipment, tools and incidentals necessary to complete the work.”*

1092.4.1.1 Controller Cabinets

Add the following section (g)

**“(g) All NEMA traffic signals controller shall be the Econolite Model ASC/3-1000 or latest model. All system master controllers shall be the Econolite Model ASC/2M-1000 or latest model. Each controller shall have fiber interface, including the following equipment and quantities:**

- 1 – Fiberoptic patch panel/distribution box (12-port, single mode**
- 1 – Ethernet switch (Cisco IE-3000 switch and power supply)**
- 2 – GBIC models (Cisco GLC-LH-SM and associated patch cords)**
- 1 – Underground splice enclosure (for splicing cable in adjacent pull box)**

***In addition to the equipment listed, the contractor shall supply and install all additional necessary items to make the fiber optic interconnect operational between the intersections.***

***The cabinet shall be Econolite type Super P-44 with Opticom interface panel. Install on Type EV Base, modified to accommodate additional width for integrated uninterruptible power supply (UPS) compartment. UPS to be Techpower M-E XL 1000 with batteries and auxiliary equipment necessary to provide backup capability of normal signal operation for at least 2 hours with 4-6 hours of flash time. No separate payment shall be made.”***

1092.4.3.1 Pre-Emption Interface

Add the following section:

***“1092.4.3.1.a Emergency vehicle preemption shall be Global Traffic Technologies equipment with I.D. capability, including detection units (Model 721), communication cable (Model 138), and Phase Selector card (Model 754 or latest model). These items shall be paid for as one (1) emergency vehicle detection system.”***

1092.4.7.2 Pedestrian Push Button

Add the following section:

***“1092.4.7.2.a Pedestrian push button detectors shall be Campbell Model A912 or latest model, equipped with computer cable to connect button to corresponding pedestrian indication.”***





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### 1092.4.7.7 Video Detection System

Add the following section:

***“1092.4.7.7.1.5 The Autoscope Sola Terra/Encore System or latest model shall be used for video detection. The system shall be complete including color cameras, processor, color monitor, mounting hardware, and camera cable per manufacturer’s specifications. The processor and cameras shall be preprogrammed for traffic data measurement. These items shall be paid for as one (1) video detection system.”***

### 1092.7 CCTV Camera Assembly, Installed

Add the following section:

#### ***“1092.7 CCTV Camera Assembly, Installed***

***1092.7.1 This work shall consist of providing and installing a CCTV Camera Assembly at the signalized intersections shown in the plans. This equipment consists of an AXIS Q6032-R PTZ Dome Network camera or latest model with remotely controlled pan-tilt-zoom (PTZ), and the ability to acquire video images of the various sections of the roadway. Also included are the Ethernet video encoders and equipment necessary to transmit the video signal from the camera location using the designated fiber optic cable.***

***1092.7.2 All materials shall be in accordance with the AXIS Camera’s manufacturer’s specifications.***

***1092.7.3 Installed CCTV Camera Assemblies shall be measured per each.***

***1092.7.4 Accepted CCTV Camera Assemblies will be paid for at the contract unit price bid for the item specified in the contract documents, CCTV Camera Assembly, Installed. Such payment shall constitute full compensation for all materials, labor, tools, and equipment necessary to complete the construction item. No direct payment will be made for any incidental items necessary to complete the work unless specifically provided as a pay item in the contract.”***