



Proposal / Contract Cover

PROPOSAL SUBMITTED BY		
Contractor's Name		
Street	P.O. Box	
City	State	Zip Code

STATE OF ILLINOIS

COUNTY OF Kane

(Name of City, Village, Town or Road District)

- ☐ ESTIMATE OF COST
☒ SPECIFICATIONS
☐ PLANS
☐ MATERIAL PROPOSAL
☐ DELIVER AND INSTALL PROPOSAL
☒ CONTRACT PROPOSAL
☐ CONTRACT
X CONTRACT BOND

FOR THE IMPROVEMENT OF

2020 & 2021 & 2022 Electrical Maintenance Contract (EMC)

STREET NAME OR ROUTE NO. Various Highways

SECTION NO. 20-00000-01-GM

TYPE OF FUNDS NON-MFT

For Municipal Projects

Submitted

Approved/Passed

Date

☐ Mayor ☐ President of Board of Trustees ☐ Municipal Officer

For County and Road District Projects

Submitted/Approved

Date

☐ Highway Commissioner

Submitted/Approved

Date

☐ County Engineer/Superintendent of Highways

Department of Transportation

☐ Released for bid based on limited review

Date

Regional Engineer

☐ Concurrence in approval of award

Date

Regional Engineer

Notice to Bidders

RETURN WITH BID

Route
County
Local Agency
Section

Various Highways
Kane
Kane County D.O.T.
20-00000-01-GM

Time and Place of Opening of Bids

Sealed proposals for the improvement described below will be received at the office of the County Engineer

41W011 Burlington Road St. Charles, IL 60175

until 9:00 o'clock A .M., Wednesday Aug 28, 2019 . Proposals will be opened and read publicly
(date)
at 9:00 o'clock A .M., Wednesday Aug 28, 2019 at the office of the County Engineer
(date)

41W011 Burlington Road St. Charles, IL 60175

(address)

Description of Work

Name 2020 & 2021 & 2022 Electrical Maintenance Contract (EMC) Length N/A feet (N/A miles)

Location Various locations countywide

Proposed Improvement Continuous maintenance and repair of various existing traffic signal, ITS and street lighting infrastructure under Kane County maintenance jurisdiction as listed herein.

**\$0 Charge for Proposal
Non-refundable***

Bidders Instructions

**No Proposals issued after 12 NOON
Tuesday Aug 27, 2019**

1. Plans and proposal forms will be available in the office of

the County Engineer

41W011 Burlington Road St. Charles, IL 60175

Contacts are Stephen Zulkowski at zulkowskistephen@co.kane.il.us

2. If prequalification is required , the 2 low bidders must file within 24 hours after the letting an "Affidavit of Availability" (Form BC 57), in triplicate, showing all uncompleted contracts awarded to them and all low bids pending award for Federal, State, County, Municipal and private work. One copy shall be filed with the Awarding Authority and 2 copies with the IDOT District Office.

3. All proposals must be accompanied by a proposal guaranty as provided in BLRS Special Provision for Bidding Requirements and Conditions for Contract Proposals.

4. The Awarding Authority reserves the right to waive technicalities and to reject any or all proposals as provided in BLRS Special Provision for Bidding Requirements and Conditions for Contract Proposals.

5. Bidders need not return the entire contract proposal when bids are submitted unless otherwise required. Portions of the proposal that must be returned include the following:

- | | |
|--|---|
| a. BLR 12210 - Contract Cover | f. BLR 12230 - Proposal Bid Bond (if applicable) |
| b. BLR 12220 - Notice to Bidders | g. BLR 12325 - Apprenticeship or Training Program |
| c. BLR 12221 - Contract Proposal | Certification (do not use for federally |
| d. BLR 12222 - Contract Schedule of Prices | funded projects) |
| e. BLR 12223 - Signatures | |

6. The quantities appearing in the bid schedule are approximate and are prepared for the comparison of bids. Payment to the Contractor will be made only for the actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as hereinafter provided.

-
7. Submission of a bid shall be conclusive assurance and warranty the bidder has examined the plans and understands all requirements for the performance of work. The bidder will be responsible for all errors in the proposal resulting from failure or neglect to conduct an in depth examination. The Awarding Authority will, in no case be responsible for any costs, expenses, losses or changes in anticipated profits resulting from such failure or neglect of the bidder.
 8. The bidder shall take no advantage of any error or omission in the proposal and advertised contract.
 9. If a special envelope is supplied by the Awarding Authority, each proposal should be submitted in that envelope furnished by the Awarding Agency and the blank spaces on the envelope shall be filled in correctly to clearly indicate its contents. When an envelope other than the special one furnished by the Awarding Authority is used, it shall be marked to clearly indicate its contents. When sent by mail, the sealed proposal shall be addressed to the Awarding Authority at the address and in care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in the Notice to Bidders. Proposals received after the time specified will be returned to the bidder unopened.
 10. Permission will be given to a bidder to withdraw a proposal if the bidder makes the request in writing or in person before the time for opening proposals.

By Order of

County of Kane

(Awarding Authority)

County Engineer/County Superintendent of Highways/Municipal Clerk

Note: All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed.

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an “X” are applicable to this contract and are included by reference:

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LOCAL ROADS AND STREETS RECURRING SPECIAL PROVISIONS

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BDE SPECIAL PROVISIONS
For the August 2, 2019 and September 20, 2019 Lettings

The following special provisions indicated by a "check mark" are applicable to this contract and will be included by the Project Coordination and Implementation Section of the BD&E. An * indicates a new or revised special provision for the letting.

File Name	#		Special Provision Title	Effective	Revised
80099	1	<input type="checkbox"/>	Accessible Pedestrian Signals (APS)	April 1, 2003	Jan. 1, 2014
80274	2	<input type="checkbox"/>	Aggregate Subgrade Improvement	April 1, 2012	April 1, 2016
80192	3	<input type="checkbox"/>	Automated Flagger Assistance Device	Jan. 1, 2008	
80173	4	<input type="checkbox"/>	Bituminous Materials Cost Adjustments	Nov. 2, 2006	Aug. 1, 2017
80241	5	<input type="checkbox"/>	Bridge Demolition Debris	July 1, 2009	
50261	6	<input type="checkbox"/>	Building Removal-Case I (Non-Friable and Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50481	7	<input type="checkbox"/>	Building Removal-Case II (Non-Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50491	8	<input type="checkbox"/>	Building Removal-Case III (Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50531	9	<input type="checkbox"/>	Building Removal-Case IV (No Asbestos)	Sept. 1, 1990	April 1, 2010
80404	10	<input type="checkbox"/>	Coarse Aggregate Quality for Micro-Surfacing and Cape Seals	Jan. 1, 2019	
80384	11	<input type="checkbox"/>	Compensable Delay Costs	June 2, 2017	April 1, 2019
80198	12	<input type="checkbox"/>	Completion Date (via calendar days)	April 1, 2008	
80199	13	<input type="checkbox"/>	Completion Date (via calendar days) Plus Working Days	April 1, 2008	
80293	14	<input type="checkbox"/>	Concrete Box Culverts with Skews > 30 Degrees and Design Fills ≤ 5 Feet	April 1, 2012	July 1, 2016
80311	15	<input type="checkbox"/>	Concrete End Sections for Pipe Culverts	Jan. 1, 2013	April 1, 2016
80277	16	<input type="checkbox"/>	Concrete Mix Design – Department Provided	Jan. 1, 2012	April 1, 2016
80261	17	<input type="checkbox"/>	Construction Air Quality – Diesel Retrofit	June 1, 2010	Nov. 1, 2014
80387	18	<input type="checkbox"/>	Contrast Preformed Plastic Pavement Marking	Nov. 1, 2017	
80029	19	<input type="checkbox"/>	Disadvantaged Business Enterprise Participation	Sept. 1, 2000	March 2, 2019
80402	20	<input type="checkbox"/>	Disposal Fees	Nov. 1, 2018	
80378	21	<input type="checkbox"/>	Dowel Bar Inserters	Jan. 1, 2017	Jan. 1, 2018
80405	22	<input type="checkbox"/>	Elastomeric Bearings	Jan. 1, 2019	
* 80415	23	<input type="checkbox"/>	Emulsified Asphalts	Aug. 1, 2019	
80388	24	<input type="checkbox"/>	Equipment Parking and Storage	Nov. 1, 2017	
80229	25	<input type="checkbox"/>	Fuel Cost Adjustment	April 1, 2009	Aug. 1, 2017
80304	26	<input type="checkbox"/>	Grooving for Recessed Pavement Markings	Nov. 1, 2012	Nov. 1, 2017
80246	27	<input type="checkbox"/>	Hot-Mix Asphalt – Density Testing of Longitudinal Joints	Jan. 1, 2010	Aug. 1, 2018
80398	28	<input type="checkbox"/>	Hot-Mix Asphalt – Longitudinal Joint Sealant	Aug. 1, 2018	Jan. 1, 2019
80406	29	<input type="checkbox"/>	Hot-Mix Asphalt – Mixture Design Verification and Production (Modified for I-FIT Projects)	Jan. 1, 2019	
80399	30	<input type="checkbox"/>	Hot-Mix Asphalt – Oscillatory Roller	Aug. 1, 2018	Nov. 1, 2018
80347	31	<input type="checkbox"/>	Hot-Mix Asphalt – Pay for Performance Using Percent Within Limits – Jobsite Sampling	Nov. 1, 2014	Aug. 1, 2018
80383	32	<input type="checkbox"/>	Hot-Mix Asphalt – Quality Control for Performance	April 1, 2017	Jan. 1, 2019
80392	33	<input type="checkbox"/>	Lights on Barricades	Jan. 1, 2018	
80336	34	<input type="checkbox"/>	Longitudinal Joint and Crack Patching	April 1, 2014	April 1, 2016
80411	35	<input type="checkbox"/>	Luminaires, LED	April 1, 2019	
80393	36	<input type="checkbox"/>	Manholes, Valve Vaults, and Flat Slab Tops	Jan. 1, 2018	March 1, 2019
80400	37	<input type="checkbox"/>	Mast Arm Assembly and Pole	Aug. 1, 2018	
80045	38	<input type="checkbox"/>	Material Transfer Device	June 15, 1999	Aug. 1, 2014
80394	39	<input type="checkbox"/>	Metal Flared End Section for Pipe Culverts	Jan. 1, 2018	April 1, 2018
80165	40	<input type="checkbox"/>	Moisture Cured Urethane Paint System	Nov. 1, 2006	Jan. 1, 2010
* 80412	41	<input type="checkbox"/>	Obstruction Warning Luminaires, LED	Aug. 1, 2019	
80349	42	<input type="checkbox"/>	Pavement Marking Blackout Tape	Nov. 1, 2014	April 1, 2016
80371	43	<input type="checkbox"/>	Pavement Marking Removal	July 1, 2016	
80390	44	<input type="checkbox"/>	Payments to Subcontractors	Nov. 2, 2017	
80389	45	<input type="checkbox"/>	Portland Cement Concrete	Nov. 1, 2017	

80359	46	<input type="checkbox"/>	Portland Cement Concrete Bridge Deck Curing	April 1, 2015	Nov. 1, 2017
80300	47	<input type="checkbox"/>	Preformed Plastic Pavement Marking Type D - Inlaid	April 1, 2012	April 1, 2016
80328	48	<input type="checkbox"/>	Progress Payments	Nov. 2, 2013	
34261	49	<input type="checkbox"/>	Railroad Protective Liability Insurance	Dec. 1, 1986	Jan. 1, 2006
* 80157	50	<input type="checkbox"/>	Railroad Protective Liability Insurance (5 and 10)	Jan. 1, 2006	
80306	51	<input type="checkbox"/>	Reclaimed Asphalt Pavement (RAP) and Reclaimed Asphalt Shingles (RAS)	Nov. 1, 2012	Jan. 1, 2019
80407	52	<input type="checkbox"/>	Removal and Disposal of Regulated Substances	Jan. 1, 2019	
80395	53	<input type="checkbox"/>	Sloped Metal End Section for Pipe Culverts	Jan. 1, 2018	
80340	54	<input type="checkbox"/>	Speed Display Trailer	April 2, 2014	Jan. 1, 2017
80127	55	<input type="checkbox"/>	Steel Cost Adjustment	April 2, 2004	Aug. 1, 2017
80408	56	<input type="checkbox"/>	Steel Plate Beam Guardrail Manufacturing	Jan. 1, 2019	
* 80413	57	<input type="checkbox"/>	Structural Timber	Aug. 1, 2019	
80397	58	<input type="checkbox"/>	Subcontractor and DBE Payment Reporting	April 2, 2018	
80391	59	<input type="checkbox"/>	Subcontractor Mobilization Payments	Nov. 2, 2017	April 1, 2019
* 80317	60	<input type="checkbox"/>	Surface Testing of Hot-Mix Asphalt Overlays	Jan. 1, 2013	Aug. 1, 2019
80298	61	<input type="checkbox"/>	Temporary Pavement Marking	April 1, 2012	April 1, 2017
20338	62	<input type="checkbox"/>	Training Special Provisions	Oct. 15, 1975	
80403	63	<input type="checkbox"/>	Traffic Barrier Terminal, Type 1 Special	Nov. 1, 2018	
80409	64	<input type="checkbox"/>	Traffic Control Devices - Cones	Jan. 1, 2019	
80410	65	<input type="checkbox"/>	Traffic Spotters	Jan. 1, 2019	
80318	66	<input type="checkbox"/>	Traversable Pipe Grate for Concrete End Sections	Jan. 1, 2013	Jan. 1, 2018
80288	67	<input type="checkbox"/>	Warm Mix Asphalt	Jan. 1, 2012	April 1, 2016
80302	68	<input type="checkbox"/>	Weekly DBE Trucking Reports	June 2, 2012	April 2, 2015
* 80414	69	<input type="checkbox"/>	Wood Fence Sight Screen	Aug. 1, 2019	
80071	70	<input type="checkbox"/>	Working Days	Jan. 1, 2002	

The following special provisions are in the 2019 Supplemental Specifications and Recurring Special Provisions.

<u>File Name</u>	<u>Special Provision Title</u>	<u>New Location(s)</u>	<u>Effective</u>	<u>Revised</u>
80382	Adjusting Frames and Grates	Articles 602.02(s) and (t), 1043.04, and 1043.05	April 1, 2017	
80366	Butt Joints	Article 406.08(c)	July 1, 2016	
80386	Calcium Aluminate Cement for Class PP-5 Concrete Patching	Article 1001.01(e)	Nov. 1, 2017	
80396	Class A and B Patching	Articles 442.06(a)(1) and (2)	Jan. 1, 2018	Nov. 1, 2018
80377	Portable Changeable Message Signs	Articles 701.20(h) and 1106.02(i)	Nov. 1, 2016	April 1, 2017
80385	Portland Cement Concrete Sidewalk	Article 424.12	Aug. 1, 2017	

The following special provisions have been deleted from use.

<u>File Name</u>	<u>Special Provision Title</u>	<u>Effective</u>	<u>Revised</u>
80376	Hot-Mix Asphalt – Tack Coat	Nov. 1, 2016	
80401	Portland Cement Concrete Pavement Connector for Bridge Approach Slab	Aug. 1, 2018	

The following special provisions require additional information from the designer. The additional information needs to be submitted as a separate document. The Project Coordination and Implementation section will then include the information in the applicable special provision.

- Bridge Demolition Debris
- Building Removal - Case I
- Building Removal – Case II
- Building Removal - Case III
- Building Removal-Case IV
- Completion Date
- Completion Date Plus Working Days
- DBE Participation
- Material Transfer Device
- Railroad Protective Liability Insurance
- Training Special Provisions
- Working Days

INDEX FOR SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2019

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS, frequently used RECURRING SPECIAL PROVISIONS, and LOCAL ROADS AND STREETS RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction
(Adopted 4-1-16) (Revised 1-1-19)

SUPPLEMENTAL SPECIFICATIONS

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**STATE OF ILLINOIS
KANE COUNTY
DIVISION OF TRANSPORTATION
ELECTRICAL MAINTENANCE CONTRACT
FOR YEARS 2020-2022**

Highlights of notable changes from previous 2018-2019 EMC Contract.

These highlights are not intended to be inclusive of all changes or for this page to be a substitute to a Contractor's need to fully read and understand the contract as written. This is to help ensure balanced bidding of the contract.

- Contract Duration now 3 years (formerly 2 year contract duration)
- No Cost for Bid Documents, posted online during advertisement period.
Contractor responsible for checking for addendums prior to submitting bid.
- JULIE locate requirements
 - Need to "close" completed ticket after locate ticket being field located and marked within 48 hours.
 - Need for Contractor to administrate/communicate Locate requests with other Contractors having maintenance of facilities which are "off-maintenance"
- Certified Payroll digital records shall be transmitted monthly to KDOT Traffic
- Street Lighting Group Re-Lamping (Non-LED) will be a part of this Contract
- Clarification added on continuity of maintenance responsibilities pertaining to locations temporarily maintained by another contractor.
- Clarification added for obsolete equipment failures, where an OEM no longer supports necessary repairs for any cost.

Read Contract Related sections for more and specific details

**STATE OF ILLINOIS
 KANE COUNTY
 DIVISION OF TRANSPORTATION
 ELECTRICAL MAINTENANCE CONTRACT
 FOR YEARS 2020-2022**

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Kane County
 Division of Transportation
 Section: 20-00000-01-GM

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LR 702 Construction Signs

Kane County Prevailing Wage for July 2017

List of Locations

IDOT Standard Drawings (Highway Standards)

IDOT District 1 Standard Drawings /Details

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BLR 12222 Schedule of Prices

BLR 12223 Signature Sheet

BLR 12230 Local Agency Proposal Bid Bond

BLR 12325 Apprenticeship or Training Program Certification

BC 261 Substance Abuse Prevention Program Certification

BC 57 Affidavit of Availability

Questionnaire

Contractor Disclosure

(Provided elsewhere in Bid Package)

IDOT Recurring Special Provisions Check Sheet

IDOT Local Roads and Streets Recurring Special Provisions Check Sheet

IDOT BDE Special Provisions Check Sheet

IDOT Index for Supplemental Specifications and Recurring Special Provisions

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for the Road and Bridge Construction", adopted April 1, 2016, (hereinafter referred to as the Standard Specifications) which Standard Specifications are made a part hereof and incorporated herein and the *Supplemental Specifications and Recurring Special Provisions*, adopted January 1, 2019 (as indicated on the check sheet included herein), which is also made a part hereof and incorporated herein for the proposed improvement designated as **Section 20-00000-01-GM**. In case of conflict with any part or parts of said specifications, said special provisions shall take precedent and shall govern.

LOCATION OF IMPROVEMENT

Various intersections and other locations located on and along various Kane County Highways as shown on the schedule of locations included herein, and as directed, by the Traffic Operations Engineer or Chief of Traffic Operations & Permitting under the authority of the County of Kane's County Engineer all herein after referred to as "KDOT Traffic".

APPLICABLE SPECIFICATIONS AND STANDARDS

The latest issue of the following standards and specifications at the bid date including subsequent additions or revisions shall apply to the work covered by this Electrical Maintenance Contract, herein after referred to as Contract. The standards and specifications set forth herein below are made a part hereof and incorporated into this Contract. In case of conflict with any or parts of the standards listed below these Special Provisions defined in this Contract, shall take precedence and shall govern:

Illinois Department of Transportation Standards & Specifications

- Standard Specifications for Road and Bridge Construction, April 1, 2016 or latest edition during the period of time this Contract is in force.
- Supplemental Specifications and Recurring Specifications, January 1, 2019 or latest edition during the period of time this Contract is in force.
- Design Manual Section 3-600 on Highway Lighting.
- Highway Standards.
- 2009 Edition of The Manual on Uniform Traffic Control Devices and Illinois Supplement latest edition.
- Road, Bridge and Other Related Laws of Illinois.
- Safety Code.
- Work Site Protection Manual.
- Traffic Control Plans for Daylight Traffic Operation.
- IDOT District 1 Traffic Signal Specifications effective June 15, 2016 or latest amended during the period of time this Contract is in force.
- IDOT District 1 Traffic Signal Standard Drawings.

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National Standards and Specifications

- Roadway Lighting Design Guide published by American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., N.W., Washington, D.C. 20001, October 2010 update.
- Insulated Cable Engineers Assn. and Underwriters Laboratories publications when applicable for cable and other materials.
- National Electrical Manufacturers Associations (NEMA) Standards.
- American National Standards Institute, where applicable, for lamps, ballasts, and other accessories.
- American Society for Testing and Materials (ASTM) Standards for materials.
- All applicable manuals and policies of the Federal Highway Administration (FHWA).
- American National Standard Practice for Roadway Lighting, Published by Illuminating Society of North America, 120 Wall St., 17th Floor, New York, NY, Phone: (212) 248-5000.
- IEEE C2 1997: National Electrical Safety Code, 7 CFR 1755.503 (d)(1), published by IEEE, 345 E. 47th Street, New York, NY 10017.
- National Electrical Code, National Fire Protection Association- NF70-96, as published by National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.
- FHWA Lighting Handbook August 2012.
- Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals AASHTO Publication.
- Institute of Transportation Engineers, the latest standards, specifications, supplements, manuals and handbooks applicable to Traffic and Pedestrian Signal heads, LED modules and Traffic Signal Maintenance.
- Emergency Response Guidebook by U.S. Dept. of Transportation, latest version, for further assistance call National Response Center (NRC) 1-800-424-8802.
- Hazardous Materials Regulations, Hazardous Materials Transportation Uniform Safety Act of 1990, Hazardous Materials Regulations and Motor Carrier Safety Regulations by U.S. Department of Transportation.
- OSHA, all applicable regulations.
- USDA-RUS, all applicable regulations.
- IMSA Standards & Manuals.

DESCRIPTION OF THE ELECTRICAL MAINTENANCE CONTRACT

The work described in this Contract requires the Contractor to provide continuous maintenance of Kane County's highway electrical and communications systems consisting of but not limited to the following components:

- Traffic Signal Installations;
- Emergency Vehicle Preemption Systems;
- Intelligent Transportation Systems (ITS);
- Uninterruptible Power Supply Systems (UPS);
- Advanced Traffic Management System (ATMS) network;
- Closed Loop Signal control Systems
- Traffic Signal Fiber Optic Interconnections;
- Ethernet Communications Systems;
- Kane County IT Fiber Network;
- Video, Ethernet, and Communication Network Equipment;
- ITS System Interface Components;
- Roadway Lighting Systems;
- Vehicle Monitoring Systems (PTZ cameras and auxiliary equipment);
- Flashing Beacons (AC, DC, Solar, LED overhead span and pole mounted including push button actuated wireless solar powered Rectangular Rapid Flash Beacons (RRFB);
- Solar powered flashing LED warning and regulatory signs, Solar power / Microwave activated Advance Warning Systems;
- Roadway Weather Information Systems (RWIS);
- Driver Feedback Speed Monitoring (YOUR SPEED) Signs;
- Permanent Dynamic Message Signs (DMS);
- Traffic Data Collection systems;
- Wayside Horn Systems (WHS);
- Layer II (data link) and Layer III (network) Switches and Associated Switch Configuration Files.
- Flashing Yellow Arrow Applications
- Adaptive Traffic Signal Control Applications

The Contractor shall perform the following tasks and services per specified unit prices listed under the Schedule of Prices:

- Furnish labor and provide materials to maintain the respective installations and systems.
- Make permanent repairs to damaged equipment.
- Clean, repair, perform preventive maintenance, and overhaul specified equipment at stated intervals of time.
- Provide the necessary transportation for workers.

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- Provide continuous maintenance and repair service to all electrical components listed above, on a 24-hours per day, 7 days per week basis, including holidays, for the duration of this Contract, to correct any malfunction/failure of equipment or perform any temporary and/or emergency repairs to any and all missing, defective, damaged, or displaced equipment resulting from any cause whatsoever in the shortest possible time or within the time parameters listed in the "Repair Time Table", whichever is more timely.
- Perform all activities required and described herein.
- The Contractor shall notify KDOT Traffic within one working day, of all temporary or permanent changes made to inventoried traffic signal system and lighting system components. The inventoried components include but shall not be limited to all traffic signal installations, all ITS equipment and all lighting installations by intersection or location. This inventory shall be made available upon request. The inventoried components include but are not limited to the following items:
 1. all traffic signal faces by location, type, manufacturer, model, indication, generation and manufacturer of LED signal modules, snow shields, mounting type and date of installation;
 2. all vehicle and pedestrian detection equipment including but not limited to: video, radar, wireless, inductive loop, thermal imaging, micro wave and magnetic by location, type, manufacturer, model, firmware version, IP address and date of installation;
 3. all control cabinets by location, size, type, manufacturer and date of installation;
 4. all control equipment by location, type, manufacturer, model and firmware version (control equipment shall include traffic signal controllers, system master controllers, malfunction management units), IP address, date of installation and date of testing;
 5. all communication equipment by location, type, manufacturer, model and firmware version IP address, date of installation and date of revision (communication equipment shall include managed/unmanaged Ethernet switches, media converters and modems);
 6. all emergency vehicle pre-emption systems by location, type, manufacturer, model, firmware version, IP address, channel assignments, and date of installation;
 7. all closed loop traffic signal systems by segment, type, manufacturer, model, firmware version and date of installation, subsequent additions or modifications;
 8. all street lighting systems by location or segment, type, style, mounting height, length of luminaire arm, type of mounting, control cabinet location(s), number of fixtures, number of poles, pole identification address and date of installation;
 9. all illuminated signs by location or segment, type, style, mounting height, dimensions of panel, type of mounting, sign legend and date of installation;
 10. all flashing beacon installations, including push button actuated wireless solar powered Rectangular Rapid Flash Beacons (RRFB) with number of poles, push buttons, wireless interface equipment, solar panels and manufacturer by location, style of mounting, size of lens, type of lens, color of lens(s), type of power supply (AC/DC/Solar) and date of installation;
 11. all Solar powered flashing LED warning and regulatory signs
 12. all traffic signal installations interconnected with railroad at grade warning devices;

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13. all un-interruptible Power Supply (UPS) systems by location, manufacturer, model, battery configuration, auxiliary performance enhancement equipment, firmware version, IP address, date of installation, and existence of manual or automatic transfer switches;
14. all video monitoring systems (PTZ cameras and auxiliary equipment) by location type, manufacturer, model, encoders, firmware version, IP address and date of installation, subsequent additions or modifications;
15. all components of Pedestrian Warning Beacon Systems including number of poles, color of lenses, solar panels, push buttons, wireless interface equipment, passive detection equipment, and manufacturer;
16. all components of the Wayside Horn System including all equipment located in the road side cabinets, adjacent to cabinets and all sensing devices, and manufacturer.
17. all components of Roadway Weather Information Systems (RWIS) including all equipment located in road side cabinets, adjacent to cabinets and all sensing devices imbedded in the pavement and mounted and nearby supports;
18. all power service cabinets, meters and identification numbers;
18. all components of Driver Feedback Speed Monitoring (YOUR SPEED) Signs;
19. all components of Permanent Dynamic Message Signs (DMS);
20. all components of Traffic Data Collection systems;
21. all components of Non-Traffic Signal Intelligent Transportation System (ITS) Locations
22. all components of the Flashing Yellow Arrow applications
23. all components of the Adaptive Signal Control applications

COMPETENCY OF CONTRACTOR

- Contractors submitting bid proposals shall furnish a full financial disclosure statement for the past two consecutive years, a completed and notarized experience questionnaire and a notarized statement signed by the officers ensuring compliance with all of the requirements of **Section 102** of the Standard Specifications for all personnel employed by the Contractor or any subcontractor hired to perform the work specified under this Contract.
- The County of Kane (hereinafter referred to as the County) reserves the right to waive technicalities and to reject any bids from any Contractor the County determines is unqualified to provide the services and materials specified herein.
- The County shall approve all subcontractors.
- The Contractor's personnel executing the provisions of this Contract must be certified by the International Municipal Signal Association (IMSA) at a Level II or higher level for Traffic Signal, Fiber Optic for ITS and Roadway Lighting competency. A list of the names of all IMSA certified personnel and a copy of their certification shall be submitted with the bid proposal.

EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND WORK SITE

Prior to submitting the bid proposal, the Contractor should carefully examine the Contract, Contract proposal, plans, specifications, special provisions, and Contract bond. The Contractor's representative(s) should inspect in detail all of the locations to be maintained under this Contract. The Contractor's representative(s) should be familiar with all of the local conditions affecting the Contract and the specifications of this Contract. The Contractor shall be responsible for any pre-existing maintenance deficiencies that may exist at the time this Contract is awarded and the Contractor's bid proposal shall reflect these deficiencies. If the Contractor's bid proposal is accepted, the Contractor will be responsible for all errors in the bid proposal resulting from the Contractor's failure or neglect to comply with these instructions. The County will not, in any case, be responsible for any change in anticipated profits resulting from such failure or neglect by the Contractor.

BIDDING PROCESS AND AWARD OF CONTRACT

The proposal booklet is available online at the Kane County website at no cost:

<https://www.countyofkane.org/Pages/countybids.aspx>

Any necessary addendums will posted at this same website and will be the Contractor's responsibility to check back frequently to ensure no Addendums have been posted. The Contractor's representative must acknowledge receipt of the addendum on their bid.

The award of this Contract will be made to the lowest responsible bidder. The County reserves the right to reject any or all non-conforming, non-responsive, unbalanced, or conditioned bids, and to reject the bid of any bidder if the County believes that it would be in the best interest of the County not to award to that bidder. The County also has the right to award this Contract with the deletion or reduction of any item(s) in its entirety or partially without claim by the Contractor for loss of profit or overhead.

DELETION, REDUCTION, or INCREASE OF PLAN QUANTITIES

The County reserves the right to delete and/or reduce and/or increase the awarded (plan) quantity of any item in its entirety or partially without claim by the Contractor for loss of profit or overhead.

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SUPERVISION

All work to be performed under this Contract shall be under the general supervision and approval of the County Engineer and the direct supervision and approval of KDOT Traffic including the County Traffic Operations Engineer and any and all contracted agents or consultants under the supervision of KDOT Traffic.

INSURANCE

The Contractor shall obtain and thereafter for the duration of the Contract keep in force and effect a Commercial General Liability Policy for the following entities:

Certificate Holder and Additional Named Insured:

County of Kane

Policy Limits:

The Commercial General Liability Policy shall be written for not less than the following limits: **\$2,000,000.00** per occurrence and **\$5,000,000.00** aggregate for bodily injury and **\$500,000.00** per occurrence for property damage. All other provisions of **Article 107.27** of the Standard Specifications shall apply.

The Contractor is otherwise required to abide by and strictly follow the terms and the provisions of the Standard Specifications for Road and Bridge Construction.

PREVAILING WAGE RATES

The latest prevailing wage rate(s) established by the Illinois Department of Labor shall be paid for all work performed by tradesmen employed to fulfill the provisions of this Contract. The Contractor shall provide certified payrolls for all tradesmen employed by the Contractor monthly or as requested. The format shall be electronic copies of Certified Payroll for each calendar Month period as soon as it is available to KDOT Traffic.

CONTROL OF WORK

KDOT Traffic will be responsible for the control of work in conformance with **Section 105** of the Standard Specifications and Contract Special Provisions.

KDOT Traffic may furnish the Contractor with the names of representatives who may be available to confer with or to advise the Contractor in administrative and technical matters. KDOT Traffic, may make periodic and/or frequent inspections of the respective systems and installations to determine if all maintenance operations are being performed by the Contractor promptly and satisfactorily, and in the manner specified in this Contract. The Contractor shall respond promptly in restoring, replacing, repairing, and realigning equipment covered in this Contract when notified by any source.

KDOT Traffic may prepare MAINTENANCE SCHEDULES for the prosecution of work on the various items of Routine Maintenance, Specialty Items, and/or Extra Work, which are to be completed at regularly stated intervals as specified herein.

The Contractor shall at a minimum be required to attend quarterly progress/coordination meetings with KDOT Traffic, the County's Traffic Systems Operations Management Consultant and any other required attendees to be held at a location and on a date to be set by KDOT Traffic.

KDOT Traffic may require the Contractor to prepare and submit written progress reports for routine maintenance, specialty items, and/or extra work at the quarterly progress/coordination meetings. When required, these reports shall include (but not be limited to) one or more of the following:

- Completed or uncompleted status of work items.
- Specific troubleshooting procedures and when they were performed.
- Any temporary repair actions taken.
- Explanation of any delays experienced by the Contractor.
- Expected completion dates for each work item, based on KDOT Traffic approval. Written reports shall be required on a regular and/or periodic basis throughout the duration of the Contract.

PROSECUTION OF WORK BY THE CONTRACTOR

The purpose of this Electrical Maintenance Contract is:

1. To assure that all components of traffic signal installations; Emergency Vehicle Pre-emption Systems; Intelligent Transportation Systems (ITS); Advanced Traffic Management System (ATMS); Uninterruptible Power Supplies (UPS); Fiber Optic Interconnections; Ethernet Communications Systems; ITS devices, IT Fiber Network; Video, Ethernet and Communications Network Equipment; ITS System Interface Components; Roadway Lighting Systems; Vehicle Monitoring Systems; Flashing Beacons (AC, DC, Solar, LED, RRFB overhead and pole mounted); Advance Solar Warning Systems, Roadway Weather Information Systems, vehicle detection systems, data collection systems, and all peripheral components operate essentially as originally installed, or as subsequently modified.

2. To provide preventive maintenance, guard against and prevent equipment malfunction/failure due to mechanical or electrical defects. The proper functioning of traffic signal installations; Emergency Vehicle Pre-emption Systems; Intelligent Transportation Systems (ITS); Advanced Traffic Management System (ATMS); Uninterruptible Power Supplies (UPS); Fiber Optic Interconnections; Ethernet Communications Systems; ITS devices, IT Fiber Network; Video, Ethernet and Communications Network Equipment; ITS System Interface Components; Roadway Lighting Systems; Vehicle Monitoring Systems (PTZ cameras and auxiliary equipment); Flashing Beacons (AC, DC, Solar, LED, RRFB overhead and pole mounted); Advance Solar Warning Systems, Roadway Weather Information Systems and all peripheral components is essential to ensure the smooth, expeditious, and safe movement of vehicles, people, and goods. It is imperative that all of the traffic signal, traffic communications networks and street lighting equipment be serviceable and in good operating condition to ensure maximum working efficiency and prevent unnecessary malfunction/failure. When equipment malfunctions/failures occur, due to unforeseen events, knockdowns or from any cause whatsoever, **time is of the essence** in arriving at the location of the malfunction/failure and taking corrective measures and effecting repairs to restore the equipment to its full original operation. To ensure the continuous and uninterrupted operation of equipment, service calls and emergency calls shall be answered promptly (see Traffic Signal Routine Maintenance, item 33), and extraordinary effort shall be exercised by the Contractor to render this service. **The items listed below shall be considered included in the cost to the Routine Maintenance portion of the Contract, and will not be paid for separately unless explicitly stated otherwise in the Contract.**

a. Work Force

The Contractor shall at all times provide a workforce of qualified personnel sufficient, in the opinion of KDOT Traffic, to perform the routine work and specialized operations required and described herein. The workforce of qualified personnel shall be sufficient to simultaneously perform routine maintenance, emergency repairs, restorations, specialty and extra work items.

The Contractor shall ensure service to the County's traffic signal installations; Emergency Vehicle Pre-emption Systems; Intelligent Transportation Systems (ITS); Advanced Traffic Management System (ATMS); Uninterruptible Power Supplies (UPS); Fiber Optic Interconnections; Ethernet Communications Systems; ITS devices; IT Fiber Network; Video, Ethernet and Communications Network Equipment; ITS System Interface Components; Roadway Lighting Systems; Vehicle Monitoring Systems (PTZ cameras and auxiliary equipment); Flashing Beacons (AC, DC, Solar, LED overhead and pole mounted); Advance Solar Warning Systems; Roadway Weather Information Systems; shall take precedence over any work performed by the Contractor for third parties. KDOT Traffic may grant the Contractor authorization to postpone County work to address emergency situations on the County system, but any shortage of workforce shall otherwise be insufficient grounds for the Contractor's failure to perform routine or other non-routine work within the prescribed time constraints.

The Contractor's workforce shall possess the skills and knowledge necessary to perform all work in the proper manner. For this Contract the Contractor's personnel executing the provisions of this Contract must be certified by the International Municipal Signal Association (IMSA) at a Level II or higher level of Traffic Signal, Fiber Optics for ITS and Roadway Lighting competency. The workforce shall also include personnel having certain special expertise, including, but not limited to the following:

- Material Management
- General Electrical Power
- Building Wiring (Indoor Electrician)
- Various Types of Mechanical Work
- Roadway Electrical (Outdoor Lineman)
- Telemetry/Telecommunications
- Siemens' TACTICS (ATMS)
- TransCore's TransSuite (ATMS)
- Traffic Signal Closed Loop Monitoring Systems (Tactics 5.0, Marc NX, Aries)
- Fiber Optic Cable Installation, Repairs, Testing and Troubleshooting
- Programming, configuring, and troubleshooting of intersection/street/field
- Ethernet managed and unmanaged switches and associated configuration files
- Fiber Optic Network Layer 2 and Layer 3 switch configuration, Testing, and Troubleshooting
- Hardware/Software Trouble-Shooting
- Office Administration
- All available manufacturer training/certification
- Work zone traffic control
- Maintaining all ITS Ethernet Network components
- Flashing Yellow Arrow Applications
- Adaptive Signal Control Applications

b. Emergency Travel Time

The Contractor's workforce designated to respond to emergency calls shall be stationed to ensure their **response time to arrive at any designated point of trouble shall not exceed one (1) hour from the receipt of an emergency notification** during normal weather and under normal traffic conditions.

c. Work Priority

Priority in the performance of Routine Maintenance, Specialty Items, and Extra Work, shall be at the discretion of the Contractor unless specifically directed otherwise by KDOT Traffic.

d. Contractor's Vehicles

The Contractor shall furnish the transportation for the Contractor's employees and shall furnish the equipment used in the performance of this Contract. All vehicles used by the Contractor shall conform to all applicable laws of the State of Illinois Vehicle code and the County and shall carry such lights and safety appurtenances as may be prescribed by the State of Illinois and/or the County.

e. Communication Equipment

Patrol and construction vehicles operated by the Contractor in connection with this Contract shall be equipped with mobile telephones. Supervisory vehicles operated by the Contractor in connection with this Contract shall be equipped with mobile telephones with the ability to send and receive emails and text messages, designed for expediting and maintaining 24 hour communications with the Contractor's headquarters. The Contractor's supervisory and patrol personnel shall be equipped with and carry mobile telephones with the ability to send and receive emails and texts at all times. All patrol personnel shall be equipped with a laptop, or functional equivalent, which is enabled with mobile data and is capable of remote communication with County ATMS. A listing of cellular telephone numbers and email addresses shall be prepared and furnished to KDOT Traffic one (1) week prior to the beginning of the Contract and updated and redistributed within one (1) week if any changes in personnel or contact information occurs.

f. Subcontractor(s)

All subcontractors shall be previously approved by the Kane County Engineer. The Contractor shall provide KDOT Traffic with a list of any Subcontractor(s), designating at least one responsible representative of the subcontractor to whom instructions may be given to by KDOT Traffic. The representative designated shall be available for KDOT Traffic to contact at all times (24 hours per day, 7 days per week) under all circumstances. The Subcontractor's representative's vehicle shall at all times be equipped with a mobile telephone with the ability to send and receive emails and text messages. The list of Subcontractor(s) representative(s) shall include the representative's name(s), home address, home telephone number(s), and email addresses. Substitution(s) to this list on a temporary basis that might be needed by the Contractor or the subcontractor(s), if any, shall be provided to KDOT Traffic as necessary.

g. Temporary Traffic Control

Temporary Traffic Control shall be in accordance with the applicable sections of the latest editions of the IDOT Standard Specifications, the IDOT Supplemental Specifications, and the Manual on Uniform Traffic Control Devices for Streets and Highways and Illinois Supplement, any special details and IDOT Highway Standards contained in these Special Provisions or prepared separately for extra work.

Special attention is called to **Article 107.09** and **Division 700** of the Standard Specifications and the following Highway Standards, Details, Quality Standard for Work

Zone Traffic Control Devices, Supplemental Specifications and Recurring Special Provisions, and Special Provisions contained herein, relating to traffic control.

The Contractor shall have all equipment used in the prosecution of this Contract equipped and marked with all the necessary safety equipment required by law and the referenced specifications. The Contractor shall be responsible for maintaining traffic at all times as required by the provisions of this Contract and as directed by KDOT Traffic. The Contractor shall be responsible for providing any other safety measures necessary for keeping the traveling public aware whenever work is being performed on all County highways, or as directed by KDOT Traffic.

The Contractor shall keep at least one lane of two-lane highways, and one through lane in each direction on multi-lane highways, open to traffic unless otherwise directed by KDOT Traffic. These restrictions shall not apply when and for the time necessary to clear damaged equipment, debris, or other objects from the highway which constitute a hazard to the public. The Contractor shall notify KDOT Traffic of all planned lane closures lasting more than two and one half hours at least seven (7) calendar days in advance so that appropriate public notification can be issued by the County.

Planned lane closures are prohibited on **Monday** through **Friday** from **6:00 a.m. to 9:00 a.m.** and from **3:00 p.m. to 7:00 p.m.** unless authorized by KDOT Traffic and except for clearing the roadway of objects, which constitute a hazard to the public.

Highway Standards for Temporary Traffic Control

The following standards (or latest revision) shall apply:

- 701006-05 Off-Road Operations, 2L, 2W 4.5 m (15') to Pavement Edge for Speeds \geq 45 MPH
- 701101-05 Off-Road Operations, Multilane Less than 4.5 m (15') Away for Speeds \geq 45 MPH
- 701106-02 Off-Road Operations, Multilane More than 4.5 m (15') Away for Speeds \geq 45 MPH
- 701201-05 Lane Closure, 2L, 2W, Day Only On-Road to 600 mm (24") Off -Road for Speeds \geq 45 MPH
- 701301-04 Lane Closure 2L, 2W, Short Time Operations \geq 45 MPH
- 701502-09 Urban Lane Closure 2L, 2W with Bidirectional Left Turn Lane
- 701602-10 Urban Lane Closure, Multilane, 2W with Bidirectional Left Turn Lane
- 701606-10 Urban Lane Closure, Multilane, 2W with Mountable Median
- 701701-10 Urban Lane Closure Multilane Intersection
- 701801-06 Lane Closure Multilane 1W or 2W Crosswalk or Sidewalk Closure
- 701901-08 Traffic Control Devices

Recurring Special Provisions for Temporary Traffic Control

The following special provisions shall apply:

- LRS 3 Work Zone Traffic Control Surveillance
LRS 4 Flaggers in Work Zones

The Contractor shall furnish the name of the individual(s) in the Contractor's direct employ who is responsible for the installation and maintenance of the temporary traffic control for this Contract. If the actual installation and maintenance are to be accomplished by a subcontractor, consent shall be requested of KDOT Traffic in accordance with **article 108.01** of the Standard Specifications. This shall not relieve the Contractor of the requirement to have a responsible individual in the Contractor's direct employ supervise this work. KDOT Traffic will provide the Contractor with the name of a representative, if necessary, to provide guidance for administration of the Traffic Control Plan.

Traffic Control Deficiency Deduction:

When the County or KDOT Traffic is notified or determines a traffic control deficiency exists any authorized employee or agent of the County shall be the judge as to whether the traffic control deficiency constitutes an immediate safety hazard. The Contractor shall cease all work immediately that encroaches in or near live traffic lanes and dispatch sufficient resources to correct such traffic control deficiencies that constitute an immediate safety hazard before work will be allowed to resume. If the Contractor fails to restore the required traffic control and protection once notified of the traffic control deficiency, KDOT Traffic will impose a monetary deduction for each traffic control deficiency occurrence. For this project, the deduction shall be per occurrence at a standard deduction of * . In addition, if the Contractor fails to respond, KDOT Traffic may correct the traffic control deficiencies and the cost thereof shall be deducted from monies due or which may become due to the Contractor under the terms of this Contract or any other source of County revenue. This corrective action will in no way relieve the Contractor of the Contractor's contractual requirements or responsibilities. If the Contractor is notified of 3 or more occurrences (within a 90 day period) of the same or similar traffic control deficiency, a deduction (equal to *) may be imposed upon the Contractor regardless of its correction, in this scenario, if the deficiency is not corrected the standard deduction of * shall be double. An example of a "same or similar traffic control deficiency" may be the lack of an arrow board when a traffic lane drop is staged.

* - The cost of the deduction will be calculated by dividing the awarded contract price by the number of calendar days anticipated for this project. The number of calendar day anticipated for this project is **1095**. This procedure is to be followed regardless of whether the Contract is based upon working day, contains a completion date, or has an incentive/disincentive clause.

h. Contractor's Shops

The Contractor shall have and maintain adequate facilities for the timely completion of the work under this Contract. These facilities shall be available at all times, and shall include a central base of operations (headquarters) and 24-hour dispatch center.

The Contractor shall maintain, equipment and staff a facility for the testing, repairing and overhauling of all traffic signal and roadway lighting control equipment to be maintained under this Contract.

KDOT Traffic shall have the authority to visit the Contractor's facilities at any time.

i. Extra Work

The Contractor shall perform Extra Work in accordance with **Article 109.04** of the Standard Specifications and the special provisions contained herein, when directed by KDOT Traffic.

j. Equipment and Materials

All equipment, materials, miscellaneous items and component parts shall be furnished by the Contractor at his expense, unless otherwise specified in writing by KDOT Traffic. All equipment, material or any item used in the prosecution of this Contract shall be the best grade of its' respective kind for the purpose of maintaining the County's installations. When required by these Specifications, or when called for by KDOT Traffic, full information concerning the equipment, materials or articles, which the Contractor intends to incorporate into the work, shall be submitted to and for approval by KDOT Traffic (this may include such submittals as the manufacturer's catalog information). The Contractor shall prepare the equipment and materials in the Contractor's shop so that KDOT Traffic can easily inspect them for approval for use on the County system.

All Extra Work directed by KDOT Traffic shall be completed with all new materials and parts, unless otherwise specified by KDOT Traffic.

k. Testing Instruments

The Contractor shall provide all necessary testing instruments and related troubleshooting equipment for all Contractor personnel assigned to provide routine and emergency service maintenance. That portion of instrumentation for use in the performance of this Contract shall be calibrated by an approved testing laboratory once each year. The Contractor shall maintain all current certificates of calibration, and shall provide any and all calibration information when requested by KDOT Traffic. This equipment shall include but not be limited to the following:

- Inductive Loop Analyzer
- Amp Probe
- Ohm Meter
- Volt Meter
- Emergency Pre-emption System Emitter/Tester
- Conflict monitor Tester
- Malfunction Monitoring Unit Tester
- Fiber Optic Tester (Optical Time Domain Reflectometer – O.T.D.R.)
- Ground Tester
- Megger
- Video Detection Camera Focus Adjustment Tool (Lens Adjustment Module - L.A.M.)
- UPS load box
- Lap top computer with wireless internet connection. Traffic signal controller software and traffic signal system software capable of interfacing with any Manufacturer's model and firmware version shall also be included.
- Digital camera
- Young Model 52260 Rain Gauge Calibrator

l. Contractor's Equipment

The Contractor shall provide at all times, sufficient equipment in the opinion of KDOT Traffic to perform the routine work and specialized operations required and described herein. This equipment should be dedicated to the work under this Contract or be managed in a way where equipment is available to meet the provisions of this contract. Unless otherwise approved by KDOT traffic in writing, and is in addition to the equipment required for any other work being performed by the Contractor. Equipment shall include sufficient devices/mechanisms to track Contractor personnel and their vehicles and immediately furnish to KDOT Traffic upon request, the locations of their personnel or vehicles.

The Contractor's personnel performing work on this contract shall have sufficient equipment necessary to meet the response time tables in this contract. This includes personnel having accommodations to become elevated or lifted to be able to access the equipment/component heights in order to provide service to the various items and components of this contract. A Contractor personnel responding to or patrolling a location must have reasonable accommodations to service that location.

m. Work by Others

The Contractor shall report to KDOT Traffic, by the fastest means of communication the following information:

- Any unauthorized work being performed by others affecting or in immediate proximity to any component of the traffic signal or highway lighting systems.
- Any other work in progress which may come to the Contractor's attention and which may endanger any installation of the traffic signal or highway lighting systems.
- Any emergency and/or temporary repairs effected by the Contractor's maintenance personnel on the County's traffic signal or highway lighting systems.

n. Emergency Temporary Repairs and Permanent Repairs

The Contractor shall make emergency temporary repairs and permanent repairs (refer to "Repair Time Table") to assure all components of all traffic signal installations; all Emergency Vehicle Pre-emption Systems; all Intelligent Transportation Systems (ITS); all Advanced Traffic Management System (ATMS); Uninterruptible Power Supplies (UPS); all Fiber Optic Interconnections; all Ethernet Communications Systems; all ITS devices, all IT Fiber Network; all Video, Ethernet and Communications Network Equipment; all ITS System Interface Components; all Roadway Lighting Systems; all Vehicle Monitoring Systems; all Flashing Beacons (AC, DC, Solar, LED, RRFB overhead and pole mounted); all solar powered flashing LED warning and regulatory signs; all Advance Solar Warning Systems, all Roadway Weather Information Systems and all peripheral components operate essentially as originally installed, or as subsequently modified. Unless specifically authorized by KDOT Traffic, permanent repairs shall be started not later than the second working day following emergency temporary repairs, and shall be continued insofar as possible without interruption, until completion. The Contractor shall assemble all equipment and parts necessary for making permanent repairs within one (1) working day following notification of damage. The Contractor shall notify KDOT traffic one (1) working day in advance of all permanent repairs not requiring lane closures and seven working days in advance of any permanent repairs requiring lane closures of longer than two and half hours. The Contractor shall be responsible for providing all temporary traffic control devices alerting motorists in accordance with this specification.

When arriving on site to perform a repair, contractor's personnel shall document by digital camera photos the condition prior to and after temporary repairs, and then once again to document the completed state of an item after permanent repairs have been completed, reasonable care should be taken by Contractor to ensure digital camera photos adequately capture the scope of damage, the scope of the repair, and surrounding locational elements (context). Multiple photos may be required if context of where the damage or repair occurred is not immediately evident. An example of context would be to take a photo of the work area plus surrounding buildings or street name signs. Context photos should be taken of initial damage, temporary repairs, and permanent repairs

o. Equipment Location and Access Responsibility

The Contractor shall be responsible for responding to all calls requesting location of County maintained electrical or communication (Fiber) facilities included under this Contract, including locations which may temporarily be maintained by others (with modified requirements**). The Contractor shall locate and mark underground cables or any other components of the system with the proper color (red, orange) flags and paint to prevent damage and facilitate work by others (including detection loops and lead in wire, if requested). For routine equipment locate requests, the Contractor shall locate and mark the appropriate equipment within forty-eight (48) hours of the request, upon completion of any locate ticket, Contractor must formally close the JULIE ticket (as applicable) within forty-eight (48) hours of completing the locate. Emergency equipment locates, when directed by KDOT Traffic, shall be performed immediately upon the Contractor's notification. **The Contractor shall procure and maintain sufficient quantities of customized "text" or "label" locate flags in both red and orange colors. Flags shall be sized at 4"x5" and a minimum 18" total wire length. The customized text on each flag shall be 3 lines of black text reading: "KANE COUNTY", "D.O.T.", "630-584-1170" on at least one face of each flag.**

In the event a locate request involves a Kane County facility which is temporarily off maintenance (*example: typically when maintenance transferred to another Contractor*), The Contractor (*of this Contract*) shall perform any required coordination to notify, convey, and communicate locate requests and locate responsibilities to the other Contractor having maintenance; upon other Contractor completing locate, The Contractor (*of this contract*) shall close the JULIE ticket (as applicable)*. If requested by KDOT Traffic, The Contractor (*of this Contract*) shall provide sufficient quantities of customized locate flags to the off maintenance Contractor and perform emergency locates in the event of a unresponsive other Contractor having maintenance. The costs for all equipment location services required of the Contractor shall not be paid for separately and are incidental to the Contract.

***In the event the other Contractor having maintenance fails to be responsive to JULIE Locates, KDOT Traffic may issue the Special Task to have the Contractor of this contract mark the facilities requested in the JULIE ticket. If no Special task is issued and no response is received from the other contractor having maintenance, the ticket may be closed after 30 days, provided the contractor of this contract has documentation of the multiple attempts to validate completed Locates.

The Contractor is also required to provide access to equipment for other Contractors and consultants who have approved Contracts to work on the systems. The Contractor shall provide personnel to open cabinets and facilities for inspection and review of equipment. All of the work items and services included herein shall be considered incidental to the respective "A" items for Maintenance.

p. Repair Records

The Contractor shall maintain records for each respective system's equipment as described and/or directed by KDOT Traffic, under the terms and conditions of the Contract.

This work shall include keeping records of repairs and services to all serial-numbered pieces of equipment, and making them available for review by KDOT Traffic at all times.

All records created shall be the property of the County and shall be indexed, safeguarded and shall not be disposed of without the prior written consent of KDOT Traffic. Any such records shall be compiled and provided in digital format to the County at the end of the Contract.

q. Utility Service Coordination

The Contractor shall keep incoming electrical energy and telecommunication service(s) in proper condition at all times, and shall cooperate with the appropriate utility company in this matter. The Contractor shall cooperate with any utility company providing services to the County. In addition, the Contractor shall perform such work at live terminals as may be required. In the event of a service outage or disruption of service, the reporting and continued correspondence with utility service (until service is restored) shall be the responsibility of the Contractor; Contractor shall keep records of this correspondence and immediately furnish to KDOT Traffic upon request. The Contractor shall also coordinate with any authorized utility company and best accommodate authorized devices which may be located on existing County facilities. Authorized devices may include but will not be limited to "small cell" applications whereby power, data, and physical occupancy may need to be coordinated.

r. Cable, Conduit, & Handhole Maintenance

The Contractor shall maintain all interconnecting fiber optic cable, all tracer wire, all conduit and all handholes between various intersections, points and junctions of the traffic signal system and the County's Arterial Operations Center (AOC) at 41W011 Burlington Road, St. Charles, IL 60175. The Contractor shall maintain access to and locate all County IT Fiber Optic Network Cable, conduits, and handhole/junction boxes. All parts of an existing cable system and appurtenances, which become inoperative and/or designated for abandonment by KDOT Traffic, shall be removed by the Contractor, as directed, to the satisfaction of KDOT Traffic or if an unknown obstruction is encountered within existing conduits, the approximate conduit obstruction location may be requested by KDOT Traffic to be cleared or exposed, obstruction corrected, and conduit patched/clamped as required. Contractor shall provide OTDR fiber optic testing (with reports provided to KDOT traffic) and fusion splicing (inside a signal cabinet) at no additional cost if, in the opinion of KDOT traffic, is necessary to facilitate good maintenance of the existing cable system or in troubleshooting an ongoing issue.

s. Equipment Labels

The Contractor shall label all circuit breakers, fuse boxes, lighting poles and disconnect switches, indicating the associated equipment. Fiber Optic cable runs shall be labeled in the associated traffic signal cabinet indicating Fiber Cable type/count and direction the cable is headed (towards next cabinet). All labels shall be maintained in readable condition at all times and replaced as required. In the event that labels do not exist, labels shall be created as directed by KDOT traffic. If requested by KDOT Traffic, The Contractor shall perform verification and labeling of fiber terminations and splices by tube color/fiber color designation which should appear on the front (near bulk heads) or side of the fiber optic termination panel.

t. Malfunction/Failure Investigation

When directed by KDOT Traffic, the Contractor shall provide additional special patrols, inspections, and tests to confirm proper system equipment operation and/or collect information to isolate the cause of repetitious or intermittent system malfunctions/failures. The times and locations shall be specified by KDOT Traffic. The cost for all malfunction/failure investigations required of the Contractor shall not be paid for separately and are incidental to the routine maintenance provisions of this Contract.

u. Adequate Parts Inventory

The Contractor shall be responsible for providing an adequate number of spare components and equipment in order to satisfy the repair times listed in the "Repair Time Table", and shall have them available for emergency, routine service and for overhauling replacement. Within sixty (60) calendar days after award of the Contract, the Contractor shall prepare an itemized inventory of the Contractor's spare components and equipment. The spare components inventory shall include the following:

- The manufacturer and model number of the spare component.
- The quantity of each spare component in the inventory.
- The serial number of each spare component, when indicated by the manufacturer.
- The current location of each spare component (i.e. specific shop location or intersection where installed).
- The dates installed and subsequently removed from County traffic signal locations. The current spare components inventory shall be provided to KDOT Traffic upon request.

In the event the Contractor fails to have adequate spare components and equipment, KDOT Traffic may deduct liquidated damages as specified in "Routine Maintenance-All System Components" item 34.

v. Locks (to be Paid for as Extra Work if desired)

The Contractor shall be responsible for keeping all equipment locks in proper working order at all times. Whenever KDOT Traffic deems it necessary to change, replace, or remove locks, the Contractor shall assume the full cost for such changes. Adding new locks to locations not previously having a lock will be considered Extra Work. Whenever any locks are changed or added, 2 keys per lock shall be furnished to KDOT Traffic. For IDOT facilities maintained by the County under this Contract through outside agreement, 2 keys per lock shall be furnished to the local IDOT Area Traffic Signal Engineer as well as IDOT's Electrical Maintenance Contractor (unless the Contractor is the one and the same for IDOT and the County). Kane County does not currently use Locks throughout the locations identified in this contract.

w. Restoration of Work Area

Restoration of the traffic signal work area shall be incidental to the related pay item such as foundation, conduit, handhole, trench and backfill, etc. and no extra compensation shall be allowed. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved (salt tolerant) sod, and all damage to un-mowed fields shall be seeded, in accordance with **Sections 250** and **252** of the Standard Specifications.

NEW INSTALLATIONS, INCREASED OR DECREASED QUANTITIES

Whenever the quantity of any Maintenance item of work, as listed in the Schedule of Prices ("Maintenance of Traffic Signal and Roadway Lighting Installations"), is increased or decreased due to additions or deletions of items in the installations or systems, payment will be made on the basis of the actual work performed.

KDOT Traffic shall notify the Contractor in writing when changes are made in any installations or systems, which will increase or decrease the quantities in the Schedule of Prices. This notification shall give the following information:

- A description of the equipment, unit or pay item to be added or removed.
- The location of the equipment, unit, or pay item.
- The revised totals of the respective item as shown in the Schedule of Prices.
- Effective date of the change.

In case of installation of new equipment to be added to this Contract, KDOT Traffic shall inform the Contractor of the scheduled date and time of equipment activation. The Contractor shall make such inspection as necessary at the time of activation to ascertain that the equipment is in proper working order. In the event the Contractor determines that the equipment is not in proper working order he shall immediately notify KDOT Traffic in writing within ten (10) working days. If upon the expiration of the 10 working days, the Contractor has failed to notify KDOT Traffic that the equipment is not in proper working order, it shall constitute Contractor's acceptance of maintenance responsibilities. In addition, at no extra cost to the County, the Contractor shall notify KDOT Traffic in writing any information regarding malfunction/failure of parts, guarantee periods, malfunction/failure due to faulty construction, and knockdowns.

MAINTENANCE SCHEDULES

This section supplements **Section 108** of the Standard Specifications.

1. KDOT Traffic may present MAINTENANCE SCHEDULES to the Contractor or may require the Contractor to present proposed schedules to KDOT Traffic. Where schedules are required, the Contractor shall submit schedules a minimum of two weeks before work is to begin. Schedules shall detail anticipated maintenance dates by location and associated "A" item and/or scheduled item, such as group re-lamping of roadway lighting or UPS load testing, WHS testing.
2. The Contractor shall complete all work items contained in MAINTENANCE SCHEDULES within the time period specified. Failure to complete the work items as specified, and within the designated time period, is sufficient cause for the County to collect liquidated damages as defined herein.
3. The Contractor may request changes in a MAINTENANCE SCHEDULE by submitting proposed changes in writing to KDOT Traffic at least five (5) working days prior to the scheduled starting date of any item(s). Any such changes will become effective only upon the written approval of KDOT Traffic.
4. The Contractor shall forward a MAINTENANCE SCHEDULE Completion Report to KDOT Traffic at the completion of a Work Item, or prior to the end of the Contract, whichever occurs first.

DISRUPTION OF SERVICE - LIQUIDATED DAMAGES

The Contractor is obligated to assure that the various items of equipment in the installations and systems perform properly. Maintenance operations to the respective installations and systems prescribed by this Contract must not be interrupted. MAINTENANCE SCHEDULES and completion dates are specified for various items of work and are deemed of paramount importance in the maintenance functions. Failure to perform all functions in the manner specified and within any time limit specified may seriously jeopardize the welfare of the general public. The Contractor agrees that should he/she refuse or fail to prosecute the work, or any separable part thereof, promptly and in the manner specified in this Contract with such diligence as will insure its satisfactory completion, KDOT Traffic at its sole option may take one or more of the following actions:

1. Withhold payment of any monthly or final remittance for any installation or system until all work has been performed to the satisfaction of KDOT Traffic.
2. Deduct a proportionate amount of money for work not performed on any installation or system, from any monthly or final remittance due the Contractor, with the amount of money deducted to be determined by KDOT Traffic.

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3. By written notice to the Contractor, terminate the Contractor's right to proceed with the work or such part of the work that has been delayed, in which event the County may take over the work, prosecute the same to completion, by Contract or otherwise, and the Contractor and the Contractor's sureties shall be liable to the County for any excess expenditures occasioned by the County.
4. Assess liquidated damages if any work covered by MAINTENANCE SCHEDULES, or any Routine Work or other work which has a time limit specified, shall remain uncompleted after the expiration of such time limit, or after any authorized extension of such stipulated time. The Contractor expressly agrees to pay the County the sum of Five Hundred Dollars (\$500.00) for each and every Calendar Day, or part of a day, for each and every item of such work remaining uncompleted. Such monies shall be paid by the Contractor as liquidated damages to partially cover losses and expenses to the County, and not as a penalty. The County shall recover said liquidated damages by deducting the amount thereof from any monies due or that may become due to the Contractor, and if said monies are insufficient to cover said damages, then the Contractor or the Surety shall pay such amount due, provided, in any of the above instances, the right of the Contractor to proceed with the work was not deterred by the County, other Contractors employed by the County, or unforeseen causes beyond the control and without the fault or negligence of the Contractor. The Contractor shall as soon as practicable notify KDOT Traffic in writing of the cause of such delay, if any, and request approval from KDOT Traffic in writing for such additional time or relief as the Contractor may deem necessary. KDOT Traffic shall have sole discretion of approving or denying the Contractor's request

ALL EXTRA WORK

KDOT Traffic may authorize the Contractor to perform Extra Work to furnish all necessary materials and parts, provided that changes are not of such magnitude as to constitute a substantial or material variation in the original Contract. However, the County reserves the right to advertise for competitive bids to effect changes on any system or installation. Authorization for All Extra Work shall be given by KDOT Traffic in writing to the Contractor.

The completion time for All Extra Work shall be twenty-one (21) calendar days, unless specifically agreed to otherwise by KDOT Traffic. If the Contractor is certain that he cannot fulfill the twenty-one (21) calendar day requirement when submitting the quotation for Extra Work, the quotation should contain a proposed schedule for start and finish of the work being quoted. Failure to complete the work within the required time will constitute disruption of service and appropriate liquidated damages will be assessed as specified in this Contract herein.

For the purposes of this Contract, "damaged by traffic" shall mean but not necessarily be limited to cases of knockdown or loss causing at a minimum a replacement or re-erection of a primary structure or support. Examples of a primary structure or support include but shall not be limited to the traffic signal or lighting pole/post, mast arm, mast arm pole, foundation, control cabinet, lighting transformer/break-away base. For cases of damage only impacting auxiliary components to the primary structure or support, replacement of damaged components shall be considered routine maintenance. Examples of auxiliary components shall include traffic signal mast arm pole shrouds, traffic signal backplates, traffic/pedestrian signal heads, traffic signal head/pedestrian signal head visors, pedestrian push buttons, and any associated mounting hardware or brackets. In cases where there is loss to a primary structure and an auxiliary component on the same structure, both shall be considered part of the "damaged by traffic" extra work.

1. Extra work includes replacing or making temporary and permanent repairs to all equipment, which is damaged by traffic, construction forces working under other Contracts, construction forces working under permits, or County personnel.
2. Extra work includes but is not limited to making temporary modification or modernization to existing Kane County maintained traffic signal, ITS and street lighting and other electrical installations and; construction and installation of new traffic signal, ITS and street lighting and other electrical installations.
3. The repair of equipment damaged from any cause whatsoever other than that due to traffic, construction forces working under other County contracts, permits, or County personnel, shall not be paid for as Extra Work. Such work will be considered Routine Maintenance.

4. Extra work does not include the repair or replacement of equipment damaged by the fault or negligence of the Contractor. The Contractor shall be physically and financially responsible for the repair of any damage to County's equipment caused by the Contractor, the Contractor's employees or the Contractor's subcontractor(s) performing work as part of this Contract.
5. Extra Work includes the replacement of malfunctioning/failed inductive detector loops as either "low priority" or "high priority" as described herein, providing the malfunction/failure was not caused by negligence on the part of the Contractor. Failed inductive detector loops shall be replaced or deferred as directed by KDOT Traffic.

Under "low priority" conditions, KDOT traffic will make the determination whether or not the failed loop diminishes public safety or significantly impacts the Level of Service to the motoring public. After receiving notification from KDOT Traffic to proceed, the Contractor shall repair the installation and replace the specified "low priority" inductive detector loop within twenty-one (21) calendar days.

If, in the opinion of KDOT Traffic, the absence of the loop detector diminishes public safety or significantly impacts the Level of Service to the motoring public, certain inductive detector loop installations may be designated by KDOT Traffic as a "high priority" item. For all such specially designated "priority" detector loop installations, the Contractor shall have seven (7) calendar days, after notification by the County, to complete the installation or replacement of the specified "priority" inductive detector loop.

The Contractor shall be responsible for providing all temporary traffic control devices as specified herein.

Failure to complete either "low priority" or "high priority" detector loop installations within the required time as stated in this section, or provide the proposer temporary traffic controls, will constitute disruption of service and appropriate liquidated damages will be assessed as specified herein.

6. The County reserves the right to furnish any or all of the materials or parts for Extra Work, in which case no charges for items so furnished shall be made to the County.
7. The County reserves the right to reject any invoices submitted by the Contractor for Extra Work which were not approved by KDOT Traffic before the work was started. This provision does not apply to knockdowns or emergency repairs.
8. Extra Work for items will be paid for either at a lump sum price, a unit price agreed upon by the Contractor and KDOT Traffic or force account basis in accordance with **Article 109.04** of the Standard Specifications, with the exception that no additional payments will be made for fabrication, engineering, transportation, materials ordering, or any other labor or equipment costs.

REIMBURSEMENT FROM THIRD PARTY FOR REPAIRS OR DAMAGES

a. Damages by Traffic, Vandalism and Other Miscellaneous Causes

The County reserves the right to make recovery from third party or parties for damage to any part of the installations or systems caused by vehicular traffic, vandalism, or construction forces working within the County right-of-way requiring a highway permit. This includes any and all incidents of equipment damage for which the County pays the Contractor to replace the damaged equipment. No part of such recovery or recoveries shall inure to the benefit of the Contractor. For each incident resulting in damage to electrical facilities, the Contractor shall furnish to KDOT Traffic an individual statement itemizing the location, nature of damages, the cost of labor, the number of personnel, the workforce(s)' wages, Contractor's overhead and burden, the workforce(s)' hours recorded in one half hour increments, the cost of equipment, the cost of vehicles, the cost of overtime, the cost of materials, the date of damage, and the date(s) repairs were initiated and completed.

Contingent upon the Contractor's satisfactory completion of work and timely submittal of a proper invoice with required supporting documentation, the County (or County's third party) shall be allowed at least 60 days to process and administrate or intend to process and administrate review and payment of the invoice, duration beginning at the date when all documentation is acceptable and present to KDOT traffic. Contractor should recognize that this duration may be exceeded but the County intends to work diligently to minimize the duration when feasible.

Should processing and administration exceed the described length of time, the Contractor may request an invoice review status to KDOT traffic.

b. Damages by Construction Forces Working under County Contracts

The Specifications for each County Highway project describe in detail the responsibility for equipment damaged by construction forces working under contract with the County. For cases when the Electrical Maintenance Contractor is directed to perform repairs on damaged equipment, the Contractor will be paid either directly by the Construction Contractor (upon approval by KDOT Traffic) or by the use of Extra Work Pay Items provided in this Contract as specified herein.

c. Cable Damages by County Personnel Working Within the County Right-of-Way

Damage to underground cable caused by County personnel in the performance of their assigned duties shall be paid for by the County as Extra Work, as provided in this Contract as specified herein. The Contractor shall request an inspection by KDOT Traffic of the damaged cable at the site of the damage prior to making permanent repairs.

d. Record Keeping Requirements for Third Party Damages and Malfunctions/Failures to all KDOT Electrical Systems included under this Contract (Web-Based Incident Reports).

The Contractor shall maintain a web-based system of sequentially numbered Incident Report (Report) for every notification of equipment damage and/or malfunction/failure (incident) and whether or not the Contractor is notified via a law enforcement agency, municipal public works departments, KDOT Traffic or a citizen/motorist or if the incident is discovered by the Contractor's personnel. The Report shall identify the name and contact information of the reporting agency or individual, the full name of the Contractor's representative preparing the Report (not by an Identification Number), the location of the incident, a description of the incident, the date and time the incident is reported to the Contractor, and the source of the notification or discovery of the incident. The Report shall include the date and time the Contractor's personnel are notified to respond to the incident, the time the Contractor's personnel arrived at the location of the incident, a description of what was found at the location of the incident, temporary and permanent repairs and if additional permanent repairs are required to restore the system. The Contractor shall prepare a Report for each occurrence of damage or malfunction/failure to be repaired or replaced and for all Emergency, Temporary, or Permanent Repairs made to the installations or systems. Reports, and digital pictures of the damage shall be completed and made available to KDOT Traffic within **24 hours** of occurrence or discovery. Photographic documentation of damage as initially found by Contractor and of the temporary and permanent repair shall be captured and submitted to KDOT Traffic and provided as supporting documentation for any Extra Work related invoices. The Report shall include the date and time all permanent repairs are completed and the system is completely restored. The system used to collect the Report information shall have the capability of being exported as an electronic maintenance log in a data base (.csv or excel file format) or spreadsheet format to KDOT Traffic at the conclusion of the contract.

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METHOD OF BILLING

By the tenth day of each month, the Contractor shall submit invoices in duplicate to KDOT Traffic for Routine Maintenance work performed during the preceding month.

Billing for the cost of Routine Maintenance operations shown on invoices shall be for full monthly periods only, and shall not be prorated for shorter periods. Work performed on installations completed and activated on or before the fifteenth day of the month shall be billed to cover the entire month; however, work performed on installations completed and activated after the fifteenth day of the month shall not be billed on the current invoice, and payment shall begin the following month. Equipment that has been deactivated, eliminated or which the County has relinquished maintenance responsibility after the fifteenth day of the month, shall be billed for the full month, however, equipment that has been deactivated or eliminated on or before the fifteenth day of the month shall not be billed for that month. If any Extra Work was performed during the billing cycle for routine maintenance, a document shall be included but under a separate cover which details these activities or invoices. An example of this document may look like the following:

Invoice #	Date of Start	Date of Temp Repair (if applicable)	Date of Completed Work	Location	Description of Work	Stage of Invoice or work	Approx. Cost (to date)
XXXXXX	01/01/15	01/01/15	01/15/15	Kirk/Mesa	NE Quad Signal Post knockdown	Invoiced, Not Paid	\$3,000
YYYYYY	02/15/15			Randall/Dean	Auth #10 – New Fiber Cable	Scheduling Mobilization	\$15,000

KDOT Traffic shall withhold the payment of the final month routine maintenance billing until all work, determined by KDOT Traffic to be the responsibility of the Contractor, is completed by the Contractor to KDOT Traffic satisfaction.

Separate invoices should be submitted no later than thirty (30) calendar days after the completion of the work for Extra Work. Each invoice shall show the date of authorization and location of the work. Partial project billing will not be accepted unless previously authorized by KDOT Traffic. In cases where work is completed across many days and/or involves both temporary and permanent repairs, all work involving a single loss or authorization shall be invoiced together under the same invoice number. Invoices submitted later than ninety (90) calendar days after completion of work for Extra Work will not be accepted. This duration begins once permanent repairs are complete in cases where both temporary and permanent repairs are invoiced together.

Each invoice shall have a notarized certification by the Contractor to the effect that the work shown thereon has been completed in accordance with the provisions of the Contract and all applicable specifications.

The County's fiscal year ends November 30. The Contractor shall submit all outstanding invoices for the fiscal year prior to the calendar-year end to allow for sufficient processing time.

DAMAGED PARTS, MATERIALS, AND EQUIPMENT

Surplus or damaged parts, materials, or other equipment deemed salvageable by KDOT Traffic shall be stored in the Contractor's warehouse or yard and designated as property of the County until disposed of or repaired under the direction of KDOT Traffic. KDOT Traffic may require inside, protected storage of specified equipment. If a new Contract is awarded to a new Contractor, all costs associated in the transport or receipt of such equipment shall be included in the negotiated price of this Contract.

Used parts may not be installed to repair the various systems and installations unless specifically permitted by the Routine Maintenance Special Provisions or when otherwise directed by KDOT Traffic in writing.

REPORTS AND FORMS

The following reports, in addition to the other reports or forms listed as specified in the Contract herein, shall be submitted when required:

a. **Unsatisfactory Service Report**

When, in the opinion of KDOT Traffic, any maintenance operation is not being properly performed to the satisfaction of KDOT Traffic, KDOT Traffic may submit an Unsatisfactory Service Report. The Contractor shall take necessary action in the most practical manner possible to correct the items listed in the report. A copy of the report showing the action taken and the date of such action shall be submitted to KDOT Traffic.

b. **Condition Report**

The Contractor shall submit to KDOT Traffic, when requested, a Condition Report showing the history of any item in the system. This report shall contain the following information or such other information as required by KDOT Traffic.

- The general condition of the item, including the results of tests.
- The record of any breakdown of the item, and of remedial action taken
- The Contractor's recommendations for corrective measures necessary to insure the proper performance of the item.

c. **Inspection Report**

When the Contractor finds any item of equipment not functioning properly, he shall submit to KDOT Traffic an Inspection Report. This report shall contain a detailed description of the particular malfunction and the Contractor's detailed recommendations for corrective measures necessary to eliminate the condition.

d. Web-Based Incident Report

Whenever defective, non-operative, or damaged equipment (incidents) are reported to the Contractor via phone, radio, email or any means of communications sequentially numbered Incident Report shall be initiated. Copies of the web-based Incident Report shall be available to KDOT Traffic at all times. A spreadsheet summary of all Incident Reports shall be provided to KDOT Traffic weekly. The Web Based Incident Report shall show, in addition to the description of the defect, the Contractor's Work Order number, which is initiated by the Contractor to correct the reported incident. This provision does not require a Contractor's Work Order to be generated for every Incident Report. However, KDOT Traffic reserves the right to require a Contractor Work Order Report for specific maintenance activities. KDOT Traffic shall have the ability to contact a Contractor's Representative 24 hours a day 7 days a week, including holidays to request specific Incident Reports or a listing of Incident Reports either through contact with Contractor personnel or through a web-based access being granted to the KDOT Traffic for real-time, shared access to the reporting system software.

e. Work Order

Copies of all Work Order(s) issued to correct the defect(s) indicated on an Incident Report shall be maintained with the associated Incident Report. The copy of the Work Order(s) shall indicate the exact location of the component at fault and whether it is being bypassed, removed, replaced, or repaired temporarily or permanently. KDOT Traffic shall have access to all Work Orders related to a specific Incident Report. When requested by KDOT Traffic, copies of Work Orders shall be provided within two (2) hours from the time the request is received by the Contractor.

DURATION OF CONTRACT

This Contract shall be in full force from **December 1, 2019** to **November 30, 2022** following the date of execution and acceptance of the Contract, subject however, to the right of the County to cancel and terminate the same at any time with or without cause, or for reasons which it believes to be in the public interest by giving thirty (30) days' notice in writing to the Contractor.

In the event of such cancellation, the Contractor shall be entitled to receive payment for services and work performed and materials or equipment furnished under the terms of the Contract prior to the effective date of such cancellation, but shall not be entitled to receive any damages on account of such cancellation or any further payment whatsoever. The County may take possession of the work and all materials, tools, appliances thereon and there at, and records, for any reason which KDOT Traffic deems to be in the public interest, and its decision shall be final.

In the event the Contractor has incomplete work or is unable to complete remaining work to the satisfaction of KDOT traffic by the end of the duration of the Contract, this Contract shall remain in full force and remain the contractual obligation of the Contractor for the locations or associated "A" items which contain incomplete/unsatisfactory items. The Contract extension period shall remain indefinite until remaining work is completed to the satisfaction of KDOT Traffic. The costs associated with routine maintenance during the extended Contract duration period shall not be paid for separately but instead considered to be included in the compensation provided during the original duration of the Contract.

CONTRACTOR DISCLOSURE

- A. Prior to award, every Contractor or vendor who is seeking or who has obtained Contracts or change orders to Contracts or two (2) or more individual Contracts with Kane County resulting in an amount greater than Fifteen Thousand Dollars (\$15,000) shall disclose to the Kane County Purchasing Department, in writing all cumulative campaign contributions, (which includes multiple candidates) made within the previous twelve (12) months of awarding of the Contract made by that Contractor, union, or vendor to any current officer or countywide elected officer whose office the Contract to be awarded will benefit. Disclosure shall be updated annually during the term of a multi-year Contract and prior to any change order or renewal requiring Board level approval. For purposes of this disclosure requirement, "Contractor or vendor" shall include owners, officers, managers, insurance brokers, lobbyists, agents, consultants, bond counsel and underwriters counsel, subcontractors corporations, partnerships, associations, business trusts, estates, trustees, and/or beneficiaries under the control of the contracting person, and political action committees to which the contracting person has made contributions.
- B. All Contractors and vendors who have obtained or are seeking Contracts with Kane County must disclose the following information which shall be certified and attached to the application or document. Penalties for knowingly violating disclosure requirements will potentially result in immediate cancellation of the Contract, and possible disbarment from future County Contracts:
- (i) Name, address and percentage of ownership interest of each individual or entity having a legal or a beneficial interest of more than five percent (5%) in the applicant. Any entity required by law to file a statement providing substantially the information required by this paragraph with any other government agency may file a duplicate of such statement;
 - (ii) Names and contact information of their lobbyists, agents and representatives and all individuals who are or will be having contact with County employees or officials in relation to the Contract or bid. This information disclosure must be updated when any changes to the information occurs.
 - (iii) Whenever any interest required to be disclosed in paragraph (a) above is held by an agent or agents, or a nominee or nominees, the principals for whom such agents or nominees hold such interest shall also be disclosed. The application of a spouse or any other party, if constructively controlled by another person, or legal entity as set forth above, shall state the name and address and percentage of beneficial interest of such person or entity possessing such constructive control and the relationship under which such control is being or may be exercised. Whenever a stock or beneficial interest is held by a corporation or other legal entity, such shareholder or beneficiary shall also make disclosure as required by paragraph (a) above.

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- (iv) A statement under oath that the applicant has withheld no disclosures as to economic interests in the undertaking nor reserved any information, data or plan as to the intended use or purpose for which it seeks County Board or other county agency action.
- C. All disclosures and information shall be current as of the date upon which the application is presented and shall be maintained current until such time as Kane County shall take action on the application. Furthermore, this information shall be maintained in a database by the Purchasing Department, and made available for public viewing.
- D. Notwithstanding any of the above provisions, the County Purchasing Department with respect to Contracts awarded may require any such additional information from any applicant which is reasonably intended to achieve full disclosure relevant to the application for action by the County Board or any other County agency.
- E. Any failure to comply with the provisions of this section shall render any ordinance, ordinance amendment, County Board approval or other County action in behalf of the applicant failing to comply voidable at the option of the County Board or other County agency involved upon the recommendation of the County Board Chairman or the majority of the County Board.
- F. Information shall be sent directly to the Kane County Purchasing Department at the following address:

Kane County Government Center
Purchasing Department, Bldg. A
719 S. Batavia Ave. - Geneva, IL 60134

TRAFFIC SIGNAL INSTALLATIONS DEFINED

A traffic signal installation includes, but is not limited to master and local controllers, time base coordinators, coordination units, intersection monitors, modems, transceivers, induction loop detection systems, microwave detection systems, video vehicle detection systems, thermal imaging detection cameras, radar detection, wireless magnetic detection, pedestrian-activated push buttons, sonic detection or optical detection, controller and communication cabinets, U.P.S. (uninterruptible power supply) systems, signal heads (vehicle and pedestrian with countdown timers), internally illuminated and fiber optic and LED signs, pan/tilt/zoom cameras, traffic signal posts, mast arm assemblies and poles, span wire wood poles, down guys, aerial wire, aerial cable, electric cable (standard multi conductor, shielded multi conductor, co-axial, ground wire, tracer wire), Fiber Optic interconnection cable, the County's IT Fiber Optic Network Cable, conduit, communication lines, video communication systems, Ethernet managed and unmanaged switches, serial converters, concrete foundations, handholes, junction boxes, utility service installations, ground rods, and other appurtenances owned and/or maintained by the County.

At locations where a traffic signal head or pedestrian signal head assembly shares a pole with a highway lighting (luminaire) assembly, each component shall be paid for under its respective pay item. In all cases where combination mast arms are used, the pole, foundation and wood pole if part of a temporary or span-wire installation, shall be considered part of the traffic signal installation and shall be maintained as part of the signal system.

In all cases where the signal head is bracket mounted to a combination mast arm assembly pole or wood pole if part of a temporary or span-wire installation with a lighting unit, the foundation and mast arm assembly and pole or wood pole shall be maintained under *Traffic Signal Routine* Pay Item A-1. The luminaire shall be maintained under the *Roadway Lighting Routine* Pay Item A-8, where both the traffic signal installation and street lighting are maintained by the County.

At locations where the County maintains the traffic signal installation and others (i.e. a municipality) maintains the street lighting system, and where combination mast arms are used, the pole, foundation and wood pole if part of a temporary or span-wire installation, the foundation, mast arm assembly and pole shall be maintained under *Traffic Signal Routine* Pay Item A-1 and the lighting arm, luminaire and related wiring shall be maintained by the municipality (others). In this case the County Electrical Maintenance Contractor shall coordinate all repair work with the municipality (others).

The quantity of any item of work as listed in the Schedule of Prices may not reflect the actual amount of work performed. Payment will be made only on the basis of actual work performed.

ROUTINE MAINTENANCE - ALL SYSTEM COMPONENTS

The following shall be part of Pay Items A-1 through A-11

1. **Contractor's Responsibilities**: The Contractor shall maintain and repair all of the various installations and perform all work necessary to keep them in proper working order, to the satisfaction of KDOT Traffic at all times. No compensation will be allowed over and above the bid prices for meeting the requirements of Routine Maintenance.
2. **Contractor to Maintain**: The Contractor, after receiving notification from KDOT Traffic either by phone, email, text message or in writing, shall accept maintenance of any new, modernized or existing installation, which are accepted for maintenance by the County.
3. **Contractor's Duty to Report**: The Contractor shall report the following to KDOT Traffic as quickly as possible:
 - Any work not authorized by KDOT Traffic or the Contractor being performed on the installations by anyone other than the Contractor.
 - Any work, which comes to the attention of the Contractor, which may endanger any installation.
 - Any emergency temporary repairs.
 - Any work of an unusual nature and/or for which KDOT Traffic has requested notification.
4. **Locating KDOT Equipment "Non-Emergency"**: The Contractor shall respond within 48 hours to all notifications made by KDOT Traffic or other parties including JULIE to locate and mark any or all underground components of an installation. . **Note** *Requirements on custom locate flags, the need to "close" completed JULIE tickets, and in "off maintenance Contractor" communication requirements detailed in "Equipment Location and Access Responsibility" Section.*
5. **Locating KDOT Equipment "Emergency"**: The Contractor shall within two hours of being notified, respond to all "Emergency Julie Locates" and mark County underground components. The Contractor shall immediately proceed to the locate and continue to attempt to contact KDOT traffic until a contact is accomplished. **Note** *Requirements on custom locate flags, the need to "close" completed JULIE tickets, and in "off maintenance Contractor" communication requirements detailed in "Equipment Location and Access Responsibility" Section.*

6. **Utilities and ITS Communication:** The Contractor shall keep incoming electrical power, communication (telephone, internet, Ethernet managed and unmanaged switching devices, etc.) service in proper working condition at all times. The Contractor shall coordinate and cooperate with the appropriate utility companies in this matter until service has been restored. In the event of service outages, the Contractor shall follow service provider's procedures for reporting a service outage; documentation of correspondence shall be made available upon request of KDOT Traffic. Fiber Optic Cable(s) leading up to and including the associated layer 3 switch housed at the KDOT building at 41W011 Burlington Road in St. Charles, IL shall be maintained, troubleshot, and repaired as needed to maintain communication with the ITS and traffic signal network. Fiber Optic Cable(s) may exist outside County ROW, such as Fiber cable on Illinois Route 64 and shall be considered included as facilities to be maintained by The Contractor. Maintenance of these items and any associated cost shall be considered incidental to this Contract. In the event of traffic signal Interconnect communication outages (even if temporarily under the maintenance of another Contractor), OTDR testing shall be performed by the Kane County EMC Contractor to determine if there is a break in an interconnect communication cable and if a break is found, inform KDOT Traffic of an approximate location of the break. KDOT traffic will then evaluate these findings and determine if the repair and/or temporary repair of damage is to be considered routine maintenance or is eligible for consideration as Extra Work if KDOT Traffic informs the Kane County EMC Contractor to perform the repair. In any event, OTDR testing shall be considered part of Routine maintenance.
7. **Routine Maintenance Patrols:** The Contractor shall patrol and inspect each installation every month and shall generate a web-based ticket for every deficiency found during the routine maintenance patrol inspection. The Contractor shall perform additional inspections as directed by KDOT Traffic or as specified in these special provisions. The Contractor shall ensure all repairs are completed and shall notify KDOT Traffic when the repairs are completed. Patrols should be conducted in such a way as to ensure proper operation of a device, in some cases, a second patrolman may be required to test pieces of a system that are too far separated to test with one patrolman (pedestrian crossing with advanced warning flashing beacons as an example).
8. **Traffic Signal Outages:** Replacement of in-operable signal indications (i.e. burned out traffic signal lamps, damaged sockets and in-operable or partially operating LED modules) shall be scheduled and accomplished in the following manner, or as directed by KDOT Traffic:
 - If two or more traffic signal indications remain in operation for any given vehicle phase (movement) on any approach to an intersection, the replacement of the burned-out lamp, damaged socket or in-operable LEDs shall be accomplished within twenty-four (24) hours for red indications and forty-eight (48) hours for all other indications. The twenty-four (24) hour and forty-eight (48) hour time periods begin immediately following discovery and/or notification of the outage. These provisions shall not apply to knockdowns.

- If only one traffic signal indication for any given vehicle phase (movement) remains in operation for any approach to an intersection, **IMMEDIATE CORRECTIVE ACTION** must be taken. This requirement includes but is not limited to arrow indications where only one such indication is operational as well as any red flashing beacons. This requirement shall not have any exceptions. These provisions shall not apply to knockdowns.

When replacing burned out traffic signal lamps, the Contractor shall clean the reflector and lens. All replacement lamps and LED modules shall meet the requirements and approval of KDOT Traffic. When replacing in-operable LED modules, the Contractor shall replace the existing indication(s) with a like product brand (i.e. *Gelcor* for *Gelcor* and *Dialight* for *Dialight*) to maintain product uniformity throughout the entire signal installation.

9. **Control Equipment Displays:** The Contractor shall replace burned out controller indicator lamps, LED and LCD displays as discovered, or when directed by KDOT Traffic. All LED and LCD replacement displays shall meet the requirements of the Original Equipment Manufacturer (OEM) and approval of KDOT Traffic.
10. **Damaged Equipment:** The Contractor shall repair or replace all defective or damaged equipment from any cause other than traffic, construction forces working under other County Contracts, permits, or County personnel (These items shall be paid for as Extra Work). In cases of replacing or repairing Ethernet switches, Contractor shall also be familiar with and program the necessary switch configurations to match the configurations of the pre-existing switch. In the event the Contractor responds to an issue 3 or more times within a 90 day period, the components related to the issue will be considered damaged and subject to replacement with new equipment. If in the opinion of the contractor, there would be value in replacement with new equipment (when repair is an option), the Contractor may propose to KDOT traffic the direct cost of new equipment minus the proposed cost of repair as an Extra Work Authorization.
11. **Equipment Inventory:** The Contractor shall maintain an inventory of equipment for performing all routine maintenance defined in this Contract's special provisions. The Contractor shall ensure all KDOT traffic signal controls, highway lighting systems, communications systems, and other Contract items are repaired within the specified time limits defined in the "Repair Time Table". The Contractor shall acquire and maintain this equipment and provide KDOT Traffic with a list of material and equipment in the Contractor's inventory for fulfilling the requirements of this Contract. The Contractor shall note the following list of equipment is crucial to the operation of the KDOT Arterial Operations Center (AOC) and associated systems on and off of fiber communications. The Contractor shall have sufficient equipment on hand or ensure the equipment is available and at a minimum shall include the following in order to satisfy the time requirements defined in the "Repair Time Table":

- Alpha FXM 1100 U.P.S. Un-interruptible Power Supply, IP addressable

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- Eagle/Siemens Model M42 controller, Model EPAC 300 master controller and M50 and M60 Series controller, IP addressable (ensure TransSuite compatible Firmware as applicable)
- Econolite Model ASC/2M (& ASC/3) controller, Model ASC/2-2100 master controller, and Cobalt controllers (ensure TransSuite compatible Firmware as applicable)
- NTCIP controllers (ensure TransSuite compatible Firmware as applicable)
- Iteris Edge II Video Processor and RZ-4 AWD Video Detection Camera
- Econolite Solo Terra Video Detection Camera
- Cornet video encoder and video decoder
- Garretcom KQ6 and KQ32 managed Ethernet switch and hub
- AXIS PTZ, IP addressable camera and controller compatible with the TransSuite traffic management system
- Media converter compatible with the KDOT Ethernet communications network and Video wall management system (as applicable)
- Carmanah and JSF solar powered flashing beacons
- FLIR "F" Series thermal imaging camera
- Wavetronix SmartSensor Matrix and Advance detection systems
- Sensys Access, Repeater, Contact Closure, EX card and Flush-Mount Wireless Sensors
- Solar Warning Systems
- Rectangular Rapid Flashing Beacon Modules and wireless communications
- TAPCO solar flashing LED warning and regulatory signs
- All components associated with High Sierra Roadway Weather Information Systems
- Driver Feedback Speed Monitoring (YOUR SPEED) Signs
- Permanent Dynamic Message Signs (DMS)
- All components associated with the Wayside Horn System equipment
- Layer III Cisco Network Switches
- Control Switches
- Intelight X3 Controllers (ensure TransSuite compatible Firmware as applicable)
- Malfunction Management Unit (MMU) – flashing yellow arrow compatible

The Contractor will be allowed to temporarily use alternative detection or other systems associated with the traffic signal installation as approved by KDOT Traffic in order to meet Service Restoration requirements set forth in the "Repair Time Table".

With the purchase of any new Cisco network switches, even if procured under routine maintenance, the Contractor shall coordinate with KDOT Traffic to determine if Cisco technical support should be included in the purchase price of the switch.

12. **Traffic Signal Minimum Conditions for Operation:** The following shall be considered the minimum acceptable signal operation pending permanent repairs:

- Two (2) far side signal faces directed towards the through traffic movements of each approach.
- Two (2) signal faces directed towards any separate turning movements (where they are provided) on each approach.
- Two (2) pedestrian signal faces for each pedestrian crossing.
- Where the distance from any stop bar to the far side signal exceeds 150 feet, the near right signal, if existing, must be maintained and is considered as a minimum acceptable signal display in addition to the previous items.

The Contractor's response time for all traffic signal knockdowns shall be in accordance with the Response Timetable contained herein. When clearing a traffic signal knockdown, the Contractor shall determine if the minimum acceptable signal operations described above are present. If the minimum conditions are not present, the Contractor shall take **IMMEDIATE CORRECTIVE ACTION** to restore the minimum acceptable signal operations. All temporary signal faces shall contain the same type, number and size of indications as the signal faces being replaced. The Contractor shall notify KDOT Traffic of knockdowns reported or serviced on the first business day following the knockdown. This repair work shall be considered routine maintenance except for damage caused by traffic, construction forces working under County Contracts, permits, or County personnel, which will be paid for as Extra Work (Items as Ordered by the Engineer). When maintenance at a signalized intersection requires that the controller be disconnected, when power is available, the Contractor shall place the intersection on flashing operation, which may require the Contractor to install a flasher unit in the controller cabinet if none is provided. The signals shall flash RED for all directions unless a different indication has been directed by KDOT Traffic.

13. **Replace Defective or Damaged Traffic Signal Equipment:** Permanent replacement equipment shall be of the same make and model of the defective or damaged equipment. If proper signal sequencing with full vehicle detection cannot be achieved immediately, a controller, which will provide the proper signal sequencing and full vehicle detection, shall be installed within twenty-four (24) hours of removal of the original controller. The Contractor shall notify KDOT Traffic no later than the first business day following removal and/or replacement of any controller.

14. **Contractor Notification of Planned Repair Work Requiring Lane Closures:** The Contractor shall notify KDOT Traffic of all planned lane closures or disruptions to traffic signal operations in excess of two and one half hours. The Contractor shall notify KDOT Traffic a minimum of seven (7) calendar days in advance of the planned activity to allow the County sufficient time to notify the motoring public of the service disruption or lane closure. The County will arrange for the placement of Changeable Message Signs in advance of the planned activity at no additional expense to the Contractor. The Contractor will be responsible for the placement of all temporary traffic control signs and stop signs as specified herein and in accordance with the details of the temporary traffic control highway standards. In the case of a planned complete traffic signal outage, the Contractor will install a series of two black on orange 48" temporary traffic control signs on each approach to the intersection. The first temporary traffic control sign will have a special message "SIGNAL WORK AHEAD" (W-21-modified) and will be placed a minimum of 1,000 feet in advance of the stop line or as directed by KDOT Traffic and the second warning sign will have the message "BE PREPARE TO STOP" (W3-4) and will be placed a minimum of 500 feet in advance of the stop line or as directed by KDOT Traffic. Stop signs shall be erected or unfolded in advance of all planned traffic signal outages. The traffic signal will be placed in all way red flash prior to turning the traffic signals off. A detail showing the placement of the temporary traffic control signs will be provided by KDOT Traffic. The Contractor shall be responsible, at no additional cost, for installing all temporary traffic control devices for routine maintenance work. The Contractor shall receive separate compensation for the cost of all temporary traffic control devices associated with non-routine maintenance work.

Lane closures are prohibited on **Monday** through **Friday** from **6:00 a.m.** to **9:00 a.m.** and from **3:00 p.m.** to **7:00 p.m.** unless authorized by KDOT Traffic and except for clearing the roadway of objects, which constitute a hazard to the public.

15. **Placement of Stop Signs:** "STOP" signs (Illinois Standard R1-1 36" x 36" or larger) shall be erected on all signalized approaches when power is not available and if folding stop signs are not permanently installed at the intersection, or if the traffic signals are in a red flashing operation and it is anticipated the flashing operation will be in operation for more than **thirty (30) minutes** after the arrival of the Contractor's personnel.
16. **New Equipment:** All permanent repairs or replacements shall be made with new equipment only, unless otherwise specifically approved by KDOT Traffic in writing.

17. **Damaged or Missing Equipment:** The Contractor shall check and maintain the following items or as directed by KDOT Traffic:
- Align all signal posts, controller pedestals, foundations, mast arm poles, astro brackets and signal heads.
 - Tighten all bolts
 - Remove the dust and debris from the interiors of controller cabinets with a brush and vacuum cleaner, and replace cabinet air filters.
 - Remove all animal and insect infestations.
 - Replace damaged, discolored, cracked or peeling signal lenses.
 - Repair or replace damaged or cracked mast arm pole shrouds - Non decorative
 - Replace damaged or repaint discolored, peeling, bent, twisted signal backplates.
 - Repair or replace any traffic signal head, traffic signal visors, traffic signal mounting hardware in cases where the structural post or mast arm was not damaged.
 - Repair or replace any pedestrian signal head, pedestrian signal visors, pedestrian signal mounting hardware in cases where the structural post or mast arm was not damaged.
 - Replace damaged or missing nut covers, mast arm shrouds, handhole covers and handles, handhole hooks, pole handhole covers, cabinet locks, and related hardware. Secure each component with manufacturer approved hardware. (Tape shall not be used).
 - Clean the exterior housings (replace if damaged) of all image sensing and PTZ (pan/tilt/zoom) cameras in strict accordance with the manufacturer's recommendations, and as directed by KDOT Traffic.
18. **Video and Thermal Imaging Equipment:** Clean external lenses of the video or thermal imaging detection cameras at least twice a year and additionally as directed by KDOT Traffic and/or recommended by the manufacture with no additional cost to the County.
19. **PTZ Cameras:** Clean external lenses or exterior domes of PTZ cameras at least once a year and additionally as directed by KDOT Traffic and/or recommended by the manufacturer with no additional cost to the County.
20. **LED Traffic and Pedestrian Signals:** The Contractor shall restore LED traffic signal and pedestrian signal (with countdown timers) outages with LED modules manufactured by Dialight or GE (Gelcor).

21. **Mast Arm Assemblies and Poles:** The Contractor shall inspect all mast arm assemblies, mast arm poles and astro brackets (or other types of hardware) supporting traffic signal heads or pedestrian signal heads. This inspection shall be completed between April 1 and October 1 of each Contract year. Prior to March 15th of the initial year and March 15th of the renewal year of this Contract, the Contractor must furnish in writing KDOT Traffic an inspection schedule with the dates on which the inspections will be completed. The inspections shall focus on the structural elements of the mast arm assembly, and must include a detailed and complete investigation of the following elements:

- Mast Arm
 - Mast-to-Pole Connection
 - Anchor Bolts
 - Pole
 - Base Plate
 - Nuts
 - Mast Arm Pole Shrouds
- a. Inspect the arm of the assembly at all signal head connections for any defects, such as cracks or buckles. Inspect the mast arm-to-pole connection for significant loss of section, cracks in welds or base metal, and deterioration of the connection plates. Inspect the bolts of the mast arm-to-pole connection for tightness and condition.
 - b. Inspect the pole for external corrosion, impact damage, perforation by rust-through, any discernible deflection, distortion or cracking. Inspect the pole for corrosion near the base plate, especially if it is mounted with a grout bed. Inspect the welds of the pole-to-base plate connection for cracks.
 - c. Inspect the base plate for any severe section loss or deformation.
 - d. Inspect the anchor bolts of the mast arm to verify the existing nuts are not loose or missing. Inspect the anchor bolts for any corrosion or bending. This inspection will require removal of the shroud.
 - e. Upon discovery of any buckles and/or significant structural defects (loose nuts, severe corrosion, dents, cracks in welds or structure, etc.), the Contractor shall immediately notify KDOT Traffic to determine if the assemblies pose an immediate hazard. If it is determined the assembly poses an immediate hazard the Contractor shall take immediate corrective action as directed by KDOT Traffic
 - f. The Contractor's personnel must inspect the entire intersection on the same working day. The Contractor shall provide KDOT Traffic a completed form for each County maintained traffic signal mast arm assembly and pole inspected.

22. **Span Wire Assemblies and ITS Poles:** The Contractor shall inspect all pole and span wire assemblies, wood pole to steel cable hardware (or other types of hardware) supporting traffic signal heads or pedestrian signal heads. This inspection shall be completed between April 1 and October 1 of each Contract year. Prior to March 15th of the initial year and March 15th of the renewal year of this Contract, the Contractor must furnish in writing KDOT Traffic an inspection schedule with the dates on which the inspections will be completed. The inspections shall focus on the structural elements of the span wire or pole assembly, and must include a detailed and complete investigation of the following elements:

- | | |
|--------------------------------|--|
| • Wood Pole | • Span Wire Accessories |
| • Span Wire-to-Pole Connection | • Tether Wires |
| • Anchor Bolts | • Electric Service Installation and Cables |
| • Pole | • Microwave detectors, and/or Auxiliary Components |
| • Base Plate | • ITS Poles |
| • Nuts | |
| • Wood Poles with Down Guys | |
| • Span Wire Cable | |

- f. Inspect the span wire assembly at all signal head connections for any defects, including minimum clearance distance from the bottom of the signal head to the surface of the roadway. Inspect the span wire-to-pole connection for cracks in welds or base metal, and deterioration of the connection plates.
- g. Inspect the pole for external corrosion, impact damage, perforation by rust-through, any discernible deflection, distortion or cracking. Inspect the pole for corrosion near the base plate, especially if it is mounted with a grout bed. Inspect the welds of the pole-to-base plate connection for cracks.
- h. Inspect the base plate for any severe section loss or deformation.
- i. Upon discovery of any buckles and/or significant structural defects (loose nuts, severe corrosion, dents, cracks in welds or structure, etc.), the Contractor shall immediately notify KDOT Traffic to determine if the assemblies pose an immediate hazard. If it is determined the assembly poses an immediate hazard the Contractor shall take immediate corrective action as directed by KDOT Traffic
- g. The Contractor's personnel must inspect the entire intersection on the same working day. The Contractor shall provide KDOT Traffic a completed form for each County maintained span wire pole assembly and ITS pole inspected.

23. **Repair Records:** The Contractor shall keep records of repairs and services to all serial numbered pieces of equipment and upon request shall furnish the records to KDOT Traffic. These records must indicate the location, the malfunction, and removal and reinstallation dates of each item. The records should also indicate the serial number of the spare piece of equipment if such item is installed.
24. **KDOT Ordered Inspections:** The Contractor shall inspect controllers, conflict monitors, flashers, relays, detectors, time clocks, coordination equipment, communication (Ethernet) equipment, telemetry equipment, cameras, UPS (battery backup) (must use a load box to determine life expectancy of the battery system) and preemption equipment to ensure the equipment is functioning properly, when directed to do so by KDOT Traffic.
25. **MMU Testing:** The Contractor shall conduct conflict monitor and/or malfunction monitor unit (MMU) testing at all locations annually. Records of the test results indicating the date, time, name of the person conducting the test, and the serial number of the unit shall be furnished to KDOT Traffic. Event logs on each MMU shall never be cleared unless instructed by KDOT Traffic, any evidence of a clearing of logs shall necessitate a re-test or replacement MMU. If any part of the test fails, the unit shall be repaired and a spare unit installed until a time that the original unit is repaired and re-installed. Prior to **March 15th** of each year of the Contract, the Contractor shall furnish in writing to KDOT Traffic, a progress schedule indicating the dates when the MMU testing will be completed. The testing shall be completed between **April 1** and **October 1** of the Contract years and the testing will be prohibited on **Monday** through **Friday** from **6:00 a.m.** to **7:00 p.m.** unless authorized by KDOT Traffic.
26. **Traffic Signal Timing:** The Contractor shall maintain proper timing of the traffic control equipment as directed by KDOT Traffic. Documentation in the controller cabinet should provide recommended settings for each piece of adjustable equipment. Changes to settings other than those shown in the documentation shall be noted with the date of the change and the initials of the person making the change. KDOT Traffic shall be contacted immediately if documentation is not present, or there is any question as to what the settings should be. The Contractor shall not make any timing or programming changes on any standalone traffic signal or traffic signal that is a part of a closed-loop or centrally controlled system or its components except through qualified electrical technicians and with the approval KDOT Traffic. If **ANY** controller timing or program changes are made at the intersection control cabinet and not through the County ATMS, notification shall be made to KDOT Traffic immediately through electronic mail (email) and to KDOT Traffic's appointed Traffic Signal Operations Management (TSOM) consultant.
27. **Graffiti and posters:** The Contractor is responsible for removing posters and graffiti from all components of the traffic signal installations and to repaint as directed by KDOT Traffic.

28. **Traffic Signal Maintenance Transfers:** The Electrical Maintenance Contractor shall furnish a qualified representative to perform inspections during all County traffic signal and street light maintenance transfers. The following two types of maintenance transfers may occur:

- A new or existing traffic signal, flashing beacon, street light(s) or ITS installation will be added to the Electrical Maintenance Contract.
- An existing traffic signal, flashing beacon, street light(s) or ITS installation will have its maintenance temporarily transferred from the Electrical Maintenance Contract to another agency or electrical Contractor.

All costs associated with these inspections are incidental to the cost of routine traffic signal maintenance and at a minimum shall include the following:

- a. The Contractor shall analyze all detector loops at the controller cabinet ensuring each detector loop, or set of detector loops, complies with **Section 886 and Article 801.13(b)(2)** of the Standard Specifications.
- b. The Contractor shall review the controller program provided by the controller manufacturer to ensure the phase and overlap designations are provided correctly in the controller program, as indicated on the traffic signal sequence drawing and cabinet wiring drawings. The Contractor shall report any discrepancies to KDOT Traffic.
- c. The Contractor shall ensure the phase timings in the traffic signal controller are those specified by the County.
- d. The Contractor shall assist in placing the traffic signal in operation by observing the signal display and the conflict monitor or MMU operations. The Contractor shall report any operational discrepancies or signal outages to KDOT Traffic immediately.
- e. The Contractor shall assist KDOT Traffic in walking all approaches of the traffic signal installation, inspecting all traffic signal items for conformance with the County specifications for the project. The Contractor shall also assist KDOT Traffic in inspecting all of the traffic signal heads for proper aiming. The intersection limits associated with the maintenance transfer shall be a minimum of 400 feet from the intersection on all legs of the intersection. Should there be question as to the limits of the maintenance, particularly when the signal is interconnected to adjacent signals maintained by another Contractor, the Contractor shall maintain the conduits and cables up to the next intersection regardless of who maintains the location downstream.
- f. The Contractor shall test and ensure Uninterruptible Power Supply Systems are installed and operating as specified.

- g. The Contractor shall test and insure that all pedestrian Push Buttons are working properly.
 - h. The Contractor shall ensure all ground wire and connections are installed as specified.
 - i. The Contractor shall assist in the testing and/or adjusting of emergency vehicle pre-emption equipment. The Contractor shall insure that whenever railroad pre-emption and emergency vehicle pre-emption are in operation simultaneously, that the railroad pre-emption has priority over emergency vehicle pre-emption.
 - j. The Contractor shall review and test the operation of all components associated with all vehicle detection systems, including Video, Thermal Imaging, Radar, Wireless and or any other type of detection.
 - k. The Contractor shall review and test the operation of all PTZ video surveillance systems.
 - l. The Contractor shall ensure locations containing railroad preemption are programmed in accordance with the approved railroad preemption program, and all special lockout devices are operating properly.
29. **Snow/Dust/Debris/Ice removal**: The Contractor shall be responsible for maintaining visibility of all traffic signal indications and shall clear any and all obstructions that might prevent visibility of a traffic signal or traffic control device. Obstructions include but shall not be limited to snow, ice, dust, debris, nests, oil. In cases of inclement weather, such as a snow storm, the Contractor shall have sufficient personnel available in the event that weather conditions produce system-wide obstructions of traffic signal indications.
30. **Firmware Updates to ITS equipment**: The Contractor shall be responsible for installing updated software and firmware for various traffic components including but not limited to video detection cards, video detection Ethernet/streamer interfaces, UPS, managed and unmanaged switches. These provisions apply to software and firmware which is made available for no cost to KDOT Traffic or to the Contractor. KDOT traffic shall instruct the Contractor to install updated firmware as needed. Any required/subsequent reconfiguration of a device due to a firmware upgrade shall not be paid for separately but shall be considered part of routine maintenance.
31. **Acceptance and Recognition of Existing Facilities**: the Contractor shall be responsible for properly evaluating pre-existing conditions prior to performing new work on an existing system. The Contractor shall then perform work in such a way as to not be impacted by the pre-existing condition. If work cannot be completed through reasonable means, the Contractor may notify KDOT Traffic of the nature of planned work and the nature of the pre-existing condition and propose workable alternatives to complete new work. KDOT Traffic may then evaluate if the request (and subsequent correction or countermeasure) is considered part of routine maintenance or considered part of Extra Work.

32. **Special Tasks as Directed by KDOT Traffic:** The Contractor shall be responsible for completing special tasks as directed by KDOT Traffic. These special tasks will be associated with the maintenance and operation of the traffic signal system. The following is a representative list of special tasks the Contractor may be required to complete. This list contains examples of special tasks that may be required, however, the list should not be considered all-inclusive or comprehensive:

- Inspect the timing operation of a signalized intersection at a specific time period and provide a recommendation for improving traffic flow.
- Program timing parameter changes that are approved by KDOT Traffic.
- Determine the phasing or operation of a signalized intersection.
- Provide a copy of timing parameters in use at a signalized location.
- Provide recommendations to improve the safety or the operation of a signalized location.
- Provide recommendations for future improvements and modernization of traffic signal, flashing beacon or ITS installations.
- Provide a compiled list of all locations meeting a specified criteria.
- Provide OTDR testing and associated report for any fiber optic cable connected to a maintained traffic signal, ITS, or switch location.
- Provide fiber optic cable fusion splicing inside traffic cabinets as required to troubleshoot and/or resolve recurring communication issues.
- Provide any services to assist in transitioning between one County Electrical Maintenance Contract to another County Electrical Maintenance Contract. Some services may require minimal activities outside the duration of this contract, such as receiving or transporting County surplus materials between different contractor storage facilities.

All costs relating to completing special tasks such as these shall be considered incidental to the cost of routine traffic signal maintenance and no additional compensation shall be allowed.

33. **Repair Time Table:** Unless specifically stated to the contrary, all items shall be repaired within a time frame more specifically described in the following Repair Timetable. This table is not to be used in place of routine maintenance schedules. The times listed are non-cumulative. Any repairs not specifically covered in the Repair Timetable, or described elsewhere, shall be completed within a time frame matching the most similar line item in the Repair Timetable. The Repair Timetable shall be subject to revision at any time, by and at the sole discretion of KDOT Traffic. The Contractor shall respond to all notifications of traffic signal malfunctions in a reasonable time. In addition to the daily routine and non-routine requirements of the Traffic Signal and Street Lighting Systems, the Contractor shall provide sufficient qualified personnel to respond to all notifications of malfunctions and damaged equipment on a round-the-clock basis (**24 hours a day, 7 days a week**). The Contractor is required to keep a time and date log of each response, from the time of the initial report to the time of final permanent repair.

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REPAIR TIME TABLE (Non-cumulative)

ITEM	RESPONSE TIME	SERVICE RESTORATION	PERMANENT REPAIRS
KNOCKDOWNS, MALFUNCTIONS/FAILURES and DAMAGE:			
Cabinet	1 hour	12 hours	21 days
Controller (Master)	1 hour	12 hours	21 days
Controller (Local)	1 hour	4 hours	21 days
Lighting Controller Cabinet	1 hour	4 hours	21 days
Detector Loop (low priority)	1 hour	Not Applicable	21 days
Detector Loop (high priority)	1 hour	Not Applicable	7 days
Loop Detector/Amplifier	1 hour	48 hours	48 hours
Video Detector Camera	1 hour	4 hours	7 days
Video Image Processor	1 hour	4 hours	7 days
Pan/Tilt/Zoom (PTZ) Camera	4 hours	48 hours	7 days
Radar Detection System	1 hour	4 hours	7 days
Wireless Magnetic Detection System	1 hour	4 hours	7 days
Roadway Weather Information System (RWIS)	Next working day	*	*
Telephone/Cable Modem	1 hour	Next Working Day	7 days
Ethernet Switch / Fiber Switch Layer II/III	1 hour	1 day	7 days
Media Converter	1 hour	4 hours	7 days
Malfunction Management Unit (MMU)	1 hour	2 hour	7 days
Un-interruptible Power Supply (UPS) & Batteries.	1 hour	24 hours	7 days
Emergency Vehicle Pre-emption System	1 hour	4 hours	7 days
Driver Feedback Speed Monitoring (YOUR SPEED) Signs	4 hours	48 hours	7 days
Permanent Dynamic Message Signs (DMS)	4 hours	48 hours	7 days
Load Switch	1 hour	2 hour	2hr
Post/Pole/Mast Arm	1 hour	4 hours	*7days
Street Light Poles	1 hour	4 hours	*7days
Street Light Luminaires	7 calendar days	Not Applicable	Not Applicable
Flashing Beacons (including RRFBS) all types	1 hour	2 hours	Next Working Day
Solar flashing LED warning signs	1 hour	2 hours	Next Working Day
Wayside Horn System (WHS) Equipment	1 hour	2 hours*	*
Fiber Optic and IT Fiber Optic Cables	1 hour	4 hours	* 7days
Cabling/Conduit	1 hour	4 hours	7days
Graffiti/Advertising	Next Working Day	Next Working Day	Next Working Day
Indicators/Switches/LED's/Displays	Next Working Day	Not Applicable	14 days
Clearing Signal Obstructions (snow, dirt, etc.)	1 hour	2 hours	2 hours
Outages not covered elsewhere	1 hour	2 hours	Next Working Day
Filter/Cleanliness/Fans/Thermostat	Next Working Day	Next Working Day	Not Applicable
Misalignment (conflicting)	1 hour	2 hours	Next Working Day
Misalignment (non-conflicting)	48 hours	48 hours	7 days
COMPLAINTS/CALLS/ALARMS:			
Timing/Phasing/Programming	1 hour	4 hours	*
Coordination Alarm/Cycle Fail	Next Working Day	48 hours	*
Controller Alarm/Status Change	1 hour	4 hours	7 days
CMU/MMU Flash/Local Flash	1 hour	2 hours	7 days

*or as approved by KDOT Traffic

34. **Liquidated Damages:** In the event the Contractor fails to meet the required times for response, service restoration, and/or permanent repairs as listed previously, KDOT Traffic may deduct liquidated damages from the monthly billing in the following amounts:

- Response Time – Fifty dollars (\$50.00) per hour for each hour or part of an hour past the response time limit.
- Service Restoration – One hundred dollars (\$100.00) per hour for each hour or part of an hour past the service restoration time limit.
- Permanent Repairs – Five hundred dollars (\$500.00) per day for each day or part of a day past the permanent repair time limit.

The above liquidated damages shall not limit the County from withholding additional monies from the monthly billing if, in the opinion of KDOT Traffic, proper service to the traffic signal system is seriously deficient. The Contractor shall as soon as practicable notify KDOT Traffic in writing of the cause of such delay, if any, and request approval from KDOT Traffic in writing such additional time or relief as the Contractor may deem necessary. KDOT Traffic shall have sole discretion of approving or denying the Contractor's request.

35. **Maintenance Schedules:** The Contractor shall furnish maintenance schedules (scheduled Preventive Maintenance Programs) for the following items:

- The Contractor shall furnish a schedule for the cleaning of the traffic signal cabinets and changing of filters, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the Group Re-lamp of all street lighting locations. The schedule is to be provided as specified in the Contract herein.(if applicable, four (4) year relamp cycle, see A-8 Specification for details)
- The Contractor shall furnish a schedule for the annual mast arm assembly and pole inspection and span wire traffic signal inspections of all traffic signal locations containing a mast arm assembly(s) and pole(s) or span wire installations, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the conflict monitor and malfunction monitor unit testing at the traffic signal locations designated by KDOT Traffic, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the cleaning of all video detection camera lenses and PTZ camera domes, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the UPS testing at the traffic signal locations designated by KDOT Traffic, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the RWIS cleaning and recalibration at the locations designated by KDOT Traffic, as specified in the Contract herein.
- The Contractor shall furnish a schedule for the WHS testing and recalibration at the locations designated by KDOT Traffic, as specified in the Contract herein.

36. **Emergency Vehicle System Modifications:** Any changes or upgrades to the emergency vehicle preemption equipment requested by the fire departments or municipalities must be approved by KDOT Traffic in writing prior to starting work thereon.
37. **Completion of Outstanding Work:** A list of outstanding deficiencies shall be provided approximately 30 days prior to the end of this Contract if a new Contract is awarded to a new Contractor**. The current Contractor shall ensure, in writing, all routine maintenance requirements are satisfied and all outstanding deficiencies that were identified during the duration of the Contract are corrected or will be corrected before the end of this Contract. In the event that deficiencies or outstanding work will remain after the Contract duration, the current Contractor shall maintain contractual responsibilities for the locations or "A-Items" associated with each deficiency until the work is completed to the satisfaction of KDOT Traffic. The extending of the Contract duration and expected responsibilities will not be eligible for compensation during the additional Contract extension months. A coordination meeting between the two Contractors to resolve any deficiencies may be scheduled by KDOT Traffic. KDOT Traffic will withhold final payment for this Contract and any other payments due from the current Contractor until all deficiencies are addressed or corrected. This withholding final payment shall also apply to any outstanding Extra Work invoices unless otherwise approved in writing by KDOT traffic.

***** Upon Contract being awarded to a new Contractor, the new Contractor shall have the same rights as the public with respect to visual observation, identification, and notification of any discovered deficiencies, as visible from the public Right-of-Way, to be conveyed to KDOT Traffic. This conveyance of deficiencies shall be completed at least 30 calendar days prior to the start of this Contract. KDOT Traffic's sole opinion shall determine the eligibility of items to be corrected by the incumbent maintenance Contractor. Regardless of a reported deficiency being identified, corrected, or not corrected the Contract section "EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND WORK SITE" shall apply and the outcome of each reported deficiency shall not alleviate the Contractor's contractual responsibilities with each item as outlined herein. Any testing of devices or access to cabinets, handholes, or other concealed facilities shall not be allowed. Any deficiencies not eligible for prior-inspection or not identified during inspection period shall become the responsibility of the new Contractor and any work to be performed by the new Contractor shall be considered compensated for as outlined in the "EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND WORK SITE" section of this Contract.***

38. **Progress Schedule:** Prior to **February 15th** of each Contract year, the Contractor shall furnish a progress schedule, in writing, to KDOT Traffic setting the completion dates for all work listed in this Contract.
39. **Monitoring, Verification, and Coordination of Devices on Traffic Network:** Contractor shall be familiar and capable of utilizing the software, including TransSuite and Tactics to monitor and verify the functionality of devices on the KDOT Traffic network and be knowledgeable of the KDOT AOC video wall. Contractor is not to be a liable for the associated hardware installed within the AOC video wall system, but should be aware that some coordination and oversight may be required with this system as it is part of the KDOT traffic network.

40. **Continuity of Maintenance Responsibilities:** Typical traffic signal maintenance for other construction contracts reference IDOT standard specifications for an approximate maintenance responsibility limit of 400 feet in all directions for a traffic signal location. The Contractor of this contract shall provide full routine contract services such that there are no gaps in maintenance or locate responsibilities; The Contractor of this contract maintains the full provisions of this contract minus the limits and associated scope covered by another contractor's maintenance, even if an "A" item quantity is temporarily removed from billable quantities for this contract.

For example, but not limited to, where fiber optic interconnection extends further than the limits covered under another contract's maintenance: The Contractor of this contract will need to locate or perform maintenance on fiber or interconnect raceways outside of the other contractor's maintenance limits and work cooperatively with KDOT traffic and the other maintenance contractor(s) as required.

Furthermore, if the Contractor of this contract is notified of a maintenance need (including but not limited to: a traffic signal in all way red flash) at a location maintained by another contractor; the contractor of this contract shall convey the maintenance need to the other contractor having maintenance and keep detailed records of each conveyed maintenance need so that it may be made available to KDOT traffic upon request.

41. **Obsolete Equipment Failures:** In cases where equipment requires repair but the Original Equipment Manufacturer (OEM) no longer supports the equipment for repair (for any cost), The Contractor may gather documentation to make a case for the failed equipment replacement costs by matching a written statement of Obsolescence from the OEM to the failed equipment. Should KDOT Traffic find the proposal acceptable, The Contractor will be authorized on a case by case basis for the "at cost" compensation under separate Extra Work authorizations for replacement for new equipment (at no markup with all other expenses included in the cost of routine services).

ROUTINE MAINTENANCE PAY ITEMS

A-1 TRAFFIC SIGNAL LOCATION

This item shall consist of maintaining permanent traffic signal locations, either as part of the County's ATMS (Advance Traffic Management System) network, an isolated closed loop signal system or an isolated signalized intersection at locations specified in the schedule of locations for TRAFFIC SIGNALS. This item may include, but shall not be limited to, any number or type of the following:

- Traffic signal heads, programmable signal heads, traffic signal posts, mast arms, combination mast arms, brackets, mast arm pole shrouds and foundations. The traffic signal heads shall consist of either incandescent or LED module traffic signal sections, back plates, louvered visors, standard traffic signal visors and mounting hardware, wood poles with down guys, span wire cable, span wire accessories, and tether wires. Internally illuminated Street name signs also included, internally illuminated signs other than street name signs are to be covered under Item A-9 ILLUMINATED TRAFFIC SIGN LOCATION.
- Pedestrian incandescent or LED module signal heads, pedestrian signal heads with count-down timers, pedestrian-actuated detectors (i.e. push buttons), pedestrian push button poles and associated signs.
- An IP addressable or non-addressable semi-actuated, or actuated controller, microprocessor based, NEMA TS-1 or; NEMA TS-2 Type 1 or TS-2 Type 2 formats, with railroad preemption, time-base and vehicle responsive coordination. The pre-emption and coordination may be internal, a module, or external to the controller. A controller cabinet with its associated equipment, systems, modems, switching units, intersection coordinators, time switches, power supplies, BIU, and, where applicable, control pedestal and foundation. Intersection monitoring devices, where applicable, shall be maintained.
- All Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections.
- All vehicle and pedestrian detectors including but not limited to the following: Inductive loops, magnetic, micro loops, preformed loops, microwave, radar, wireless magnetic, sonic, push button, accessible pedestrian systems, and all associated equipment, amplifiers, microprocessors, relays, detector racks, power supplies and diodes.
- Image sensing (video and thermo imaging) detectors (cameras) and amplifiers, microprocessors, relays and diodes. Communication for video detection systems, including transmitters, receivers, modems, and other miscellaneous communication equipment, regardless of its location in the system, shall be included under this pay item.

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- IP addressable and non-IP addressable PTZ cameras and associated image digitizer (processor), all communications systems associated with the PTZ camera, interconnection cable and associated ATMS surveillance equipment within the KDOT office.
- Traffic signal conduit and interconnect conduit. The conduit may be in the ground or attached to a structure. Traffic signal handholes, interconnect handholes, handhole frames and handhole covers. Traffic signal cable, interconnect fiber optic cable, Kane County IT Network Cable, tracer copper wire, electric service wire, communication wires (telephone, internet etc.), ground wire and service installations.
- Traffic adjusted master controllers microprocessor based, NEMA TS-1 or; NEMA TS-2 Type 1 or TS-2 Type 2 formats with associated equipment and where applicable, cabinet and foundation. The associated equipment shall consist of modems, telephone jacks, switching units, interface boards for copper and fiber optic type interconnect cables, shall be maintained and included in this pay item, and all associated components for a coordinated traffic control system.
- Flashing yellow arrow related hardware or programming.
- Adaptive signal control equipment and related hardware or programming. Coordination with the adaptive signal control vendor may be required as needed. Contractor shall be familiar or become familiar with Adaptive Vendor's requirements and recommendations as it relates to performing any action or modification on the local signal controller or Adaptive System related hardware. For example, putting a phase on recall or locking detection may produce undesirable results under adaptive control, coordinate with KDOT traffic and Adaptive vendor on any modification.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **TRAFFIC SIGNAL LOCATION** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-2 UNINTERRUPTIBLE POWER SUPPLY (U.P.S.) SYSTEM LOCATION

This item shall consist of maintaining IP addressable and non-addressable U.P.S. (traffic signal or ITS location battery back-up) systems that are part of County maintained traffic signal or ITS location installations at locations as specified in the schedule of locations for UNINTERRUPTIBLE POWER SUPPLY (U.P.S.) SYSTEM. This item may include, but shall not be limited to:

1. At least once every thirty (30) days check the operation of the UPS to assure proper operation of the traffic signals upon loss of normal electric utility power. A 30 day check shall include the following:
 - a. Simulate a loss of utility power to the Traffic Signal or ITS location. This can be done by any method approved by KDOT traffic but Utility Company disconnect or service installations switched into the "off" position is preferred for this test.
 - b. Ensure backup power immediately takes over without any interruptions to signal operations or in ITS device functionality. Verify UPS blue indicator light is on and functioning as intended. If connected to a traffic signal, the signal shall not go into flash on the entry into or exit out of UPS power.
 - c. Allow UPS to energize/run the installation for at least 15 minutes. After 15 minutes, take the following readings: "Runtime Remaining" in Hours and minutes (HH:MM).
 - d. Check UPS event log for anomalies, alarms, faults.
 - e. Verify battery temperature probe is secure and replace tape if necessary.
 - f. Replace batteries as needed.
2. At least once every year perform the following checks or tests:
 - a. Test each individual battery of the UPS system with a volt meter and make record of the volts across the positive and negative lugs of each battery in the system. The test shall be performed while the battery is removed and electrically isolated from any system for at least 5 minutes before volts are measured and recorded. Batteries shall be labeled or numbered to ensure test results can be field verified at a later point. If the difference in volts between the highest measured battery value and lowest measured battery value is greater than 1.0 volts. Replace all batteries at a location.
 - b. Inspect the batteries for cracks or swelling. Replace all four batteries if any of the batteries are cracked or swollen. Replace only a faulty battery if an AlphaGuard battery balancer or OEM equivalent product is installed, coordinate with KDOT traffic on equivalent products for non-Alpha systems.
 - c. Inspect the battery terminals for corrosions. Clean and apply a corrosion prevention compound such as NOCO Company NCP-2 or Sanchem Inc.'s No-Ox ID Grease "A"

- d. Verify that all connections are securely fastened. Tighten if necessary. Verify cabinet fan works. Check cabinet filter, replace as needed.
3. UPS System testing shall not be performed from **Monday** through **Friday** from **7:00 a.m.** to **10:00 a.m.** and from **3:00 p.m.** to **7:00 p.m.** unless authorized by KDOT Traffic.
4. Maintaining all Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections. Firmware updates may also be requested by KDOT traffic (assuming firmware is available at no cost).

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **U.P.S. (UNINTERRUPTIBLE POWER SUPPLY) SYSTEM LOCATION** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-3 EMERGENCY VEHICLE PRE-EMPTION (EVP) SYSTEM LOCATION

This item shall include the routine maintenance of emergency vehicle preemption systems that are typically part of County maintained traffic signal installations at locations as specified in the schedule of locations for EMERGENCY VEHICLE PRE-EMPTION (EVP) SYSTEMS. This item may include, but shall not be limited to the light detector(s), light detector amplifier(s), LED confirmation beacon(s), and any associated mounting hardware. Any existing incandescent confirmation beacons utilizing an incandescent flood lamp shall be converted to LED lamps whenever they require replacement. The emergency vehicle preemption system may be internal, a module, or external to the controller. Item also includes all Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections. This item may include, but shall not be limited to:

1. At least once every thirty (30) days, check the operation of the EVP system to ensure that all light detectors and LED confirmation beacons function as they are intended to function and are sufficiently aimed for optimum performance. Contractor personnel performing check shall be documented along with the date and time the check was performed. Records of personnel conducting checks, dates and times checked were performed shall be furnished to KDOT Traffic upon request.
2. Mounting hardware shall be inspected, tightened, and replaced if necessary if any component of the system is loose or incapable of being aimed properly to a tolerance consistent with the original equipment manufacturer (OEM).
3. EVP System testing shall not be performed from **Monday** through **Friday** from **7:00 a.m.** to **10:00 a.m.** and from **3:00 p.m.** to **7:00 p.m.** unless authorized by KDOT Traffic. Testing shall be performed such that it does not disrupt traffic flow or create unusually short times for green in cases where demand

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **EMERGENCY VEHICLE PRE-EMPTION (EVP) SYSTEM LOCATION** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

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A-4 FLASHING BEACON LOCATION

This item shall consist of maintaining overhead or post mounted flashing beacons and post mounted Flashing LED warning and regulatory signs** at locations as specified in the schedule of locations for FLASHING BEACONS. This item may include, but shall not be limited to, the flasher controller in housing or cabinet, solar panel, batteries, LED module or incandescent bulb, rectangular rapid flash beacon (RRFB) systems, solar panels, electric service installation, wood/metal posts, foundation, shroud, helix base, wireless communications, microwave (passive) pedestrian detectors and pedestrian push button detectors, hand holes and associated conduit, mounting hardware and signal head housing with one or more faces and one or more sections. Item also includes all Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections

**regulatory signs shall be primarily the responsibility of Kane County sign shop personnel. The Contractor shall make every effort to notify KDOT traffic in the event that a posted sign, sign face, or its mounting hardware is in need of special attention due to damage, wear, reflectivity, insecure mounting hardware, missing signage, or other related concerns. Contractor will not be responsible for replacement, removal, or general maintenance of sign panel or associated mounting hardware of sign unless specifically directed by KDOT traffic.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **FLASHING BEACON LOCATION** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-5 WAYSIDE HORN SYSTEM (WHS) LOCATION

This item shall consist of maintaining advance warning systems as specified in the schedule of locations for WAYSIDE HORN SYSTEM. This item may include, but shall not be limited to, any and all cables and conduit for interconnection, handholes / pullboxes, advance confirmation indicators, horn speakers, horn detectors, system controller, signal cabinet, system poles, system pole foundations, cabinet foundations. Item also includes all Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections. Item shall also include, but shall not be limited to:

1. At least once every thirty (30) days check the operation of the WHS system to ensure that all components including any audible or visible components function as they are intended to function and are sufficiently aimed for optimum performance. Contractor shall perform checks only during the actuation or presence of train traffic unless otherwise directed by KDOT Traffic. Whenever the Contractor's personnel performs a check or work at a WHS location, a work order shall document the personnel performing the check or work along with the date and time the checks were performed at.
2. At least once annually check the Sound / Decibel level of WHS, aiming of Horn, and durations of Horn according to latest version of 49 CFR Appendix E to Part 222 – Requirements for Wayside Horns. Key requirements of the check will be similar to the below list:
 - i. Horn System must provide a minimum sound level of 92 dB(A) and a maximum of 110 dB(A) when measured 100 feet from the centerline of the nearest track.
 - ii. Horn must sound for a minimum of 15 seconds prior to the arrival of a train and throughout the time a train is crossing.
 - iii. Horn must be directed towards traffic
3. Contractor (and any sub-contractors working on WHS) shall be familiar with and comply with all applicable laws and training with respect to work near railroad right-of-way, including the understanding of 49 CFR Part 222, and comply with all Federal Railroad Administration ("FRA") and Railroad Owner's (UP, CN, BNSF, etc.) regulations and requirements with respect to work on WHS or work near railroad tracks. These requirements shall include the following prior to performing work within railroad ROW:
 - Execute the Railroad's Right of Entry Agreement
 - Obtain the current insurance required in the Right of Entry Agreement
 - Provide such insurance policies, certificates, binders and/or endorsements to the railroad.

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- Protection of Railroad Traffic and Property

For the locations identified under this item, the Contractor shall conform to **Article 107.12** of the Standard Specifications and the provisions herein. When the Contractor's work encroaches within **twenty-five (25) feet** of the railroad tracks, the services of Railroad Flaggers shall be required. The Contractor shall notify the Railroad at least **seventy-two (72) hours** in advance of the time the Contractor intends to enter upon Railroad right of way for the performance of any work.

Union Pacific Railroad Contact:

Emergency Police Dispatch
Phone: 888-877-7267
Email: kgiwoyn@upcontractor.up.com

The cost of Railroad Flaggers shall not be paid separately but considered incidental to this item.

Insurance Requirements

The Contractor shall conform to **Article 107.11** of the Standard Specifications.

The cost of Railroad Protective Liability Insurance shall not be paid separately but considered incidental to this item.

Urgent Public Safety Coordination

In the event the Contractor must perform work to remedy an urgent public safety concern, prior to starting work, Contractor shall notify Railroad's Risk Management Control Center at 1-888-877-7267.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for WAYSIDE HORN SYSTEM LOCATION which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-6 DRIVER FEEDBACK SPEED MONITORING SIGN LOCATION

This item shall consist of maintaining DRIVER FEEDBACK SPEED MONITORING SIGN systems as specified in the schedule of locations for DRIVER FEEDBACK SPEED MONITORING SIGN. This item includes but is not limited to the maintenance and replacement of components associated with but not limited to the housing or cabinet, sign face**, solar panel, batteries, LED alpha/numeric display module, radar detection unit, electric service installation, wood/metal posts, foundation, shroud, helix base, hand holes and associated conduit, mounting hardware. Item includes all Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections. This item shall include, but shall not be limited to:

1. At least once every thirty (30) days check the operation of the Driver Feedback Speed Monitoring Sign to ensure that all components function as they are intended to function and are sufficiently aimed for optimum performance.
2. Check of location shall involve driving the location at a known speed, both below the speed limit and above the speed limit to ensure proper calibration of the speed sensor and proper programming of the dynamic display's display configuration (there should be different display configurations for measurements below and above the posted speed limit).
3. Reprogramming or reconfiguration of location in cases of maintenance or change of posted speed limit.

** signs shall be primarily the responsibility of Kane County sign shop personnel. The Contractor shall make every effort to notify KDOT Traffic in the event that a posted sign, sign face, or its mounting hardware is in need of special attention due to damage, wear, reflectivity, insecure mounting hardware, missing signage, or other related concerns. Contractor will not be responsible for replacement, removal, or general maintenance of signs unless specifically directed by KDOT traffic. In the case of Driver Feedback Speed Monitoring Sign Locations, the "Speed Limit" sign shall be the responsibility as described in this section, however, the "Your Speed is" sign that encapsulates the digital display shall be fully the responsibility of the Contractor to maintain, remove, and replace as needed.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for DRIVER FEEDBACK SPEED MONITORING SIGN systems as specified in the schedule of locations for DRIVER FEEDBACK SPEED MONITORING SIGN LOCATION which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-7 ROADWAY WEATHER INFORMATION SYSTEM (RWIS) LOCATION

This item shall consist of maintaining Roadway Weather Information Systems as specified in the schedule of locations for ROADWAY WEATHER INFORMATION SYSTEM (RWIS). This item includes but is not limited to the maintenance and replacement of components associated with a ROADWAY WEATHER INFORMATION SYSTEM (RWIS). The components to be maintained including any traffic data collection sensors are the functional parts of the RWIS located at each of the sites listed in the Schedule of Locations. Should the RWIS system or any of its components be connected to system detectors, or a traffic signal controller, these components and any associated hardware such as (but shall not be limited to), cabinets/enclosures, foundations, LED modules, incandescent bulbs, electrical service installation, cables, mounting hardware, signal post, mast arm, foundation, shroud, or conduits shall be included in this item. If RWIS is connected to a FLASHING BEACON LOCATION or DYNAMIC MESSAGE SIGN (DMS) LOCATION, those items shall be maintained under those A-items; any required hardware, software, or programming for the RWIS to work with other interconnected A-items shall remain included in this RWIS specification.

It is the EMC Contractor's responsibility to respond to calls for service received from KDOT Traffic. KDOT Traffic will provide the EMC Contractor with a specific problem(s) to be analyzed and it will be the EMC Contractor's responsibility to schedule an inspection of the RWIS and submit an analysis of the problem by the next working day of receiving a specific problem(s) from KDOT Traffic. KDOT Traffic will submit the call for service to the Contractor via FAX or email, which will describe the problem(s) to be investigated. It is the EMC Contractor's responsibility under the Routine Maintenance Items of this Contract to ascertain what repairs or replacement components will be required to resolve the problem(s) in question.

The cost to provide this analysis is incidental to the Routine Maintenance pay item for RWIS. All costs to replace or repair any failed component shall be considered as routine and will not be paid for separately.

These components of the RWIS provide the following information to KDOT:

- 1) Environmental Data:
 - a. Rain, Snow
 - b. Wind Speed, Wind Direction
 - c. Temperature, Humidity
 - d. Barometric Pressure
 - e. Solar Radiation
 - f. Visibility
- 2) Road Surface Condition Data:
 - a. Pavement and Subsurface Temperature
 - b. Moisture Content
 - c. Road Surface Status

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- 3) Real Time Telemetry Systems for Climate Monitoring and Research
- 4) Automated Data Collection with Alarms and Data Archiving.

Typical maintenance of the system includes, but is not limited to the following. The below shall be completed on a yearly basis, just before winter weather:

Wind Direction Valve:

Check that the vane and cups rotate freely.

Tipping Bucket:

Clean out accumulated dirt and debris from funnel, screen and bucket assembly. Electrical connections should be inspected and cleaned. Leveling screws may require adjustment at this time. To check/recalibrate the rain gauge use a Model 52260 Rain Gauge Calibrator or following steps will yield satisfactory results:

1. With the rain gauge properly leveled, slowly pour a measured volume of water into the collection funnel. The rate should not exceed 10 ml per minute which is approximately 1 inch per hour. The bucket should tip 5 times for each 10 ml of water. For example, 100 ml should give a count of 50 ± 1 . Bucket tips may be counted manually or with a counter connected to the rain gauge terminals.
2. If the count shows an error of more than 2%, adjust the calibrating screws to correct the error. Raise the screws if the count is low, lower the screws if the count is high. Always adjust both screws equally.

IceSight Sensor:

Periodic maintenance will need to be performed to insure successful operation of the IceSight sensor. Maintenance intervals are to be performed once a year before the winter season begins.

The lens should be cleaned of any obstruction or debris. This should be performed by first removing the spray guard. Before removing, take notice of the compression depth of the gray foam. There should be approximately 1/16" of spacing (gray foam gasket) between the sensor housing plate and the spray guard. The spray guard is mounted with two thumb screws. A flat head screwdriver can be used to assist in the removal process. The spray guard is tethered by the chain for convenience, and can be left to hang while cleaning the lens. Only use soapy water and a terry cloth to gently clean the glass lens. Initially use lots of water to flush contaminants from the lens. Then clean gently with a mild soap dilution (i.e., dish soap). Flush with clear water and dry. Upon completion, reinstall the spray guard being careful to properly align the thumb screws. Retighten screws until foam gasket is approximately 1/16" thick.

Recheck the calibration values during every maintenance 30 day patrol. If the values on a dry surface are not within a value of 10 of the nominal 1800 value the sensor shall be recalibrated. Before utilizing an "Auto Calibrate" feature, note the current readings on dry asphalt. This reading will indicate how much debris and dirt has built up on the target surface. If large amounts persist, clean and dry the target area before recalibrating. Using the sighting laser and mounts, check to make sure the sensor is still pointed at the intended target. Upon completing the calibration, be sure to click "Apply".

Road Sensors:

The moisture sensing elements must be kept clean and uncovered by roadway debris. Oils, chemicals, soil and debris can affect the output of the road moisture sensor. To ensure reliable sensor output, the exposed elements need to be cleaned (steel wool or scotch pad) and the area around the embedded sensor kept free of debris.

This item shall require the Contractor to obtain an Annual Service Plan supplied by High Sierra Electronics (HSE) for each Model 5433-80 (or current model number) IceSight Non-Invasive Remote Surface Condition Sensor installed at each RWIS installation identified in the schedule of locations. The Contractor shall provide written proof of the purchase of an Annual Service Plan from HSE.

This item also includes inspecting all components of the RWIS located in and adjacent to various roadway segments listed in the Schedule of Locations under the jurisdiction of KDOT. This work shall include the maintenance of a NEMA traffic signal controller and Ethernet communication devices. All work shall be in accordance with all applicable requirements included in the specifications for an RWIS and as required by KDOT Traffic.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **ROADWAY WEATHER INFORMATION SYSTEM**, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-8 STREET LIGHT LOCATION

This item shall consist of maintaining street lighting mounted on poles or on underpass walls specified in the schedule of locations for STREET LIGHTING. This item includes, but is not limited to, maintaining any of the following roadway light installations: a street light (luminaire) mounted on a combination mast arm, a street light mounted under a bridge/overpass, a street light mounted on its own pole, and/or an illuminated sign. All repairs of malfunctions/failures/damage to a roadway light installation shall be considered Routine Maintenance, except for damage caused by traffic, construction forces working under County Contracts, permits, or County personnel, which will be paid for as Extra Work. In addition, the Contractor shall provide the following as part of Routine Maintenance of street lighting installations:

- This item shall consist of maintaining street light installations at locations as specified in the schedule for STREET LIGHT LOCATION. This item may include, but shall not be limited to, luminaires, light pole assembly (for standalone light poles), underpass lighting, breakaway couplings and breakaway transformer bases, foundations, underground conduit/unit duct and electric cable, lighting controller and cabinet, electric service installation, hand holes, in line fuses and ballasts. Any light pole requiring replacement shall be returned to service with a breakaway transformer base.
- Report to KDOT Traffic any non-normal conditions within two (2) working days of discovery.
- Replace all burned out lamps, faulty ballasts and broken glassware not later than seven (7) calendar days following discovery or notification.
- Provide Immediate Corrective Action to restore proper working condition to any outage(s) meeting any of the following conditions:
 - a. Two (2) or more outages on a single circuit.
 - b. Two (2) or more adjacent or consecutive fixtures.
- The County schedules re-lamping of all street lights on a three year cycle to be done under the Electrical Maintenance Contract, next scheduled relamp will be in calendar year 2020.
 - a. The Contractor must furnish in writing, to KDOT Traffic, a progress schedule indicating the dates on which the above work will be completed, prior to **March 15th** of the Contract year. The group re-lamping shall be completed between **April 1** and **October 1** of the 1st Contract year. Prior to beginning re-lamp work, Contractor shall submit catalog cuts of replacement lamps.
 - b. LED based Luminaires are excluded from this relamp effort.
- If ground conditions restrict the construction of permanent repairs, repairs shall be performed in accordance with a maintenance schedule submitted by the Contractor and approved by KDOT Traffic.

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- The Contractor shall respond within **48 hours** to all calls by KDOT Traffic or other parties to locate and mark any or all underground components of an installation. The Contractor shall locate and mark said components after he has verified with KDOT Traffic that the other parties have the permission of the County to work within the right-of-way.
- The Contractor shall within two hours of being notified, respond to all “Emergency Locate” and mark County underground components. The Contractor shall attempt to contact KDOT Traffic to verify the party requesting the “Emergency Locate” has the permission of the County to work within the Right-of- Way. If the Contractor is unable to contact KDOT traffic, the Contractor shall immediately proceed to the locate and continue to attempt to contact KDOT traffic until a contact is accomplished.
- The Contractor shall conduct, patrols of the Street Lighting System and inspect each highway lighting installation or highway lighting system once every month, alternating between night patrols and day patrols. The Contractor shall immediately prepare a radio / web-based ticket for each outage found during the monthly inspection cycle. Following each month’s inspection cycle the Contractor shall provide a report for KDOT Traffic noting the date each lighting system was inspected and list all outages and the date the outages were repaired. The Contractor shall conduct any additional inspections as directed by KDOT Traffic. The Contractor shall forward the inspection cycle report to KDOT Traffic via email (or fax if requested or previously authorized).
- Protection of Railroad Traffic and Property

For the railroad underpass location at Peck Road and Keslinger Road, the Contractor shall conform to **Article 107.12** of the Standard Specifications and the provisions herein. When the Contractor’s work encroaches within **twenty-five (25) feet** of the railroad tracks, the services of Railroad Flaggers shall be required. The Contractor shall notify the Railroad at least **seventy-two (72) hours** in advance of the time the Contractor intends to enter upon Railroad right of way for the performance of any work.

Union Pacific Railroad Contact:

Emergency Police Dispatch

Phone: 888-877-7267

Email: kgiwoyn@upcontractor.up.com

The cost of Railroad Flaggers shall not be paid separately but considered incidental to this item.

Insurance Requirements

The Contractor shall conform to **Article 107.11** of the Standard Specifications.

The cost of Railroad Protective Liability Insurance shall not be paid separately but considered incidental to this item.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for STREET LIGHT LOCATION, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

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A-9 ILLUMINATED TRAFFIC SIGN LOCATION

This item includes but is not limited to the maintenance of internally illuminated traffic signs on standalone illuminated sign assemblies. This item includes inspecting the operation of the signs located at the intersections contained in the Schedule of Locations. All work shall be in accordance with all applicable requirements included in the specifications for Roadway Lighting included herein and as specified by KDOT Traffic. This work shall not include maintenance of illuminated traffic signs that are part of a traffic signal installation. The maintenance of illuminated traffic signs that are part of a traffic signal installation shall be considered incidental to the cost of A-1 TRAFFIC SIGNAL LOCATION.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for ILLUMINATED TRAFFIC SIGN LOCATION, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-10 DYNAMIC MESSAGE SIGN (DMS) LOCATION

This work shall consist of the preventative maintenance, diagnosis of problems, repairs and inspections of DMS sites, including the DMS, the enclosure, the structure, the controller, and all the communications equipment dedicated solely to the individual DMS sites. This item shall include the DMS LED boards.

Contractor shall furnish all equipment and materials necessary to perform the required functions as documented under Prosecution of Work by Contractors. Minor materials including, but not limited to, fuses, fasteners, jumper cables, cable connectors, and any wiring completely contained within the cabinet, shall be included in this work.

For each DMS site on the KDOT network, perform the following items of work on the prescribed schedule:

Preventative Maintenance

Preventative maintenance shall be performed per the Contractor developed and KDOT approved preventative maintenance plan.

Repairs

Irregularity at a DMS site, commence with the necessary steps to repair the DMS site back to proper operation. Upon discovery of abnormal wear to the structure, enclosure, or mounting upon notification of improper operation, failure, or detection of a visible hardware, report the condition to KDOT Traffic within one business day of discovery.

Repair Verification & Routine Maintenance Patrol

Contractor shall use OEM software to verify and test the state of repair of the equipment (once every 30 days). This includes a routine check of running an OEM test pattern to verify all pixels light and that no error codes exist on the equipment (once every 30 days).

Kane County has recorded training videos (16 hours long) available upon request of the Contractor to go over software and hardware training.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **DYNAMIC MESSAGE SIGN (DMS) LOCATION**, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

A-11 NON-TRAFFIC SIGNAL, INTELLIGENT TRANSPORTATION SYSTEM (I.T.S.) LOCATION

This item shall consist of maintaining non-traffic signal ITS locations, either as part of the County's ATMS (Advance Traffic Management System) network or an isolated ITS location. This item may include, but shall not be limited to, any number or type of the following:

- ITS poles, brackets, pole shrouds and foundations.
- An ITS cabinet with its associated equipment, systems, modems, switching units, power supplies, BIU, and, where applicable, control pedestal and foundation. Intersection monitoring devices, where applicable, shall be maintained.
- All Ethernet communication equipment including Ethernet (managed and unmanaged) switches, media converters, all IP addressable and non-addressable equipment associated cabling and fiber optic cable connections.
- All vehicle and pedestrian detectors including but not limited to the following: Inductive loops, magnetic, micro loops, preformed loops, microwave, radar, wireless magnetic, sonic, push button and all associated equipment, amplifiers, microprocessors, relays, detector racks, power supplies and diodes.
- Image sensing (video and thermo imaging) detectors (cameras) and amplifiers, microprocessors, relays and diodes. Communication for video detection systems, including transmitters, receivers, modems, and other miscellaneous communication equipment, regardless of its location in the system, shall be included under this pay item.
- IP addressable and non-IP addressable PTZ cameras and associated image digitizer (processor), all communications systems associated with the PTZ camera, interconnection cable and associated ATMS surveillance equipment within the KDOT office.
- ITS conduit and interconnect conduit. The conduit may be in the ground or attached to a structure. ITS handholes, interconnect handholes, handhole frames and handhole covers. ITS cable, interconnect fiber optic cable, Kane County IT Network Cable, tracer copper wire, electric service wire, communication wires (telephone, internet etc.), ground wire and service installations.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** per **MONTH** for **NON-TRAFFIC SIGNAL ITS LOCATION** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above.

NON ROUTINE MAINTENANCE ITEMS (EXTRA WORK)

EW-1 ITEMS AS ORDERED BY THE ENGINEER

If deemed necessary by KDOT Traffic under the authority of the County Engineer (hereinafter referred to as the Engineer), additional work not included in the schedules, maps and plans included herein shall be requested in writing by the KDOT Traffic and shall be measured and paid for in accordance with **Articles 104.02** and **109.04** of the Standard Specifications.

Basis of Payment: All Extra work shall be paid for in **UNITS** for **ITEMS AS ORDERED BY THE ENGINEER**. A **UNIT** shall be valued at one dollar (\$1.00).

EW-2 REPLACEMENT OF INDUCTION LOOP

This item shall consist of the replacement of failed inductive loops, providing the failure was not caused by negligence on the part of the Contractor. Failed inductive detector loops shall be replaced or deferred as directed by KDOT Traffic. This item shall comply with Section 886 and Article 1079.02 of the Standard Specifications. Loop detectors shall be installed according to the "District 1 Standard Traffic Signal Design Details."

Each loop detector lead-in wire shall be labeled in the handhole using a Panduit 250W175C waterproof tag or approved equal secured to each wire with nylon ties. The location of each dive hole shall be marked on the face of the curb or handhole with a saw cut. All detector loop saw cuts are to be filled with approved sealant to no higher than 1/8 inch below the surface of the pavement, and all excess sealant deposited on the pavement shall be removed immediately. Loop sealant shall be a two-component thixotropic chemically curing polyurethane

Method of Measurement shall follow Section 886.05. The cost of all required work including traffic control, layout, mobilization, etc. shall be considered included in the unit price of this item.

Basis of Payment: This work shall be paid for at the Contract unit price per **FOOT** as directed by KDOT Traffic for **REPLACEMENT OF INDUCTION LOOP** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above including any required mobilization or traffic control and protection.

EW-3 REPLACEMENT OF TRAFFIC SIGNAL LED, COMPLETE

This item shall consist of furnishing and installing LED signal modules at an existing traffic signal. All vehicle signals (circular and arrow indications, including optically programmed variants) and all pedestrian signals (Walk, Don't Walk, and Count Down indications) at the intersection shall be relamped as part of this pay item. Pedestrian signal heads shall be relamped as follows: The top section of the signal head shall be relamped with an LED module having overlapping full "HAND" and full "MAN" symbols. The bottom section of the signal head shall be relamped with an LED pedestrian countdown signal module. (At signals interconnected with the railroad, the countdown signal module shall not be used. Instead, both top and bottom sections shall be relamped with modules having overlapping full "HAND" and full "MAN" symbols).

All LED modules shall comply with the SIGNAL HEAD LIGHT EMITTING DIODE (LED) and PEDESTRIAN COUNTDOWN SIGNAL HEAD, LIGHT EMITTING DIODE (LED) sections of the Traffic Signal Special Provisions contained in this Contract. *Note: 15 year warranty requirements on vehicle signal LEDs. If optically programmed signal head, the standard 7 year warranty shall apply.*

KDOT Traffic shall furnish (or review) a location list for this work to the Contractor during the winter months of each Contract year. During this review, the location list shall be finalized by written direction to the Contractor by KDOT Traffic and Catalog cut review and approval shall also take place during this time and prior to the ordering of materials.

Contractor shall submit catalog cut sheets to KDOT Traffic for review and approval. Upon Contractor receiving "Approved" or "Approved as Noted" review documents, Contractor may then proceed with procurement of materials.

This Extra Work Item shall not apply to individual Signal LED modules which fail. In these cases of failure, replacement is covered under routine maintenance.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** for **TRAFFIC SIGNAL LED, REPLACEMENT COMPLETE**, which price shall include all labor materials, and equipment necessary to complete the work described above including any required mobilization or traffic control and protection. The price shall include the proper aiming of the signals, and all necessary connections and hardware, to the satisfaction of the Engineer

EW-4 REPLACEMENT UNINTERRUPTIBLE POWER SUPPLY (U.P.S.) BATTERIES & ANCILLARY COMPONENTS

This item shall consist of furnishing and installing new batteries, wiring harness, heater mats (if present), and all associated equipment and materials necessary for proper operation, excluding the Inverter/UPS controller and cabinet. Replacement equipment shall be of functional equivalent to items being replaced and shall be compatible with existing Inverter/UPS controller and existing to remain equipment. This item shall also consist of removal and disposal of existing batteries, wiring harness, heater mats, and other auxiliary equipment which connects to the existing Inverter/UPS controller.

This Extra Work provision shall only apply to locations which are scheduled (and finalized) for this work or as otherwise approved by KDOT Traffic; Batteries or Ancillary components which fail prematurely to the scheduled replacement, shall be replaced under Routine maintenance.

KDOT Traffic shall furnish (or review) a location list for this work to the Contractor during the winter months of each Contract year. During this review, the location list shall be finalized by written direction to the Contractor by KDOT Traffic and Catalog cut review and approval shall also take place during this time and prior to the ordering of materials. Contractor shall be in receipt of "Approved" or "Approved as Noted" catalog cuts prior to the ordering of materials. The Contractor shall complete work at each KDOT Traffic specified location between April 1 and October 1 of the Contract year in which the location list is finalized in writing.

The Contractor shall provide documentation of battery and associated ancillary component purchases in the form of a vendor invoice. Batteries must be stored and charged according to manufacturer specifications and the maximum length in time between invoice purchase dates from manufacturer to installation date cannot exceed 12 months or Original Equipment Manufacturer Guidelines, whichever is shorter.

UPS battery removal and replacement shall not be performed from **Monday** through **Friday** from **7:00 a.m.** to **10:00 a.m.** and from **3:00 p.m.** to **7:00 p.m.** unless authorized by KDOT Traffic.

This Extra Work Item shall not apply to UPS systems or batteries which fail (prior to the approved scheduled replacement of said item). In cases of any failure, replacement is covered under routine maintenance.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** as directed by KDOT for **REPLACEMENT UNINTERRUPTIBLE POWER SUPPLY (U.P.S.) BATTERIES & ANCILLARY COMPONENTS** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above including any required mobilization or traffic control and protection.

EW-5 REPLACEMENT UNINTERRUPTIBLE POWER SUPPLY (U.P.S.), COMPLETE

In the event “EW-4 REPLACEMENT UNINTERRUPTIBLE POWER SUPPLY (U.P.S.) BATTERIES & ANCILLARY COMPONENTS” is inadequate or inappropriate and/or existing equipment is no longer supported by manufacturer for repair, KDOT Traffic may decide to completely replace an existing UPS System to ensure reliable function of UPS.

This item shall consist of furnishing and installing a new UPS system, including a new UPS cabinet, UPS Controller, Inverter unit, bypass switch, batteries, wiring harness, heater mats, and all associated equipment and materials necessary for proper operation and for the system to have Ethernet connectivity capability, meeting the Contract specifications for new equipment. This item shall also consist of removal and disposal of all elements and equipment of the existing UPS system.

See Included IDOT D1 Special provision for UNINTERRUPTIBLE POWER SUPPLY, SPECIAL and Kane County Special provision for UNINTERRUPTIBLE POWER SUPPLY for more detailed requirements.

Informational sheets (catalog cuts) to be shall be submitted to KDOT Traffic for approval prior to work.

The Contractor shall provide documentation of UPS cabinet, UPS or Inverter unit, and battery purchases in the form of a vendor invoice.

UPS system replacement shall not be performed from **Monday** through **Friday** from **7:00 a.m.** to **10:00 a.m.** and from **3:00 p.m.** to **7:00 p.m.** unless authorized by KDOT Traffic.

This Extra Work Item shall not apply to UPS systems which fail (prior to the approved scheduled replacement of said item). In cases of any failure, replacement is covered under routine maintenance.

Basis of Payment: This work shall be paid for at the Contract unit price per **EACH LOCATION** as directed by KDOT for **REPLACEMENT UNINTERRUPTIBLE POWER SUPPLY (U.P.S.), COMPLETE** which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above including any required mobilization or traffic control and protection.

KANE COUNTY TRAFFIC SIGNAL SPECIFICATIONS (2019)

Note: WHEN THESE SPECIFICATIONS CONFLICT WITH
IDOT SPECIFICATIONS, THESE SHALL TAKE
PRECEDENT

FULL-ACTUATED CONTROLLER AND CABINET

Effective: January 1, 2002

Revised: July 1, 2015

KDOT amended: May 14, 2019

857.02TS

Description.

This work shall consist of furnishing and installing a traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of Section 857 of the Standard Specifications, as modified herein, including malfunction management unit, load switches and flasher relays, with all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) "N/A" brand traffic actuated solid state controller.

Materials.

Add the following to Article 857.02 of the Standard Specifications:

For installation as a stand-alone traffic signal, connected to a closed loop system or integrated into an advance traffic management system (ATMS), controllers shall be Econolite Cobalt, or Eagle/Siemens M62 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment suppliers will be allowed. Unless specified otherwise on the plans or these specifications, the controller shall be of the most recent model and software version supplied by the equipment supplier at the time of the traffic signal TURN-ON. A removable controller **data key shall also be provided**. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being skipped during program changes and after all preemption events and shall inhibit simultaneous display of circular yellow and yellow arrow indications.

Controller cabinet shall be compartmentalized to include a side oriented battery backup compartment sufficiently sized to accommodate the required Uninterruptible Power Supply System (paid for separately) In addition to the required volume required for the traffic signal control compartment.

Controller cabinet shall come installed with a sidewall interior mounted power strip with additional Ethernet/IP functionality detailed later in specification.

For integration into an ATMS such as Centrac, Tactics, or TransSuite, the controller shall have the latest ATMS compatible version of NTCIP software installed. For operation prior to integration into an ATMS, the controller shall maintain existing close loop management communications.

Kane County Division of Transportation (KCDOT) Requirements

The following controllers and associated firmware versions are compatible with KCDOT ATMS, TransSuite.

Controller Description	Firmware Version
Eagle/Siemens M62 (Linux)	4.58
Econolite Cobalt (ASC/3 Firmware)	2.65

Add the following to Article 1074.03 (KCDOT Requirements)

- (b) (1) (g) Malfunction Management Unit shall have a Network interface card (NIC) and associated RJ45 port so that device can be communicative over an Ethernet (fiber optic) network.
- (b) (1) (h) Malfunction Management Unit (Make/model/firmware) shall natively support flashing yellow arrow monitoring capability.

- (b) (5) Power Strip, shall have a Network Interface through RJ 45 port Ethernet communications. The power switch shall have a minimum of 8 outlets which are remotely switched and 2 outlets which are always on. Shall also support functionality for automatically pinging IP addresses with a programmable function to reboot user designated outlets.

Add the following to Article 1074.03 of the Standard Specifications:

- (a) (6) Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.
- (b) (1) Revise "conflict monitor" to read "Malfunction Management Unit"
- (b) (5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
- (b) (6) Controller Harness – Provide a TS2 Type 2 "A" wired harness in addition to the TS2 Type 1 harness.
- (b) (7) Surge Protection – Shall be a 120VAC Single phase Modular filter Plug-in type, supplied from an approved vendor.
- (b) (8) BIU – shall be secured by mechanical means.
- (b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
- (b) (10) Switch Guards – All switches shall be guarded.
- (b) (11) Heating – One (1) 200 watt, thermostatically-controlled, electric heater.
- (b) (12) Lighting – One (1) LED Panel shall be placed inside the cabinet top panel and one (1) LED Panel shall be placed on each side of the pull-out drawer/shelf assembly located beneath the controller support shelf. The LED Panels shall be controlled by a door switch. The LED Panels shall be provided from an approved vendor.
- (b) (13) The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch (38mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches (610mm) wide.
- (b) (14) Plan & Wiring Diagrams – 12" x 15" (305mm x 406mm) moisture sealed container attached to door.

- (b) (15) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
- (b) (16) Field Wiring Labels – All field wiring shall be labeled.
- (b) (17) Field Wiring Termination – Approved channel lugs required.
- (b) (18) Power Panel – Provide a nonconductive shield.
- (b) (19) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
- (b) (20) Police Door – Provide wiring and termination for plug in manual phase advance switch.

Basis of Payment.

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET; FULL-ACTUATED CONTROLLER AND TYPE V CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET; FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET (SPECIAL); FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET (SPECIAL).

ETHERNET MANAGED SWITCH, TYPE 1

Description

This work shall include all materials and work necessary to install an Ethernet Managed Switch, Type 1 in a traffic signal cabinet. The Ethernet Managed Switch, Type 1 will connect the equipment in the field cabinet to the Kane County ITS data-comm fiber optic network.

Materials

The Ethernet Managed Switch, Type 1 is a managed edge switch configured with a minimum of the following ports:

- 8 RJ-45 10/100 Communication ports;
- 2 Single-Mode 1000 base fiber optic communication ports through utilization of modular SFP slots (RJ45/SFP combo ports)

The Ethernet Managed Switch, Type 1 shall satisfy the following:

Power Consumption: 20 W (maximum)

Temperature Range -40 to +165 degrees F; (-40 to +75 degrees Celsius)
cooling shall use convection and heat sinking; no fans

Performance:

Filtering / Forwarding Rate:	Ethernet (10Mb): 14,880 pps
Fast Ethernet (100Mb):	148,800 pps
Gigabit Ethernet (1000Mb):	1,488,000 pps
Switching Processing:	Store and Forward with IEEE 802.3x full duplex flow-control, non-blocking
Data Rate:	10Mbps, 100Mbps and 1000Mbps
Address Table Capacity:	4K node, self-learning with address aging
Packet buffer size :	240KB for 10/100 and 120KB for 1000Mb
Latency:	5 μ s + packet time (100 to 100Mbps) 15 μ s + packet time (10 to 10 Mbps, and 10 to 100Mbps)
Throughput with	max.- 4.17M pps (Transmit) (8 10/100links and 2Glinks)
Back plane-	2.66Gb/s per slot

Network Standards and Compliance, hardware

Ethernet V1.0/V2.0 IEEE 802.3: 10BASE-T,
IEEE 802.3u: 100Base-TX, 100BASE-FX
IEEE 802.3z: 1000BASE-X Ethernet (Auto-negotiation)
IEEE 802.3ab: 1000BASE-X Ethernet
IEEE 802.1p: Priority protocol

IEEE 802.1d: Spanning tree protocol
IEEE 802.1w: Rapid Spanning tree protocol
IEEE 802.1q: VLAN Tagging
IEEE 802.3x: Flow Control
IEEE 802.3ad: Link Aggregation (Trunking)
IEEE 802.1x: Port based Network access control

Compatibility

The switch must be functionally interchangeable with the legacy Garrettcom 6KQE Ethernet switch. If requested by the Engineer, the Contractor shall provide an off-the-shelf factory model of the proposed switch and demonstrate that the proposed switch will operate transparently and with full functionality in the existing ITS data-comm network. The demonstration will take place prior to ordering any data-comm equipment.

Construction

The Contractor shall locate shelf space or other suitable mounting location in the traffic signal cabinets or as identified on the plans. The Contractor shall secure the Ethernet Switch as appropriate and approved by the engineer.

The Contractor shall install all necessary patch cords, optical transceivers, connectors, power supplies, communication transformers, or auxiliary equipment necessary to complete the communication circuits at full functional potential. The Contractor shall connect the switch to the field devices as indicated on the plans.

When requested by the Contractor, the Engineer will provide the necessary IP address assignments and port assignments, including the necessary port provisioning. The contractor shall be responsible for all network programming of the network switches and communicating elements within the traffic signal cabinet.

The Contractor will demonstrate that the switches are correctly installed and configured as specified in other special provisions for this project.

Basis of Payment

This work shall be paid for at the contract unit price each for ETHERNET MANAGED SWITCH, TYPE 1, which price shall be payment in full for furnishing and installing an Ethernet Managed Switch as specified.

ETHERNET MANAGED SWITCH, TYPE 2

Description

This work shall include all materials and work necessary to install an Ethernet Managed Switch, Type 2 in a traffic signal cabinet. The Ethernet Managed Switch, Type 2 connects field elements to the Kane County ITS data-comm network; in addition, it acts as an aggregation node and Gigabit Ethernet router.

Materials

The Ethernet Managed Switch, Type 2 is a managed edge switch configured with a minimum of the following ports:

- 12 RJ-45 10/100 Communication ports;
- 4 Single-Mode 1000 base fiber optic communication ports through utilization of modular SFP slots (RJ45/SFP combo ports)

The Ethernet Managed Switch, Type 2 shall satisfy the following:

Power Consumption: 20 W (maximum)

Temperature Range -40 to +165 degrees F; (-40 to +75 degrees Celsius)
cooling shall use convection and heat sinking; no fans

Performance:

Filtering / Forwarding Rate: Ethernet (10Mb): 14,880 pps

Fast Ethernet (100Mb): 148,800 pps

Gigabit Ethernet (1000Mb): 1,488,000 pps

Switching Processing: Store and Forward with IEEE 802.3x full-duple flow - control, non-blocking

Data Rate: 10Mbps, 100Mbps and 1000Mbps

Address Table Capacity: 4K node, self-learning with address aging

Packet buffer size : 240KB for 10/100 and 120KB for 1000Mb

Latency: 6 μ s + packet time (100 to 100Mbps)

Throughput with max.- 8.33M pps (Transmit)
(8 10/100inls and 4 Glinks)

Back plane- 2.66Gb/s per slot

Network Standards and Compliance, hardware

Ethernet V1.0/V2.0 IEEE 802.3: 10BASE-T,

IEEE 802.3u: 100Base-TX, 100BASE-FX

IEEE 802.3z: 1000BASE-X Ethernet (Auto-negotiation)

IEEE 802.3ab: 1000BASE-X Ethernet

IEEE 802.1p: Priority protocol

IEEE 802.1d: Spanning tree protocol

IEEE 802.1w: Rapid Spanning tree protocol

IEEE 802.1q: VLAN Tagging

IEEE 802.3x: Flow Control
IEEE 802.3ad: Link Aggregation (Trunking)
IEEE 802.1x: Port based Network access control

Compatibility

The switch must be functionally interchangeable with the legacy Garrettcom 6K32 Ethernet switch. If requested by the Engineer, the Contractor shall provide an off-the-shelf factory model and demonstrate that the proposed switch will operate transparently and with full functionality in the existing ITS data-comm network. The demonstration will take place prior to ordering any data-comm equipment.

Construction

The Contractor shall locate shelf space or other suitable mounting location in the traffic signal cabinets or as identified on the plans. The Contractor shall secure the Ethernet Switch as appropriate and approved by the engineer.

The Contractor shall install all necessary patch cords, optical transceivers, connectors, power supplies, communication transformers, or auxiliary equipment necessary to complete the communication circuits at full functional potential. The Contractor shall connect the switch to the field devices as indicated on the plans.

When requested by the Contractor, the Engineer will provide the necessary IP address assignments and port assignments, including the necessary port provisioning. The contractor shall be responsible for all network programming of the network switches and communicating elements within the traffic signal cabinet.

The Contractor will demonstrate that the switches are correctly installed and configured as specified in other special provisions for this project.

Basis of Payment

This work shall be paid for at the contract unit price each for ETHERNET MANAGED SWITCH, TYPE 2, which price shall be payment in full for furnishing and installing an Ethernet Managed Switch as specified.

FIBER OPTIC CABLE

Add the following to Article 871.01 of the Standard Specifications:

The Fiber Optic cable shall be installed in conduit or as specified on the plans.

Add the following to Article 872.02 of the Standard Specifications:

The control cabinet distribution enclosure shall be supplied under FIBER OPTIC CABLE 36 FIBERS, SINGLE MODE. The Fiber Optic Cable shall provide **twelve fibers per tube**. Fiber Optic Cable may be **gel filled or have an approved water blocking tape**.

Add the following to Article 871.04 of the Standard Specifications:

A nominal twelve single-mode fibers minimum from each cable shall be terminated with approved optical connectors at the distribution enclosure/Patch Panel. **ST type connectors shall be used on the Patch Panel** unless otherwise directed by the Engineer or detailed on the plans. Remaining fibers will either be "spliced through" in splice trays or connectorized into pigtails but left unconnected to the interface panel of the enclosure.

The Patch panel/enclosure shall be minimally sized to be 1 Rack Unit (1U/1RU) in size or larger if one or two fiber cables are entering the enclosure OR sized to a minimum of 2 Rack Unit (2U/2RU) in size if three or more fiber cables (Legs of an intersection) are entering the enclosure. The 1U size enclosure shall have capacity for 3 adapter plates with each adapter plate installed with 12 ST ports per adapter plate with unused/unterminated ports capped with a protective cover. The 2U size enclosure shall have capacity for 6 adapter plates and be installed with 12 ST port adapter plates in each slot. All terminated ST ports shall be labeled on the exterior of the enclosure to identify the fiber and cable each port corresponds to. Enclosure shall be a Slide-Out type and shall be mounted to the top or bottom of the signal cabinet shelf or cabinet side-wall to ensure no movement of enclosure, adequate clearance in front of adapter plates, and full range of motion of slide out mechanism.

Pre-connectorized pigtails shall be used as part of terminations at the patch panel/enclosure. All splices for "through" connections and pigtail connections shall be performed in a splice tray within the Patch panel/distribution enclosure. All Splice Trays shall be labeled to indicate tube color/fiber numbers contained within a splice tray and indicate if the tray is for "local splices" or "splice through" or both. A minimum of 13.0 feet (4m) of extra cable length shall be provided for controller cabinets. The remaining fibers from each cable shall fusion spliced to preconnectorized ST pigtails left unconnected to the adapter plate unless otherwise directed by the engineer or as shown on the plans. In cases where Tied and bundled or "T+B" are indicated on the plans, those fibers shall be spliced to preconnectorized ST pigtails and left unconnected to the adapter plate unless otherwise directed by the engineer. The controller cabinet extra cable length shall be coiled and stored as approved by the Engineer.

Pre-connectorized Pigtail

The pre-connectorized cable connects the adapter plate ports in the patch panel to the splice in the mainline fiber cable. ST-connectors are factory-installed on one end of a cable pigtail. The

other end of the cable is spliced to appropriate fibers in the mainline cable. The cable shall be optically and mechanically equivalent to the fiber optic mainline cable specified for this project. These cables shall contain either 36 fibers for the 36-fiber termination. The pigtails shall be factory-tested and shall have loss not exceeding 0.5 dB per connector. Pigtail connectors shall have tube colors matching the fiber color they connect with.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB. For each splice.

The Contractor shall measure the end-to-end attenuation of each fiber, from connector to connector, using an optical power meter and source. This loss shall be measured at from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. For cables less than 1.6 km (1 mile), the measured loss should not exceed 2 dB. Measurements shall be made at both 1300 and 1550 nm for single mode cable.

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the required objectives.

General Requirements

All mounting hardware and labeling materials are included. Also included are jumper cables with ST connectors on one end and SC (or LC) connectors on the other to match the connectors on the equipment. These jumpers connect the terminated fibers to the ports on the Ethernet switches or other field devices. **Each 12-fiber ST Adapter plate shall include two (2) jumpers.** Each jumper will be 72 inches long. Jumpers not used for this project will be stored in plastic pouches as maintenance spares and placed in the controller cabinets. If pigtails are used to attach connectors to the mainline cables, excess pigtails shall be similarly stored in plastic bags and placed in the controller cabinet.

New Fiber Cable Added to Existing Signal Cabinet / Fiber Patch Panel/Enclosure

For every new added fiber cable, there must exist at least twelve open and unused ST ports in the patch panel for the termination of each new cable. Should insufficient ports be available in the existing enclosure (even after considering higher ST port density adapter plates), Contractor shall remove and replace existing enclosure and re-establish all pre-existing fiber cable terminations and splices as they were in addition to terminating the new cable to this specification and the enclosure and related Patch panel requirements for sizing, ST port quantities, and other requirements of a new fiber enclosure. Documentation of the existing fiber cables, connections, and splices shall be shared by the contractor to the County and Engineer. The County shall then verify in writing If we concur with the documentation prior to any removal or impacts to the existing fiber connections.

Include in paragraph (b) of Article 1076.02:

Single mode fiber shall satisfy the criteria of ITU Recommendation. G.652.

Basis of Payment:

This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE 36 FIBERS, SINGLE MODE

INTERSECTION VIDEO TRAFFIC MONITORING SYSTEM WITH PTZ CAMERA

Description

The Contractor shall furnish and install a video surveillance camera system consisting of a special video camera in a dome, a dome mount to the video monitoring pole, all mounting hardware, brackets, outdoor rated network cable (to be paid for separately) supplied to the required length by the video system manufacturer with fast disconnect at the camera mount, video camera controller and special electronics/cabling for video transmission and pan/tilt/zoom controls, video controller unit to link all electronic components between the controller unit and the camera dome** to include heater, fan, PTZ camera, video coax, video decoders with video encoding and decoding software.

Materials

The camera shall be designed and optimized for roadway video monitoring. The items shall have a minimum mechanical zoom of thirty (30x) and a minimum digital zoom of twelve (12x). The camera, joystick controller (required for field adjustments and video verification at the cabinet), camera controller and auxiliary devices necessary for a complete and functional video operation shall be provided as part of this pay item; however if joystick capability is provided through a web browser interface, a physical joystick controller will not be required. The camera shall be digital with IP port(s) and a built-in encoder for connection to the central office. A separate encoder shall not be required. The camera shall provide for 360-degree rotation on the horizontal plane and +20-degree to -90-degree Tilt allowing for full visibility within the lower hemisphere of the dome and partial uptilt into the upper hemisphere**. The Camera housing shall have at minimum an environmental dust and water resistance requirement of IP66 and be NEMA 4X- Rated. Camera shall be rated to withstand temperatures of at least -58 to +140 Fahrenheit (-50 to +60 Celsius)

**Pan, Tilt, Zoom cameras which allow for 360-degree rotation in both the horizontal and vertical planes are also allowable and are not restricted to a "Dome" style enclosure.

Video resolution of video feed shall have a minimum image quality of HDTV 1080p and shall natively support 16:9 aspect ratio (1920x1080 pixel resolution at 1080p).

The camera shall natively support H.264 and MPEG4 (part 10) streaming in both unicast and multicast modes for at least 4 simultaneous full resolution streams at a minimum of 30 frames per second. The Camera shall natively support automatic settings for white balance, Exposure (day/night modes), and digital image stabilization.

The Contractor shall install an auxiliary cabinet when the distance between the camera and traffic controller cabinet exceeds 300 feet. The auxiliary cabinet shall be NEMA rated to provide appropriate environmental protection for the hardware contained within. The use of a cabinet would be to house any communication or power boosters or media conversion to allow for proper functions, communication, and power of the camera. The costs shall be considered

incidental to the cost of the video traffic monitoring system and no additional compensation shall be provided for the cabinet, cables, additional fiber optic cable, jumpers, etc.

The Contractor shall furnish and install the video software for decoding and encoding so that camera operations work with the local controller joystick as well as function through the camera's native web interface. Optional to providing a physical joystick, the camera could support native web browser interface to allow for viewing and configuring the camera. Full web browser functionality should then be supported on at least two (latest version) web browsers (such as: Internet Explorer, Google Chrome, Firefox, etc.)

This item includes furnishing and installing the video monitoring camera, power injector (if required), and an auxiliary cabinet as shown on the intersection wiring diagrams (or as needed to provide reliable functionality), box prints and fiber optic wiring diagram (if copper to fiber conversion is required due to distance). This item also includes furnishing, installing and testing all auxiliary cabling, connectors, couplers, in-building hardware and software, jacks, splitters, conversion adapters, equipment racks, power supplies, power strips, surge suppressors, etc., necessary for a complete and fully functional system. This item includes all necessary network configurations and testing to ensure proper function in the network. The cable to be used for connecting the video monitoring camera to the local Ethernet switch shall be paid for separately under the pay item "OUTDOOR RATED NETWORK CABLE."

All mounting platforms, connecting hardware and auxiliary devices to test and operate this system to the satisfaction of the Engineer shall be incidental to this pay item and no additional compensation will be allowed.

The contractor shall coordinate with Kane County prior to installing the PTZ camera and associated wiring, to receive final approval on the camera location, mounting height, and aiming.

Basis of Payment

This item will be paid for at the contract unit price each for INTERSECTION VIDEO TRAFFIC MONITORING SYSTEM WITH PTZ CAMERA, which price shall be payment in full for furnishing all associated equipment required, installing the system complete and in place, and placing the system in operation to the satisfaction of Kane County.

NETWORK CONFIGURATION

Description

This work shall consist of installing, configuring, and provisioning a fully operational Ethernet Local Area Network (LAN), which provides communication with remote traffic control field devices from the Kane County Division of Transportation (KCDOT) Arterial Operations Center (AOC). If plans specify the expansion of an existing network or interconnect, this work shall consist of coordination with KCDOT in the understanding of the existing network configurations and appropriately expanding upon and applying those configurations to new devices being brought onto the network.

Devices include traffic signal controllers, loop detectors, Malfunction Management Units (MMU), Uninterruptible Power Supply (UPS) units, video detection systems, Microwave/Radar detection systems, and CCTV (PTZ) cameras, or other specified Intelligent Transportation System (ITS) field device as shown on the plans or as have Ethernet connectivity options. These ITS devices may include, but are not limited to, Dynamic Message Signs (DMS), Radar Speed Signs (RSS), Flashing Beacon Controllers, and Roadway Weather Instrumentation Systems (RWIS) if present in contract.

Should the contract or plans include ITS field devices such as but not limited to controllers, PTZ cameras, video detection cameras, RWIS, or DMS this NETWORK CONFIGURATION work shall also include any necessary integration of those items into KCDOT's Advanced Traffic Management System (ATMS), TransSuite and Video Wall management system, Christie Phoenix.

Construction

Contractor shall include configuring Ethernet switches, terminal servers, RWIS remote processing unit, media converters, DMS controllers, and any other device with network connectivity, assigning IP addresses to field devices based on KCDOT Traffic staff input/standards, troubleshooting and submitting documentation to KCDOT Traffic staff of final configurations and the verified testing of communication to each device from the network. Configuring switches with dedicated Virtual Local Area Network (VLAN) and port assignments to match existing network switch settings.

This work shall also require coordination with each manufacturer of field end devices, converters, and networking equipment to ensure successful digital video transmissions, serial-over-copper, serial-over-fiber, and serial-over-Ethernet communications between the network and field devices.

Contractor shall provide a list of any camera video feed URLs that are being brought online as part of this contract. In the case of Video Detection camera feeds, each camera shall have a separate video streaming channel with a respective video feed URL such that all camera feeds (Processed feeds showing detection overlay) can be streamed simultaneously. If additional equipment/wiring/configurations are necessary to provide this functionality to video detection cameras it shall be included in this pay item.

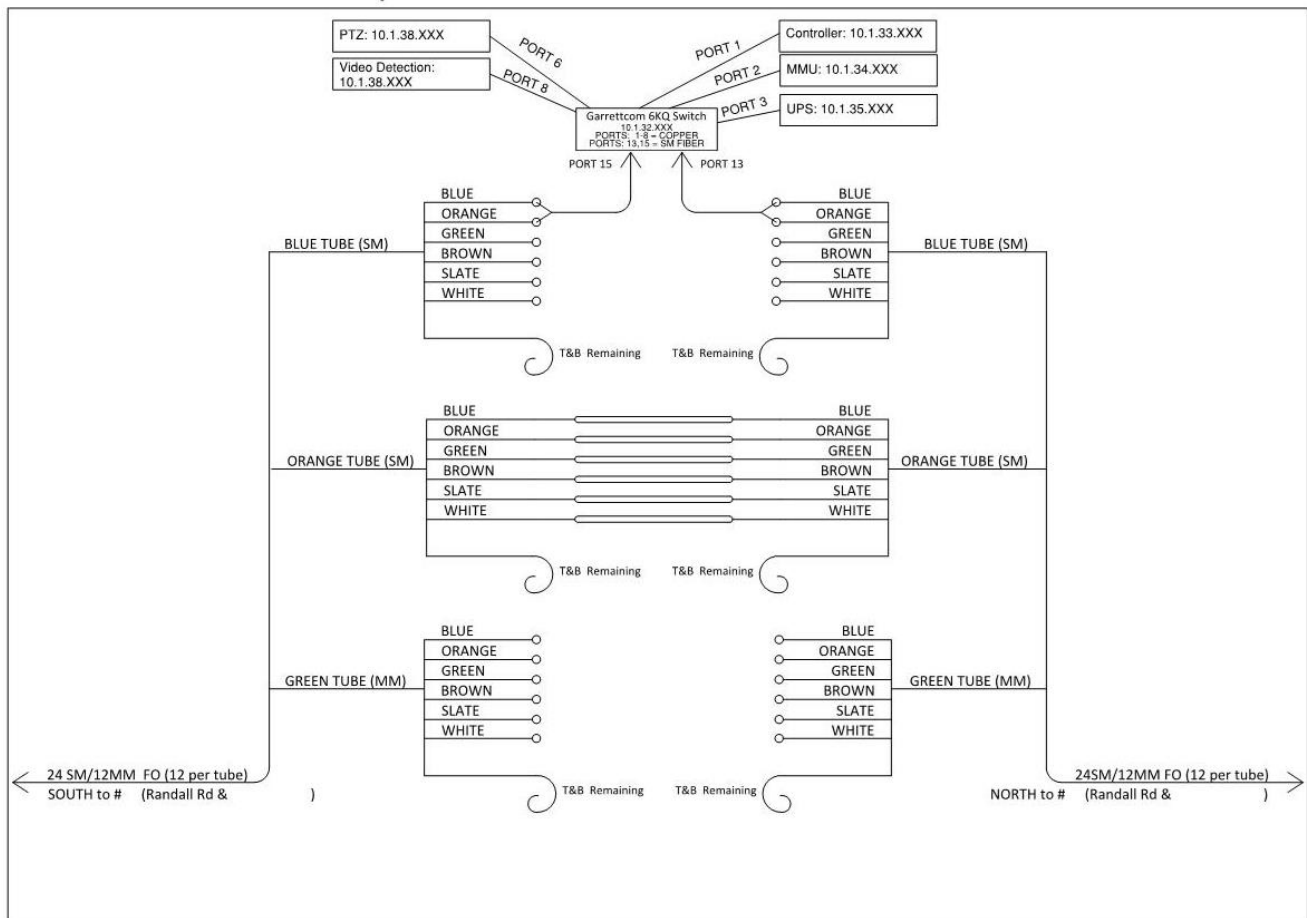
Coordination with any DMS and RWIS provider or Original Equipment Manufacturer (OEM) may be required, if applicable, to determine specific central software requirements for the communications including communication channels, static IP addresses, port forwarding, and TCP and UDP ports.

The contractor shall also coordinate final connection to the existing system network with the KCDOT network consultant of record. The contractor shall setup a meeting (and continue coordination as needed) between the contractor, KCDOT IT staff, KCDOT stakeholders, and the Engineer to coordinate programming requirements for the final network programming prior to final turnover. A final engineering drawing(s) shall be produced by the contractor which inventories all fiber optic cable/tube/fiber terminations and splicing and which inventories all IP configurations for each device which has been brought online into the KCDOT interconnect.

EXAMPLE ENGINEERING DRAWING

(to document Cable/Tube/Fiber terminations and splices, IP addresses and port assignments)

Intersection ID # - Randall Rd & Splice & Termination Detail



Testing and Integration

The Contractor shall develop a written test plan and submit it to the Engineer and KCDOT Traffic for approval. The test plan shall be revised to the satisfaction of the Engineer and KCDOT Traffic for approval. The testing plan shall include systematic procedures with anticipated results that demonstrate that the communication network and all of its subsystems are fully operational. Approved testing procedures will be performed in the presence of KCDOT and Contractor representatives. The testing plan shall include forms listing itemized functional checks of the system with signature placeholders for KCDOT and Contractor representatives.

Upon the satisfactory completion of this test plan, Contractor shall be responsible for the integration tasks listed below. KCDOT staff will assist with the integration below but the Contractor will need to supply any required integration information on devices to be integrated with. Additionally, any incompatibility with the system or network shall remain the responsibility of the contractor to provide an alternate solution for which shall also meet the satisfaction of KCDOT and other KCDOT network users.

1. TransCore's TransSuite ATMS Integration
 - a. Add and configure any controllers, controller databases, and system detectors.
 - b. Add and configure any PTZ cameras or other video feeds. Pan, Tilt, and Zoom functionality should work within TransSuite.
 - c. Add or configure a new Intersection Diagram within TransSuite ATMS Explorer.
 - d. Add, configure, or modify the appropriate TransSuite Time Space diagram if new controllers are added into the network within 1 mile spacing of an existing system.
 - e. TransCore Contact information: 770-246-6202 or ITS@Transcore.com
2. Christie Digital's Phoenix system (Videowall) Integration
 - a. Add new camera feed inputs for each video feed URL added to the network.
 - b. Christie Digital Contact information: 714-236-8610

Basis of Payment

The work shall be paid for at the contract unit price per lump sum for NETWORK CONFIGURATION, which price shall be payment in full for all communication network configurations, coordination, and integration necessary to deliver an Ethernet network that provides successful communications between all field devices and the communication backhaul to the KCDOT Traffic Office and ATMS.

OUTDOOR RATED NETWORK CABLE

Description

This work shall consist of furnishing an outdoor-rated 24 AWG, 4-pair data cable. Each cable link that is routed to an external device outside of the area serving ITS cabinet shall be protected by a lightning protection device on the switch side of the link cable for equipment protection. Contractor shall also provide an outdoor rated Ethernet extender to connect to ITS devices and power and connect to PTZ CCTV cameras located throughout the project.

Materials

Shielded polyolefin cable with four 24 AWG twisted pair conductors.

Jacket Material: PE
Conductor Material: Bare Copper
Drain Wire Material: Tinned Copper
Insulation Material: Polyolefin
Separator Material: Polyolefin
Shield (Tape) Material: Aluminum/Poly

Cable shall meet the following electrical criteria:

ANSI/TIA Category: 6A
Maximum dc Resistance Unbalance: 5 percent
Maximum dc Resistance: 9.38 ohms/100 m
Mutual Capacitance: 6.0 nF/100 m @ 1 kHz
Nominal Velocity of Propagation (NVP): 62 percent
Maximum Operating Frequency: 250 MHz
Transmission Standards: ANSI/TIA-568-C.2, CENELEC EN 50288-6-1, ISO/IEC 11801 Class E (A)

Cable Connectors shall be RJ-45 compatible and be rated for Category 6A performance

Cable shall have an operating temperature from -40 degrees Celsius to 70 degrees Celsius, with an insulation temperature from 0 degrees Celsius to 60 degrees Celsius.

Cable shall be type F/UTP (unshielded) with 4 pairs.

Conductor gauge shall be 24 AWG and of solid type. 8 conductors shall be provided.

Maximum pull tension of cable shall be 11 kg.

Nominal cable diameter over jacket shall be no greater than 8.255 millimeters.

A RJ-45 grounded lightning protection device shall be installed on the switch side of the OUTDOOR RATED NETWORK CABLE. Lightning protection device shall meet 3,000W/pair (10/1000us impulse) dissipation for all 8 pins and shall comply with IEEE std. 802.3af and 802.3at for PoE. Lightning protection device shall have a UL497B approval.

For any OUTDOOR RATED NETWORK CABLE which runs longer than 300 feet (as measured along the length of cable) a RJ-45 External Ethernet and POE extender with 60W pass thru shall be provided and have performance specifications meeting or exceeding the Original Equipment Manufacturer (OEM) specifications of the equipment on either end of the network cable (ITS device and Ethernet Switch) being connected on either end. The cost associated for providing such an extender shall be included in the cost of OUTDOOR RATED NETWORK CABLE.

Cable Testing

Cable shall be tested for Verification and Qualification standards (In accordance with TIA and ISO standards) including but not limited to:

Bandwidth Test:	Passing values in 10BASE-T, 100BASE-TX, and Gigabit
Continuity and Wiremap:	Passing values

A report indicating the results of these tests, date of test, description of each cable, and printed and signed name of Tester and the agency the tester works under shall be included in duplicate and copies of report shall be provided within the cabinet/switch side of the cable run.

Basis of Payment

This work will be paid for at the contract unit price per FOOT for OUTDOOR RATED NETWORK CABLE which price shall include all equipment, labor, and materials necessary to complete this work as specified including mounting hardware, extenders, and terminating connectors.

UNINTERRUPTIBLE POWER SUPPLY, SPECIAL

Description

This work shall consist of furnishing and installing an uninterruptible power supply (UPS).

The UPS shall have the power capacity to provide normal operation of a signalized intersection that utilizes all LED type signal head optics, for a minimum of 10 (ten) hours.

The UPS shall include, but not be limited to the following: inverter/charger, power transfer relay, batteries, battery cabinet, a separate manually operated non-electronic bypass switch, and all necessary hardware and interconnect wiring according to the plans. The UPS shall provide reliable emergency power to the traffic signals in the event of a power failure or interruption. The transfer from utility power to battery power and visa versa shall not interfere with the normal operation of traffic controller, conflict monitor/malfunction management unit, or any other peripheral devices within the traffic controller assembly.

The UPS shall be designed for outdoor applications, and shall meet the environmental requirements of, "NEMA Standards Publication No. TS 2 – Traffic Controller Assemblies", except as modified herein.

Add the following to Article 862.03 of the Standard Specifications:

The UPS shall additionally include, but not be limited to, a battery cabinet, where applicable. For Super-P (Type IV) and Super-R (Type V) cabinets, the battery cabinet is integrated to the traffic signal cabinet, and shall be included in the cost for the traffic signal cabinet of the size and type indicated on the plans.

The UPS shall provide reliable emergency power to the traffic signals in the event of a power failure or interruption.

Materials

The UPS shall be line interactive and provide voltage regulation and power conditioning when utilizing utility power. The UPS shall be sized appropriately for the intersection's normal traffic signal operating connected load, plus 20 percent (20%). The total connected traffic signal load shall not exceed the published ratings for the UPS. The UPS shall provide a minimum of ten (10) hours of normal operation run-time for signalized intersections with LED type signal head optics at 77 °F (25 °C) (minimum 700 W/VA active output capacity, with 90 percent minimum inverter efficiency).

The maximum transfer time from loss of utility power to switchover to battery backed inverter power shall be 65 milliseconds.

The UPS shall be provided with safety locks to prevent improper installation. This protection shall include a reverse polarity protection and protection against electrical

back feed to the utility service that complies with UL 1778 and CSA C22.2 No. 107.1.3 requirements and safety standard EN50091-1-1-2 and EN60950. Besides passing Immunity Standards, EN61000-4-2, 3, 4, 5, 6 and 8 and EN61000-3-2 Standards, the manufacturer's nameplate label shall display agency approval mark "cCSAus".

The UPS shall be provided with an SNMP Ethernet port for remote programming and monitoring, complete with password and remote operation software or browser application. Additionally, the UPS shall be provided with an RS-232 port for local programming and a LCD display and local control and monitoring of alarm logging events. The UPS shall be provided with a minimum of three SPDT relay contacts for user programming of alarms or other controls for operation. A sixth SPDT relay contact set shall be provided to output the alarms for a secondary remote alarm system that is programmed by the factory. The relay contacts shall be located on a panel mounted terminal block or locking circular connectors, rated at a minimum 120 V/1 A, and labeled so as to identify each contact according to the plans. Contact closures shall be energized whenever the unit:

- Switches to battery power. Contact shall be labeled or marked "On Batt".
- Has been connected to battery power for two (2) hours. Contact shall be labeled or marked "Timer".
- Has an inverter/charger failure. Contact shall be labeled or marked "UPS Fail".

Operating temperature for the inverter/charger, power transfer relay, and manual bypass switch shall be -35 to 165 °F.

Both the power transfer relay and manual bypass switch shall be rated at 240 VAC/30 amps, minimum.

The UPS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 1.4 – 2.2 mV/°F per cell. The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 6.5 ft of wire.

Batteries shall not be recharged when battery temperature exceeds $122\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$.

The UPS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 85 VAC to 135 VAC ($\pm 2\text{ VAC}$).

When utilizing battery power, the UPS output voltage shall be between 110 and 125 VAC, pure sine wave output, ≤ 3 percent THD, 60 Hz ± 3 Hz.

The UPS shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.

When the utility line power has been restored at above $90\text{ VAC} \pm 2\text{ VAC}$ for more than 30 seconds, the UPS shall dropout of battery backup mode and return to utility line mode.

When the utility line power has been restored at below 130 VAC \pm 2 VAC for more than 30 seconds, the UPS shall dropout of battery backup mode and return to utility line mode.

The UPS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

In the event of inverter/charger failure, the power transfer relay shall revert to the NC state, where utility line power is reconnected to the cabinet. In the event of an UPS fault condition, the UPS shall always revert back to utility line power.

Recharge time for the battery, from "protective low-cutoff" to 80 percent or more of full battery charge capacity, shall not exceed twenty hours.

The manual bypass switch shall be wired to provide power to the UPS when the switch is set to manual bypass.

When the intersection is in battery backup mode, the UPS shall bypass all internal cabinet lights, ventilation fans, service receptacles, any lighted street name signs, any automated enforcement equipment and any other devices directed by the Engineer. Cabinet wiring shall be designed to exclude traffic video monitoring operation from functioning during power transition to battery power and shall re-energize normal traffic video monitoring when power is restored to utility power.

A blue LED indicator light shall be mounted on the front of the traffic signal cabinet or on the side of the UPS cabinet facing traffic and shall turn on to indicate when the cabinet power has been disrupted and the UPS is in operation. The light shall be a minimum 1 in. diameter, be viewable from the driving lanes, and able to be seen from 200 ft away.

All 24 volt and 48 volt systems shall include an external or internal component that monitors battery charging to ensure that every battery in the string is fully charged. The device shall compensate for the effects of adding a new battery to an existing battery system by ensuring that the charge voltage is spread equally across all batteries.

Mounting/Configuration

The inverter/charger unit shall be rack or shelf-mounted.

All interconnect wiring provided between the power transfer relay, manual bypass switch, and cabinet terminal service block shall be at least 6.5 ft of #10 AWG wire.

Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be 6.5 ft of #18 AWG wire.

Battery Cabinet

Batteries, inverter/charger and power transfer relay shall be housed in a separate NEMA Type 3R cabinet if installed on an existing signal controller cabinet or if UNINTERRUPTIBLE POWER SUPPLY, SPECIAL is procured at the same time as the signal controller cabinet, the battery cabinet shall be integrated as a separate side

compartment meeting or exceeding the following requirements of the NEMA type 3R cabinet .

The cabinet shall be Aluminum alloy, 5052-H32, 0.125-inch thick and have a natural mill finish or painted to match the traffic signal cabinet at the intersection.

The door shall open to the entire cabinet, have a neoprene gasket, an Aluminum continuous piano hinge with stainless steel pin, and a three point locking system. The cabinet shall be provided with a main door lock which shall operate with a traffic industry conventional No. 2 key. Provisions for padlocking the door shall be provided.

The manually bypass switch shall be installed inside the traffic signal cabinet.

No more than three batteries shall be mounted on individual shelves for a cabinet housing six batteries and no more than four batteries per shelf for a cabinet housing eight batteries.

A minimum of three shelves shall be provided. Each shelf shall support a load of 132 lb minimum.

The battery cabinet housing shall have the following nominal outside dimensions: a width of 25 in., a depth of 16 in., and a height of 41 to 48 in. Clearance between shelves shall be a minimum of 10 in.

The battery cabinet shall be ventilated through the use of louvered vents, filters, and one thermostatically controlled fan. The cabinet fan shall not be energized when the traffic signals are on UPS power.

The battery cabinet shall have provisions for an external generator connection.

The UPS shall be provided with a Battery Heater Mat that shall function when power line voltage is present and temperature ranges indicate the advantage of heating the batteries for enhanced performance, activating at five degrees Celsius and deactivating at temperatures at or above fifteen degrees Celsius. The Manual Bypass Switch shall be provided for manual connection or disconnection and testing. The Automatic Transfer Switch shall automatically transfer the load from line power to UPS power and back when the incoming line voltage is impaired and then corrected for proper operation. The battery heater mat shall be sized for the battery array installed where the entire footprint of each battery is covered by a heater mat..

The UPS with battery cabinet shall come with all bolts, conduits and bushings, gaskets, shelves, and hardware needed for mounting. A warning sticker shall be placed on the outside of the cabinet indicating that there is an uninterruptible power supply inside the cabinet.

Maintenance, Displays, Controls, and Diagnostics

The UPS shall include a display and/or meter to indicate current battery charge status and conditions.

The UPS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.

The UPS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.

The UPS hardware and batteries shall be easily replaced without requiring any special tools or devices.

The UPS shall include a re-settable front-panel event counter display to indicate the number of times the UPS was activated. The total number of hours the unit has operated on battery power shall be available from the controller unit or UPS unit.

The UPS shall include tip or kill switch installed in the battery cabinet, which shall completely disconnect power from the UPS when the switch is manually activated.

The UPS shall incorporate a flanged electric generator inlet for charging the batteries and operating the UPS. The generator connector shall be male type, twist-lock, rated as 15A, 125VAC with a NEMA L5-15P configuration and weatherproof lift cover plate. Access to the generator inlet shall be from a secured weatherproof lift cover plate or behind a locked battery cabinet police panel.

The manufacturer shall include two sets of equipment lists, operation and maintenance manuals, board-level schematic and wiring diagrams of the UPS, and battery data sheets. The manufacturer shall include any software needed to monitor, diagnose, and operate the UPS. The manufacturer shall include any required cables to connect the UPS to a laptop computer.

Battery System

Individual batteries shall be 12 V type, 65 amp-hour minimum capacity at 20 hours, and shall be easily replaced and commercially available off the shelf.

The UPS shall consist of an even number of batteries that are capable of maintaining normal operation of the signalized intersection for a minimum of ten (10) hours. Calculations shall be provided showing the number of batteries of the type supplied that are needed to satisfy this requirement. A minimum of four batteries shall be provided.

All batteries supplied in the UPS shall be Gel Cell Valve Regulated Lead Acid (VRLA) type specifically designed for outdoor application using a "Float Service" to provide 100% runtime capacity without initialization charging. Batteries shall be constructed using Silver Alloy positive plates and shall have a five year full replacement warranty, non-prorated. Battery capacity rating at 20 hour shall be 94 Amp Hours, 12 VDC – each battery. Battery design for the UPS shall be either four or eight units per design application. Batteries shall be installed and connected to operate at the 48 VDC design. The contractor shall furnish either the four or eight battery design based on the signalized intersection design and power requirements for each intersection. either gel cell or AGM type, deep cycle, completely sealed, prismatic lead-calcium based, silver alloy, valve regulated lead acid (VRLA) requiring no maintenance. All batteries in a UPS installation shall be the same type; mixing of gel cell and AGM types within a UPS installation is not permitted.

The Gel Cell Batteries shall be certified by the manufacturer to operate over a temperature range of -13 to 160 °F

The batteries shall be provided with appropriate interconnect wiring and corrosion resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.

The batteries shall be installed alongside a monitoring system which is capable of monitoring each individual battery voltage, temperature, and admittance. This system shall either be integrated into the Inverter/Charger or provided as a separate device. This system shall be accessible via web browser over a network RJ45 connection to a network switch or shall be directly integrated into the UPS Inverter's network connection and web browser interface.

The UPS shall be provided with a Battery Charge Maintenance Management System to equalize charging of batteries with different battery life ratings and to allow adding new batteries to existing installation sites without changing all existing batteries at a single time. This management system shall comply with CSA C22.2 No. 107.1 and UL 1778 Standards for safe operation of batteries under unattended applications. This system shall be accessible via web browser over a network RJ45 connection to a network switch or shall be directly integrated into the UPS Inverter's network connection and web browser interface.

Batteries shall indicate maximum recharge data and recharging cycles.

Battery interconnect wiring shall be via a modular harness. Batteries shall be shipped with positive and negative terminals pre-wired with red and black cabling that terminates into a typical power-pole style connector. The harness shall be equipped with mating power-pole style connectors for the batteries and a single, insulated plug-in style connection to the inverter/charger unit. The harness shall allow batteries to be quickly and easily connected in any order and shall be keyed and wired to ensure proper polarity and circuit configuration.

Battery terminals shall be covered and insulated so as to prevent accidental shorting.

Warranty

The warranty for an uninterruptible power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the UPS shall be warranted for full replacement for a minimum of five years from the date the traffic signal and UPS are placed into service.

Installation

When a UPS is installed at an existing traffic signal cabinet, the UPS cabinet shall partially rest on the lip of the existing controller cabinet foundation and be secured to the existing controller cabinet by means of at least four (4) stainless steel bolts. The UPS cabinet shall be completely enclosed with the bottom and back constructed of the same material as the cabinet.

When a UPS is installed at a new signal cabinet and foundation, it shall be as part of a dedicated side compartment of the new signal cabinet.

Latest available versions of firmware shall be installed on any applicable component of the system; for components of the system which are connected over an RJ45 network connection, firmware updates shall be downloadable onto the components over such a connection.

Contractor shall coordinate with jurisdictional owner of new UPS system and Contractor shall configure all network connected devices to work and communicate appropriately on the existing network.

Basis of Payment:

This work will be paid for at the contract unit price per each for UNINTERRUPTIBLE POWER SUPPLY, SPECIAL.

LIGHT EMITTING DIODE (LED) SIGNAL HEAD AND OPTICALLY PROGRAMMED LED SIGNAL HEAD (KANE CO. SUPPLEMENT)

This specification is intended to supplement the IDOT special provision 880.01 TS for Kane County Projects. In places of Conflict, this specification shall supersede:

Materials.

Add the following to the third paragraph of Section 1078 of the Standard Specifications:

The LED signal modules shall be replaced or repaired if an LED signal module fails to function as intended due to workmanship or material defects within the first **15 years** from the date of the traffic signal TURN-ON. LED signal modules which exhibit luminous intensities less than the minimum values specified in Table 1 of the ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 27, 2005) [VTSCH], or applicable successor ITE specifications, or show signs of entrance of moisture or contaminants within the first **15 years** of the date of traffic signal TURN-ON shall be replaced or repaired. The vendor's written warranty for the LED signal modules shall be dated, signed by a vendor's representative and included in the product submittal to the state.

Add the following to Article 880.03 of the Standard Specifications:

Signal Heads are to be vertically aligned unless otherwise approved by the engineer or detailed in the plans. When multiple signal heads are mounted to a mast arm assembly, the red indications (circular red, or red arrow) shall be vertically aligned with one another, from the perspective of approaching traffic for all signal heads on that mast arm assembly to the satisfaction of the engineer. Contractor shall ensure the bottom of any signal head and backplate maintains a minimum 16 foot clearance to the highest point of pavement with no more than 18 foot unless otherwise approved by the engineer.

MAST ARM ASSEMBLY AND POLE (KANE CO. SUPPLEMENT)

This specification is intended to supplement the IDOT special provision 877.01 TS for Kane County Projects. In places of Conflict, this specification shall supersede:

Add the following to Article 1077.03 of the Standard Specifications:

(c) Dampening Plate. As directed by the engineer, a 30 inch by 36 inch, blank, sign panel with stiffening channels, may be requested to be installed at the end of a mast arm to reduce galloping fatigue (in accordance with section 720). The mounting of this sign panel shall be horizontal (skyward) with 18 inches of the panel extending on either side of the arm. Ideal placement of this sign panel is as close to the end of the arm as possible, 5 feet or less from end of arm is desirable, final location to be approved by the engineer. The costs associated with the sign panel, sign mount, stiffening channels, labor or any other related expenses shall be included in the cost of the mast arm assembly and pole being installed.

(d) Shroud. When used, should be appropriately sized as to not overhang the foundation to the satisfaction of the engineer.

MAST ARM SIGN PANELS (KANE CO. SUPPLEMENT)

This specification is intended to supplement the IDOT special provision 720.01 TS for Kane County Projects. In places of Conflict, this specification shall supersede:

Add the following to Article 720.02 of the Standard Specifications:

Sign stiffening channel systems shall be aluminum and meet the requirements of ASTM 6261-T5. Sign mounting banding, buckles and buckle straps shall be manufactured from AISI 201 stainless steel.

Add the following to Article 720.04:

(c) any Traffic signal structure; such as a post, pole, mast arm or pole or any other traffic signal structure, regardless of the size of sign.

(d) mast arms, where a sign panel is used as a dampening plate.

IDOT DISTRICT ONE TRAFFIC SIGNAL SPECIFICATIONS (2019)

Note: IDOT no longer recognizes the traffic signal specifications as a "book", for the purposes of this contract, all specifications have been included and shall be used as applicable to the provisions of this contract

MAST ARM SIGN PANELS

Effective: May 22, 2002

Revised: July 1, 2015

720.01TS

Add the following to Article 720.02 of the Standard Specifications:

Sign stiffening channel systems shall be aluminum and meet the requirements of ASTM 6261-T5. Sign mounting banding, buckles and buckle straps shall be manufactured from AISI 201 stainless steel.

SIGN SHOP DRAWING SUBMITTAL

Effective: January 22, 2013

Revised: July 1, 2015

720.02TS

Add the following paragraph to Article 720.03 of the Standard Specifications:

Shop drawings will be required, according to Article 105.04, for all Arterials/Expressways signs except standard highway signs covered in the MUTCD. Shop drawings shall be submitted to the Engineer for review and approval prior to fabrication. The shop drawings shall include dimensions, letter sizing, font type, colors and materials.

TRAFFIC SIGNAL GENERAL REQUIREMENTS

Effective: May 22, 2002

Revised: March 25, 2016

800.01TS

These Traffic Signal Special Provisions and the "District One Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction." The intent of these Special Provisions is to prescribe the materials and construction methods commonly used for traffic signal installations.

- All material furnished shall be new unless otherwise noted herein.
- Traffic signal construction and maintenance work shall be performed by personnel holding current IMSA Traffic Signal Technician Level II certification. A copy of the certification shall be immediately available upon request of the Engineer.
- The work to be done under this contract consists of furnishing, installing and maintaining all traffic signal work and items as specified in the Plans and as specified herein in a manner acceptable and approved by the Engineer.

Definitions of Terms.

Add the following to Section 101 of the Standard Specifications:

101.56 Vendor. Company that sells a particular type of product directly to the contractor or the Equipment Supplier.

101.57 Equipment supplier. Company that supplies, represents and provides technical support for IDOT District One approved traffic signal controllers and other related equipment. The Equipment Supplier shall be located within IDOT District One and shall:

- Be full service with on-site facilities to assemble, test and trouble-shoot traffic signal controllers and cabinet assemblies.
- Maintain an inventory of IDOT District One approved controllers and cabinets.
- Be staffed with permanent sales and technical personnel able to provide traffic signal controller and cabinet expertise and support.
- Technical staff shall hold current IMSA Traffic Signal Technician Level III certification and shall attend traffic signal turn-ons and inspections with a minimum 14 calendar day notice.

Submittals.

Revise Article 801.05 of the Standard Specifications to read:

All material approval requests shall be submitted electronically through the District's SharePoint System unless directed otherwise by the Engineer. Electronic material submittals shall follow the District's Traffic Operations Construction Submittals guidelines. General requirements include:

1. All material approval requests shall be made prior to or no later than the date of the preconstruction meeting. A list of major traffic signal items can be found in Article

801.05. Material or equipment which is similar or identical shall be the product of the same manufacturer, unless necessary for system continuity. Traffic signal materials and equipment shall bear the U.L. label whenever such labeling is available.

2. Product data and shop drawings shall be assembled by pay item. Only the top sheet of each pay item submittal will be stamped by the Department with the review status, except shop drawings for mast arm pole assemblies and the like will be stamped with the review status on each sheet.
3. Original manufacturer published product data and shop drawing sheets with legible dimensions and details shall be submitted for review.
4. When hard copy submittals are necessary, four complete copies of the manufacturer's descriptive literatures and technical data for the traffic signal materials shall be submitted. For hard copy or electronic submittals, the descriptive literature and technical data shall be adequate for determining whether the materials meet the requirements of the plans and specifications. If the literature contains more than one item, the Contractor shall indicate which item or items will be furnished.
5. When hard copy submittals are necessary for structural elements, four complete copies of the shop drawings for the mast arm assemblies and poles, and the combination mast arm assemblies and poles showing, in detail, the fabrication thereof and the certified mill analyses of the materials used in the fabrication, anchor rods, and reinforcing materials shall be submitted.
6. Partial or incomplete submittals will be returned without review.
7. Certain non-standard mast arm poles and special structural elements will require additional review from IDOT's Central Office. Examples include ornamental/decorative, non-standard length mast arm pole assemblies and monotube structures. The Contractor shall account for the additional review time in his schedule.
8. The contract number or permit number, project location/limits and corresponding pay code number must be on each sheet of correspondence, catalog cuts and mast arm poles and assemblies drawings.
9. Where certifications and/or warranties are specified, the information submitted for approval shall include certifications and warranties. Certifications involving inspections, and/or tests of material shall be complete with all test data, dates, and times.
10. After the Engineer reviews the submittals for conformance with the design concept of the project, the Engineer will stamp the drawings indicating their status as 'Approved', 'Approved-As-Noted', 'Disapproved', or 'Incomplete'. Since the Engineer's review is for conformance with the design concept only, it is the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, layout drawings, or other documents by the Department's approval thereof. The Contractor must still be in full compliance with contract and specification requirements.
11. The Contractor shall secure approved materials in a timely manner to assure construction schedules are not delayed.
12. All submitted items reviewed and marked 'APPROVED AS NOTED', 'DISAPPROVED', or 'INCOMPLETE' are to be resubmitted in their entirety, unless otherwise indicated within the submittal comments, with a disposition of previous comments to verify contract compliance at no additional cost to the contract.

13. Exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations or substitutions will be permitted without the approval of the Engineer.
14. Contractor shall not order major equipment such as mast arm assemblies prior to Engineer approval of the Contractor marked proposed traffic signal equipment locations to assure proper placement of contract required traffic signal displays, push buttons and other facilities. Field adjustments may require changes in proposed mast arm length and other coordination.

Marking Proposed Locations.

Revise "Marking Proposed Locations for Highway Lighting System" of Article 801.09 to read "Marking Proposed Locations for Highway Lighting System and Traffic Signals."

Add the following to Article 801.09 of the Standard Specifications:

It shall be the contractor's responsibility to verify all dimensions and conditions existing in the field prior to ordering materials and beginning construction. This shall include locating the mast arm foundations and verifying the mast arms lengths.

Inspection of Electrical Systems.

Add the following to Article 801.10 of the Standard Specifications:

- (c) All cabinets including temporary traffic signal cabinets shall be assembled by an approved equipment supplier in District One. The Department reserves the right to request any controller and cabinet to be tested at the equipment supplier's facility prior to field installation, at no extra cost to this contract.

Maintenance and Responsibility.

Revise Article 801.11 of the Standard Specifications to read:

- a. Existing traffic signal installations and/or any electrical facilities at all or various locations may be altered or reconstructed totally or partially as part of the work on this Contract. The Contractor is hereby advised that all traffic control equipment, presently installed at these locations, may be the property of the State of Illinois, Department of Transportation, Division of Highways, County, Private Developer, Municipality or Transit Agency in which they are located. Once the Contractor has begun any work on any portion of the project, all traffic signals within the limits of this contract or those which have the item "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," shall become the full responsibility of the Contractor. The Contractor shall supply the Engineer, Area Traffic Signal Maintenance and Operations Engineer, IDOT

ComCenter and the Department's Electrical Maintenance Contractor with two 24-hour emergency contact names and telephone numbers.

- b. Automatic Traffic Enforcement equipment such as red lighting running and railroad crossing camera systems are owned and operated by others and the Contractor shall not be responsible for maintaining this equipment.
- c. Regional transit, County and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.
- d. When the project has a pay item for "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," the Contractor must notify both the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 and the Department's Electrical Maintenance Contractor, of their intent to begin any physical construction work on the Contract or any portion thereof. This notification must be made a minimum of seven (7) working days prior to the start of construction to allow sufficient time for inspection of the existing traffic signal installation(s) and transfer of maintenance to the Contractor. The Department will attempt to full-fill the Contractor's inspection date request(s), however workload and other conditions may prevent the Department from accommodating specific dates or times. The Contractor shall not be entitled to any other compensation if the requested inspection date(s) cannot be scheduled by the Department. If work is started prior to an inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection. The Contractor will become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic signal. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted.
- e. The Contractor is advised that the existing and/or temporary traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shut down the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.
- f. The Contractor shall be fully responsible for the safe and efficient operation of the traffic signals and other equipment noted herein. Any inquiry, complaint or request by the Department, the Department's Electrical Maintenance Contractor or the public, shall be investigated and repairs begun within one hour. Failure to

provide this service will result in liquidated damages of \$1000 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of \$1000 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. The Department may inspect any signaling device on the Department's highway system at any time without notification.

- g. Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.
- h. The Contractor shall be responsible to clear snow, ice, dirt, debris or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.
- i. The Contractor shall maintain the traffic signal in normal operation during short or long term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be for separately but shall be included in the contract.

Damage to Traffic Signal System.

Add the following to Article 801.12(b) of the Standard Specifications to read:

Any traffic signal control equipment damaged or not operating properly from any cause shall be replaced with new equipment meeting current District One traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, all as approved by the Engineer. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices are only allowed at the bases of post and mast arms.

Temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the

Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause, shall be the responsibility of the municipality or the Automatic Traffic Enforcement company per Permit agreement.

Traffic Signal Inspection (TURN-ON).

Revise Article 801.15(b) of the Standard Specifications to read:

It is the intent to have all electric work completed and equipment field tested by the Equipment Supplier prior to the Department's "turn-on" field inspection. If in the event the Engineer determines work is not complete and the inspection will require more than two (2) hours to complete, the inspection shall be canceled and the Contractor will be required to reschedule at another date. The maintenance of the traffic signals will not be accepted until all punch list work is corrected and re-inspected.

When the road is open to traffic, except as otherwise provided in Section 850 of the Standard Specifications, the Contractor may request a turn-on and inspection of the completed traffic signal installation at each separate location. This request must be made to the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 a minimum of seven (7) working days prior to the time of the requested inspection. The Department will attempt to fulfill the Contractor's turn-on and inspection date request(s), however workload and other conditions may prevent the Department from accommodating specific dates or times. The Contractor shall not be entitled to any other compensation if the requested turn-on and inspection date(s) cannot be scheduled by the Department. The Department will not grant a field inspection until written or electronic notification is provided from the Contractor that the equipment has been field tested and the intersection is operating according to Contract requirements. The Contractor must invite local fire department personnel to the turn-on when Emergency Vehicle Preemption (EVP) is included in the project. When the contract includes the item RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM, OPTIMIZE TRAFFIC SIGNAL SYSTEM, or TEMPORARY TRAFFIC SIGNAL TIMINGS, the Contractor must notify the SCAT Consultant of the turn-on/detour implementation schedule, as well as stage changes and phase changes during construction.

The Contractor must have all traffic signal work completed and the electrical service installation connected by the utility company prior to requesting an inspection and turn-on of the traffic signal installation. The Contractor shall be responsible to provide a police officer to assist with traffic control at the time of testing.

The Contractor shall provide a representative from the control equipment vendor's office who is knowledgeable of the cabinet design and controller functions to attend the traffic signal inspection for both permanent and temporary traffic signal turn-ons.

Upon demonstration that the signals are operating and all work is completed in accordance with the Contract and to the satisfaction of the Engineer, the Engineer will then allow the signals to be placed in continuous operation. The Agency that is responsible for the maintenance of each traffic signal installation will assume the maintenance upon successful completion of this inspection.

The District requires the following Final Project Documentation from the Contractor at traffic signal turn-ons in electronic format in addition to hard copies where noted. A CD/DVD shall be submitted with separate folders corresponding to each numbered title below. The CD/DVD shall be labelled with date, project location, company and contract or permit number. Record Drawings, Inventory and Material Approvals shall be submitted prior to traffic signal turn-on for review by the Department as described here-in.

Final Project Documentation:

1. Record Drawings. Signal plans of record with field revisions marked in red ink. One hard copy set of 11"x17" record drawings shall also be provided.
2. Inventory. Inventory of new and existing traffic signal equipment including cabinet types and devices within cabinets in an Excel spread sheet format. One hard copy shall also be provided.
3. Pictures. Digital pictures of a minimum 12M pixels of each intersection approach showing all traffic signal displays and equipment. Pictures shall include controller cabinet equipment in enough detail to clearly identify manufacture and model of major equipment.
4. Field Testing. Written notification from the Contractor and the equipment vendor of satisfactory field testing with corresponding material performance measurements, such as for detector loops and fiber optic systems (see Article 801.13). One hard copy of all contract required performance measurement testing shall also be provided.
5. Materials Approval. The material approval letter. A hard copy shall also be provided.
6. Manuals. Operation and service manuals of the signal controller and associated control equipment. One hard copy shall also be provided.
7. Cabinet Wiring Diagram and Cable Logs. Five (5) hard copies 11" x 17" of the cabinet wiring diagrams shall be provided along with electronic pdf and dgn files of the cabinet wiring diagram. Five hard copies of the cable logs and electronic excel files shall be provided with cable #, number of conductors and spares, connected device/signal head and intersection location.
8. Controller Programming Settings. The traffic signal controller's timings; backup timings; coordination splits, offsets, and cycles; TBC Time of Day, Week and Year Programs; Traffic Responsive Program, Detector Phase Assignment, Type and Detector Switching; and any other functions programmable from the keyboard. The controller manufacturer shall also supply a printed form, not to exceed 11" x 17" for recording that data noted above. The form shall include a location, date, manufacturer's name, controller model and software version. The form shall be approved by the Engineer and a minimum of three (3) copies must

- be furnished at each turn-on. The manufacturer must provide all programming information used within the controller at the time of turn-on.
9. Warrantees and Guarantees. All manufacturer and contractor warrantees and guarantees required by Article 801.14.
 10. GPS coordinate of traffic signal equipment as describe in the Record Drawings section herein.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal "turn on", completeness of the required documentation and successful operation during a minimum 72 hour "burn-in" period following activation of the traffic signal. If approved, traffic signal acceptance shall be verbal at the "turn on" inspection followed by written correspondence from the Engineer. The Contractor shall be responsible for all traffic signal equipment and associated maintenance thereof until Departmental acceptance is granted.

All equipment and/or parts to keep the traffic signal installation operating shall be furnished by the Contractor. No spare traffic signal equipment is available from the Department.

All punch list work shall be completed within two (2) weeks after the final inspection. The Contractor shall notify the Electrical Maintenance Contractor to inspect all punch list work. Failure to meet these time constraints shall result in liquidated damage charges of \$500 per month per incident.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements shall be subject to removal and disposal at the Contractor's expense.

Record Drawings.

The requirements listed for Electrical Installation shall apply for Traffic Signal Installations in Article 801.16. Revise the 2nd paragraph of Article 801.16 of the Standard Specifications to read:

"When the work is complete, and seven days before the request for a final inspection, the reduced-size set of contract drawings, stamped "RECORD DRAWINGS", shall be submitted to the Engineer for review and approval and shall be stamped with the date and the signature of the Contractor's supervising Engineer or electrician. The record drawings shall be submitted in PDF format on CDROM as well as hardcopy for review and approval. If the contract consists of multiple intersections, each intersection shall be saved as an individual PDF file with TS# and location name in its file name.

In addition to the record drawings, copies of the final catalog cuts which have been Approved or Approved as Noted shall be submitted in PDF format along with the record drawings. The PDF files shall clearly indicate the pay item either by filename or PDF Table of Contents referencing the respective pay item number for multi-item PDF

files. Specific part or model numbers of items which have been selected shall be clearly visible.”

As part of the record drawings, the Contractor shall inventory all traffic signal equipment, new or existing, on the project and record information in an Excel spreadsheet. The inventory shall include equipment type, model numbers, software manufacturer and version and quantities.

Add the following to Article 801.16 of the Standard Specifications:

“In addition to the specified record drawings, the Contractor shall record GPS coordinates of the following traffic signal components being installed, modified or being affected in other ways by this contract:

- All Mast Arm Poles and Posts
- Traffic Signal Wood Poles
- Rail Road Bungalow
- UPS
- Handholes
- Conduit roadway crossings
- Controller Cabinets
- Communication Cabinets
- Electric Service Disconnect locations
- CCTV Camera installations
- Fiber Optic Splice Locations
- Conduit Crossings

Datum to be used shall be North American 1983.

Data shall be provided electronically and in print form. The electronic format shall be compatible with MS Excel. Latitude and Longitude shall be in decimal degrees with a minimum of 6 decimal places. Each coordinate shall have the following information:

- File shall be named: TSXXX-YY-MM-DD (i.e. TS22157_15-01-01)
- Each intersection shall have its own file
- Row 1 should have the location name (i.e. IL 31 @ Klausen)
- Row 2 is blank
- Row 3 is the headers for the columns
- Row 4 starts the data
- Column A (Date) – should be in the following format: MM/DD/YYYY
- Column B (Item) – as shown in the table below
- Column C (Description) – as shown in the table below
- Column D and E (GPS Data) – should be in decimal form, per the IDOT special provisions

Examples:

Date	Item	Description	Latitude	Longitude
01/01/2015	MP (Mast Arm Pole)	NEQ, NB, Dual, Combination Pole	41.580493	-87.793378
01/01/2015	HH (Handhole)	Heavy Duty, Fiber, Intersection, Double	41.558532	-87.792571
01/01/2015	ES (Electrical Service)	Ground mount, Pole mount	41.765532	-87.543571
01/01/2015	CC (Controller Cabinet)		41.602248	-87.794053
01/01/2015	RSC (Rigid Steel Crossing)	IL 31 east side crossing south leg to center HH at Klausen	41.611111	-87.790222
01/01/2015	PTZ (PTZ)	NEQ extension pole	41.593434	-87.769876
01/01/2015	POST (Post)		41.651848	-87.762053
01/01/2015	MCC (Master Controller Cabinet)		41.584593	-87.793378
01/01/2015	COMC (Communication Cabinet)		41.584600	-87.793432
01/01/2015	BBS (Battery Backup System)		41.558532	-87.792571
01/01/2015	CNCR (Conduit Crossing)	4-inch IL 31 n/o of Klausen	41.588888	-87.794440

Prior to the collection of data, the contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 1 foot. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the contractor shall make corrections to the data collection equipment and or process and submit the data for review and approval as specified.

Accuracy. Data collected is to be mapping grade. A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have a minimum 1 foot accuracy after post processing.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable.

The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of 6 years.”

Delete the last sentence of the 3rd paragraph of Article 801.16.

Locating Underground Facilities.

Revise Section 803 to the Standard Specifications to read:

IDOT traffic signal facilities are not part of any of the one-call locating service such as J.U.L.I.E or Digger. If this Contract requires the services of an Electrical Contractor, the Contractor shall

be responsible at his/her own expense for locating existing IDOT electrical facilities prior to performing any work. If this Contract does not require the services of an Electrical Contractor, the Contractor may request one free locate for existing IDOT electrical facilities from the District One Electrical Maintenance Contractor prior to the start of any work. Additional requests may be at the expense of the Contractor. The location of underground traffic facilities does not relieve the Contractor of their responsibility to repair any facilities damaged during construction at their expense.

The exact location of all utilities shall be field verified by the Contractor before the installation of any components of the traffic signal system. For locations of utilities, locally owned equipment, and leased enforcement camera system facilities, the local Counties or Municipalities may need to be contacted: in the City of Chicago contact Digger at (312) 744-7000 and for all other locations contact J.U.L.I.E. at 1-800-892-0123 or 811.

Restoration of Work Area.

Add the following article to Section 801 of the Standard Specifications:

801.17 Restoration of work area. Restoration of the traffic signal work area shall be included in the related pay items such as foundation, conduit, handhole, underground raceways, etc. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded. All brick pavers disturbed in the work area shall be restored to their original configuration as directed by the Engineer. All damaged brick pavers shall be replaced with a comparable material approved by the Engineer. Restoration of the work area shall be included in the contract without any extra compensation allowed to the Contractor.

Bagging Signal Heads.

Light tan colored traffic and pedestrian signal reusable covers shall be used to cover dark/un-energized signal sections and visors. Covers shall be made of outdoor fabric with urethane coating for repelling water, have elastic fully sewn around the cover ends for a tight fit over the visor, and have a minimum of two straps with buckles to secure the cover to the backplate. A center mesh strip allows viewing without removal for signal status testing purposes. Covers shall include a message indicating the signal is not in service.

OPTIMIZE TRAFFIC SIGNAL SYSTEM

Effective: May 22, 2002

Revised: July 1, 2015

800.02TS

Description.

This work shall consist of optimizing a closed loop traffic signal system.

OPTIMIZE TRAFFIC SIGNAL SYSTEM applies when a new or existing closed loop traffic signal system is to be optimized and a formal Signal Coordination and Timing (SCAT) Report is to be prepared. The purpose of this work is to improve system performance by optimizing traffic signal timings, developing a time of day program and a traffic responsive program.

After the signal improvements are completed, the signal system shall be optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as noted herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank a CD, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) The following tasks are associated with OPTIMIZE TRAFFIC SIGNAL SYSTEM.

1. Appropriate signal timings and offsets shall be developed for each intersection and appropriate cycle lengths shall be developed for the closed loop signal system.
2. Traffic counts shall be taken at all intersections after the permanent traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday and on a Saturday or Sunday, as directed by the Engineer, to account for special traffic generators such as shopping centers, educational institutes and special event facilities. The turning movement counts shall identify cars, and single-unit and multi-unit heavy vehicles.
3. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.

4. A traffic responsive program shall be developed, which considers both volume and occupancy. A time-of-day program shall be developed for used as a back-up system.
 5. Proposed signal timing plan for the new or modified intersection shall be forwarded to IDOT for review prior to implementation.
 6. Consultant shall conduct on-site implementation of the timings and make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations. The consultant shall respond to IDOT comments and public complaints for a minimum period of 90 days from date of timing plan implementation.
 7. Speed and delay studies shall be conducted during each of the count periods along the system corridor in the field before and after implementation of the proposed timing plans for comparative evaluations. These studies should utilize specialized electronic timing and measuring devices.
- (b) The following deliverables shall be provided for OPTIMIZE TRAFFIC SIGNAL SYSTEM.
1. Consultant shall furnish to IDOT one (1) copy of a SCAT Report for the optimized system. The SCAT Report shall include the following elements:

Cover Page in color showing a System Map
Figures <ol style="list-style-type: none"> 1. System overview map – showing system number, system schematic map with numbered system detectors, oversaturated movements, master location, system phone number, cycle lengths, and date of completion. 2. General location map in color – showing signal system location in the metropolitan area. 3. Detail system location map in color – showing cross street names and local controller addresses. 4. Controller sequence – showing controller phase sequence diagrams.
Table of Contents
Tab 1: Final Report <ol style="list-style-type: none"> 1. Project Overview 2. System and Location Description (Project specific) 3. Methodology 4. Data Collection 5. Data Analysis and Timing Plan Development 6. Implementation <ol style="list-style-type: none"> a. Traffic Responsive Programming (Table of TRP vs. TOD Operation) with am, md, and pm cycle lengths 7. Evaluation <ol style="list-style-type: none"> a. Speed and Delay runs
Tab 2. Turning Movement Counts <ol style="list-style-type: none"> 1. Turning Movement Counts (Showing turning movement counts in the intersection diagram for each period, including truck percentage)
Tab 3. Synchro Analysis <ol style="list-style-type: none"> 1. AM: Time-Space diagram in color, followed by intersection Synchro report (Timing report) summarizing the implemented timings. 2. Midday: same as AM 3. PM: same as AM 4. Special weekend or off-peak traffic generators (shopping centers, educational facilities, arenas, etc.): same as AM
Tab 4: Speed, Delay Studies <ol style="list-style-type: none"> 1. Summary of before and after runs results in two (2) tables showing travel time and delay time. 2. Plot of the before and after runs diagram for each direction and time period.
Tab 5: Environmental Report <ol style="list-style-type: none"> 1. Environmental impact report including gas consumption, NO₂, HCCO, improvements.
Tab 6: Electronic Files <ol style="list-style-type: none"> 1. Two (2) CDs for the optimized system. The CDs shall include the following elements: <ol style="list-style-type: none"> a. Electronic copy of the SCAT Report in PDF format b. Copies of the Synchro files for the optimized system c. Traffic counts for the optimized system

d. New or updated intersection graphic display files for each of the system intersections and the system graphic display file including system detector locations and addresses.

Basis of Payment.

The work shall be paid for at the contract unit each for OPTIMIZE TRAFFIC SIGNAL SYSTEM, which price shall be payment in full for performing all work described herein for the entire traffic signal system. Following the completion of traffic counts, 25 percent of the bid price will be paid. Following the completion of the Synchro analysis, 25 percent of the bid price will be paid. Following the setup and fine tuning of the timings, the speed-delay study, and the TRP programming, 25 percent of the bid price will be paid. The remaining 25 percent will be paid when the system is working to the satisfaction of the engineer and an approved report and CD have been submitted.

RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM

Effective: May 22, 2002

Revised: July 1, 2015

800.03TS

Description.

This work shall consist of re-optimizing a closed loop traffic signal system according to the following Levels of work.

LEVEL I applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system. The purpose of this work is to integrate the improvements to the subject intersection into the signal system while minimizing the impacts to the existing system operation. This type of work would be commonly associated with the addition of signal phases, pedestrian phases, or improvements that do not affect the capacity at an intersection.

LEVEL II applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system and detailed analysis of the intersection operation is desired by the engineer, or when a new signalized or existing signalized intersection is being added to an existing system, but optimization of the entire system is not required. The purpose of this work is to optimize the subject intersection, while integrating it into the existing signal system with limited impact to the system operations. This item also includes an evaluation of the overall system operation, including the traffic responsive program.

For the purposes of re-optimization work, an intersection shall include all traffic movements operated by the subject controller and cabinet.

After the signal improvements are completed, the signal shall be re-optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer discs, copies of computer simulation files for the existing optimized system and a timing database will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) LEVEL I Re-Optimization

1. The following tasks are associated with LEVEL I Re-Optimization.
 - a. Appropriate signal timings shall be developed for the subject intersection and existing timings shall be utilized for the rest of the intersections in the system.
 - b. Proposed signal timing plan for the modified intersection(s) shall be forwarded to IDOT for review prior to implementation.
 - c. Consultant shall conduct on-site implementation of the timings at the turn-on and make fine-tuning adjustments to the timings of the subject intersection in the field to alleviate observed adverse operating conditions and to enhance operations. The consultant shall respond to IDOT comments and public complaints for a minimum period of 60 days from date of timing plan implementation.
2. The following deliverables shall be provided for LEVEL I Re-Optimization.
 - a. Consultant shall furnish to IDOT a cover letter describing the extent of the re-optimization work performed.
 - b. Consultant shall furnish an updated intersection graphic display for the subject intersection to IDOT and to IDOT's Traffic Signal Maintenance Contractor.

(b) LEVEL II Re-Optimization

1. In addition to the requirements described in the LEVEL I Re-Optimization above, the following tasks are associated with LEVEL II Re-Optimization.
 - a. Traffic counts shall be taken at the subject intersection(s) after the traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday and on a Saturday and/or Sunday, as directed by the Engineer, to account for special traffic generators such as shopping centers, educational institutes and special event facilities. The turning movement counts shall identify cars, and single-unit, multi-unit heavy vehicles, and transit buses.
 - b. As necessary, the intersection(s) shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.
 - c. Traffic responsive program operation shall be evaluated to verify proper pattern selection and lack of oscillation and a report of the operation shall be provided to IDOT.
2. The following deliverables shall be provided for LEVEL II Re-Optimization.
 - a. Consultant shall furnish to IDOT one (1) copy of a technical memorandum for the optimized system. The technical memorandum shall include the following elements:
 - (1) Brief description of the project
 - (2) Printed copies of the analysis output from Synchro (or other appropriate, approved optimization software file)
 - (3) Printed copies of the traffic counts conducted at the subject intersection
 - b. Consultant shall furnish to IDOT two (2) CDs for the optimized system. The CDs shall include the following elements:
 - (1) Electronic copy of the technical memorandum in PDF format

- (2) Revised Synchro files (or other appropriate, approved optimization software file) including the new signal and the rest of the signals in the closed loop system
- (3) Traffic counts conducted at the subject intersection(s)
- (4) New or updated intersection(s) graphic display file for the subject intersection(s)
- (5) The CD shall be labeled with the IDOT system number and master location, as well as the submittal date and the consultant logo. The CD case shall include a clearly readable label displaying the same information securely affixed to the side and front.

Basis of Payment.

This work shall be paid for at the contract unit price each for RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL I or RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL II, which price shall be payment in full for performing all work described herein per intersection. Following completion of the timings and submittal of specified deliverables, 100 percent of the bid price will be paid. Each intersection will be paid for separately.

SERVICE INSTALLATION (TRAFFIC SIGNALS)

Effective: May 22, 2002

Revised: June 15, 2016

805.01TS

Revise Section 805 of the Standard Specifications to read:

Description.

This work shall consist of all materials and labor required to install, modify, or extend the electric service installation. All installations shall meet the requirements of the "District One Standard Traffic Signal Design Details".

General.

The electric service installation shall be the electric service disconnecting means and it shall be identified as suitable for use as service equipment.

The electric utility contact information is noted on the plans and represents the current information at the time of contract preparation. The Contractor must request in writing for service and/or service modification within 10 days of contract award and must follow-up with the electric utility to assure all necessary documents and payment are received by the utility. The Contractor shall forward copies of all correspondence between the contractor and utility company to the Engineer and Area Traffic Signal Maintenance and Operations Engineer. The service agreement and sketch shall be submitted for signature to the IDOT's Traffic Operations Programs Engineer.

Materials.

- a. General. The completed control panel shall be constructed in accordance with UL Std. 508A, Industrial Control Panel, and carry the UL label. Wire terminations shall be UL listed.
- b. Enclosures.
 1. Pole Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 4X, unfinished single door design, fabricated from minimum 0.080-inch (2.03 mm) thick Type 5052 H-32 aluminum. Seams shall be continuous welded and ground smooth. Stainless steel screws and clamps shall secure the cover and assure a watertight seal. The cover shall be removable by pulling the continuous stainless steel hinge pin. The cabinet shall have an oil-resistant gasket and a lock kit shall be provided with an internal O-ring in the locking mechanism assuring a watertight and dust-tight seal. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 14-inches (350 mm) high, 9-inches (225 mm) wide and 8-inches (200 mm) in depth is required. The cabinet shall be channel mounted to a wooden utility pole using assemblies recommended by the vendor.

2. Ground Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 3R unfinished single door design with back panel. The cabinet shall be fabricated from Type 5052 H-32 aluminum with the frame and door 0.125-inch (3.175 mm) thick, the top 0.250-inch (6.350 mm) thick and the bottom 0.500-inch (12.70 mm) thick. Seams shall be continuous welded and ground smooth. The door and door opening shall be double flanged. The door shall be approximately 80% of the front surface, with a full length tamperproof stainless steel .075-inch (1.91 mm) thick hinge bolted to the cabinet with stainless steel carriage bolts and nylocks nuts. The locking mechanism shall be slam-latch type with a keyhole cover. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 40-inches (1000 mm) high, 16-inches (400 mm) wide and 15-inches (375 mm) in depth is required. The cabinet shall be mounted upon a square Type A concrete foundation as indicated on the plans. The foundation is paid for separately.
 3. All enclosures shall include a green external power indicator LED light with circuitry as shown in the Electrical Service-Panel Diagram detail sheet. For pole mounted service enclosures, the power indicator light shall be mounted as shown in the detail. For ground mounted enclosures, the power indicator light shall be mounted on the side of the enclosure most visible from the major roadway.
- c. Electric Utility Meter Housing and Riser. The electric meter housing and meter socket shall be supplied and installed by the contractor. The contractor is to coordinate the work to be performed and the materials required with the utility company to make the final connection at the power source. Electric utility required risers, weather/service head and any other materials necessary for connection shall also be included in the pay item. Materials shall be in accordance with the electric utility's requirements. For ground-mounted service, the electric utility meter housing shall be mounted to the enclosure. The meter shall be supplied by the utility company. Metered service shall not be used unless specified in the plans.
- d. Surge Protector. Overvoltage protection, with LED indicator, shall be provided for the 120 volt load circuit by the means MOV and thermal fusing technology. The response time shall be <5n seconds and operate within a range of -40C to +85C. The surge protector shall be UL 1449 Listed.
- e. Circuit Breakers. Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type circuit breakers with trip free indicating handles. 120 volt circuit breakers shall have an interrupting rating of not less than 65,000 rms symmetrical amperes. Unless otherwise indicated, the main disconnect circuit breaker for the traffic signal controller shall be rated 60 amperes, 120 V and the auxiliary circuit breakers shall be rated 10 amperes, 120 V.

- f. Fuses, Fuseholders and Power Indicating Light. Fuses shall be small-dimensional cylindrical fuses of the dual element time-delay type. The fuses shall be rated for 600 V AC and shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated voltage. The power indicating light shall be LED type with a green colored lens and shall be energized when electric utility power is present.
- g. Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.
- h. Utility Services Connection. The Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.
- i. Ground Rod. Ground rods shall be copper-clad steel, a minimum of 10 feet (3.0m) in length, and 3/4 inch (20mm) in diameter. Ground rod resistance measurements to ground shall be 25 ohms or less. If necessary additional rods shall be installed to meet resistance requirements at no additional cost to the contract.

Installation.

- a. General. The Contractor shall confirm the orientation of the traffic service installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.
- b. Pole Mounted. Brackets designed for pole mounting shall be used. All mounting hardware shall be stainless steel. Mounting height shall be as noted on the plans or as directed by the Engineer.
- c. Ground Mounted. The service installation shall be mounted plumb and level on the foundation and fastened to the anchor bolts with hot-dipped galvanized or stainless steel nuts and washers. The space between the bottom of the enclosure and the top of the foundation shall be caulked at the base with silicone.

Basis of Payment.

The service installation shall be paid for at the contract unit price each for SERVICE INSTALLATION of the type specified which shall be payment in full for furnishing and installing the service installation complete. The CONCRETE FOUNDATION, TYPE A, which includes the ground rod, shall be paid for separately. SERVICE INSTALLATION, POLE MOUNTED shall include the 3/4 inch (20mm) grounding conduit, ground rod, and pole mount assembly. Any

charges by the utility companies shall be approved by the engineer and paid for as an addition to the contract according to Article 109.05 of the Standard Specifications.

GROUNDING OF TRAFFIC SIGNAL SYSTEMS

Effective: May 22, 2002

Revised: July 1, 2015

806.01TS

Revise Section 806 of the Standard Specifications to read:

General.

All traffic signal systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC. This work shall be in accordance with IDOT's District One Traffic Signal Design Details.

The grounding electrode system shall include a ground rod installed with each traffic signal controller concrete foundation and all mast arm and post concrete foundations. An additional ground rod will be required at locations where measured resistance exceeds 25 ohms. Ground rods are included in the applicable concrete foundation or service installation pay item and will not be paid for separately.

Testing shall be according to Article 801.13 (a) (4) and (5).

- (a) The grounded conductor (neutral conductor) shall be white color coded. This conductor shall be bonded to the equipment grounding conductor only at the Electric Service Installation. All power cables shall include one neutral conductor of the same size.
- (b) The equipment grounding conductor shall be green color coded. The following is in addition to Article 801.04 of the Standard Specifications.
 - 1. Equipment grounding conductors shall be bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment grounding conductor.
 - 2. Equipment grounding conductors shall be bonded, using a UL Listed grounding connector, to all traffic signal mast arm poles, traffic signal posts, pedestrian posts, pull boxes, handhole frames and covers, conduits, and other metallic enclosures throughout the traffic signal wiring system, except where noted herein. Bonding shall be made with a splice and pigtail connection, using a sized compression type copper sleeve, sealant tape, and heat-shrinkable cap. A UL listed electrical joint compound shall be applied to all conductors' terminations, connector threads and contact points. Conduit grounding bushings shall be installed at all conduit terminations including spare or empty conduits.
 - 3. All metallic and non-metallic raceways shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.

4. Individual conductor splices in handholes shall be soldered and sealed with heat shrink. When necessary to maintain effective equipment grounding, a full cable heat shrink shall be provided over individual conductor heat shrinks.
- (c) The grounding electrode conductor shall be similar to the equipment grounding conductor in color coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, UL listed pressure connectors, and UL listed clamps.

COILABLE NON-METALLIC CONDUIT

Effective: May 22, 2002

Revised: July 1, 2015

810.01TS

Description.

This work shall consist of furnishing and installing empty coilable non-metallic conduit (CNC).

General.

The CNC installation shall be in accordance with Sections 810 and 811 of the Standard Specifications except for the following:

Add the following to Article 810.03 of the Standard Specifications:

CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways to the handholes.

Add the following to Article 811.03 of the Standard Specifications:

On temporary traffic signal installations with detector loops, CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways from the saw-cut to 10 feet (3m) up the wood pole, unless otherwise shown on the plans

Basis of Payment.

All installations of CNC for loop detection shall be included in the contract and not paid for separately.

UNDERGROUND RACEWAYS

Effective: May 22, 2002

Revised: July 1, 2015

810.02TS

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduits shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped.

The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap.

The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

ROD AND CLEAN EXISTING CONDUIT

Effective: January 1, 2015

Revised: July 1, 2015

810.03TS

Description.

This work shall consist of inserting a duct rod or electrical fish rod or tape of sufficient length and rigidity into an electrical conduit opening in one electrical handhole, and pushing the said rod through the conduit to emerge at the next or subsequent handhole in the conduit system at the location(s) shown on the plans. The duct rod may be inserted and removed by any standard construction method which causes no damage to the conduit. The size of the conduit may vary, but there shall be no differentiation in cost for the size of the conduit.

The conduit which is to be rodded and cleaned may exist with various amounts of standing water in the handholes to drain the conduit and to afford compatible working conditions for the installation of the duct rods and/or cables. Pumping of handholes shall be included with the work of rodding and cleaning of the conduit.

Any handhole which, in the opinion of the Engineer contains excessive debris, dirt or other materials to the extent that conduit rodding and cleaning is not feasible, shall be cleaned at the Engineer's order and payment approval as a separate pay item.

Prior to removal of the duct rod, a duct cleaning attachment such as a properly sized wire brush or cleaning mandrel shall be attached to the duct rod, which by removal of the duct rod shall be pulled through the conduit to remove sand, grit, or other light obstructions from the duct to provide a clean, clear passage for the installation of cable. Whenever the installation of cables is not performed as an adjunct to or immediately following the cleaning of the duct, a light weight pulling line such as a 1/8" polyethylene line or conduit measuring tape shall be placed and shall remain in the conduit to facilitate future work. When great difficulty of either inserting the duct rod or removal of the cleaning mandrel is encountered, the duct may require further cleaning by use of a compressed air gun, or a low pressure water hose. In the case of a broken conduit, the conduit must be excavated and repaired. The existence and location of breaks in the conduit may be determined by rodding, but the excavation and repair work required will be paid for separately.

This work shall be measured per lineal foot for each conduit cleaned. Measurements shall be made from point to point horizontally. No vertical rises shall count in the measurement.

Basis of Payment.

This work shall be paid for at the contract unit price per lineal foot for ROD AND CLEAN EXISTING CONDUIT for the installation of new electric cables in existing conduits. Such price shall include the furnishing of all necessary tools, equipment, and materials required to prepare a conduit for the installation of cable.

HANDHOLES

Effective: January 01, 2002

Revised: July 1, ~~2015~~2018

814.01TS

Description.

Add the following to Section 814 of the Standard Specifications:

All conduits shall enter the handhole at a depth of 30 inches (762 mm) except for the conduits for detector loops when the handhole is less than 5 feet (1.52 m) from the detector loop. All conduit ends should be sealed with a waterproof sealant to prevent the entrance of contaminants into the handhole.

Steel cable hooks shall be coated with hot-dipped galvanization in accordance with AASHTO Specification M111. Hooks shall be a minimum of 1/2 inch (13 mm) diameter with two 90 degree bends and extend into the handhole at least 6 inches (152 mm). Hooks shall be placed a minimum of 12 inches (305 mm) below the lid or lower if additional space is required.

Precast round handholes shall not be used unless called out on the plans.

The cover of the handhole frame shall be labeled "Traffic Signals" with legible raised letters. Only handholes serving IDOT traffic signal equipment shall have this label. Handhole covers for Red Light Running Cameras shall be labeled "RLRC".

Revise the third paragraph of Article 814.03 of the Standard Specifications to read:

"Handholes shall be constructed as shown on the plans and shall be cast-in-place, or precast concrete units. Heavy duty handholes shall be either cast-in-place or precast concrete units."

Add the following to Article 814.03 of the Standard Specifications:

"(c) Precast Concrete. Precast concrete handholes shall be fabricated according to Article 1042.17. Where a handhole is contiguous to a sidewalk, preformed joint filler of 1/2 inch (13 mm) thickness shall be placed between the handhole and the sidewalk."

Cast-In-Place Handholes.

All cast-in-place handholes shall be concrete, with inside dimensions of 21-1/2 inches (546 mm) minimum. Frames and lid openings shall match this dimension.

For grounding purposes the handhole frame shall have provisions for a 7/16 inch (11 mm) diameter stainless steel bolt cast into the frame. The covers shall have a stainless steel threaded stint extended from the eye hook assembly for the purpose of attaching the grounding conductor to the handhole cover.

The minimum wall thickness for heavy duty hand holes shall be 12 inches (305mm).

Precast Round Handholes.

All precast handholes shall be concrete, with inside dimensions of 30 inches (762mm) diameter. Frames and covers shall have a minimum opening of 26 inches (660mm) and no larger than the inside diameter of the handhole.

For grounding purposes the handhole frame shall have provisions for a 7/16 inch (11 mm) diameter stainless steel bolt cast into the frame. For the purpose of attaching the grounding conductor to the handhole cover, the covers shall either have a 7/16 inch (11 mm) diameter stainless steel bolt cast into the cover or a stainless steel threaded stint extended from an eye hook assembly. A hole may be drilled for the bolt if one cannot be cast into the frame or cover. The head of the bolt shall be flush or lower than the top surface of the cover.

The minimum wall thickness for precast heavy duty hand holes shall be 6 inches (152 mm).

Precast round handholes shall be only produced by an approved precast vendor.

Materials.

Add the following to Section 1042 of the Standard Specifications:

“1042.17 Precast Concrete Handholes. Precast concrete handholes shall be according to Articles 1042.03(a)(c)(d)(e).”

GROUNDING CABLE

Effective: May 22, 2002

Revised: July 1, 2015

817.01TS

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add the following to Article 817.02 (b) of the Standard Specifications:

Unless otherwise noted on the Plans, traffic signal grounding conductor shall be one conductor, #6 gauge copper, with a green color coded XLP jacket.

The traffic signal grounding conductor shall be bonded, using a UL Listed grounding connector to all proposed and existing traffic signal mast arm poles and traffic/pedestrian signal posts, including push button posts. The grounding conductor shall be bonded to all proposed and existing pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system and noted herein and detailed on the plans. The grounding conductor shall be bonded to conduit terminations using rated grounding bushings. Bonding to existing handhole frames and covers shall be paid for separately.

Add the following to Article 817.05 of the Standard Specifications:

Basis of Payment.

Grounding cable shall be measured in place for payment in foot (meter). Payment shall be at the contract unit price for ELECTRIC CABLE IN CONDUIT, EQUIPMENT GROUNDING CONDUCTOR, NO. 6 1C, which price includes all associated labor and material including grounding clamps, splicing, exothermic welds, grounding connectors, conduit grounding bushings, and other hardware.

FIBER OPTIC TRACER CABLE

Effective: May 22, 2002

Revised: July 1, 2015

817.02TS

The cable shall meet the requirements of Section 817 of the Standard Specifications, except for the following:

Add the following to Article 817.03 of the Standard Specifications:

In order to trace the fiber optic cable after installation, the tracer cable shall be installed in the same conduit as the fiber optic cable in locations shown on the plans. The tracer cable shall be continuous, extended into the controller cabinet and terminated on a barrier type terminal strip mounted on the side wall of the controller cabinet. The barrier type terminal strip and tracer cable shall be clearly marked and identified. All tracer cable splices shall be kept to a minimum and shall incorporate maximum lengths of cable supplied by the manufacturer. The tracer cable will be allowed to be spliced at handholes only. The tracer cable splice shall use a Western Union Splice soldered with resin core flux and shall be soldered using a soldering iron. Blow torches or other devices which oxidize copper cable shall not be allowed for soldering operations. All exposed surfaces of the solder shall be smooth. The splice shall be covered with a black shrink tube meeting UL 224 guidelines, Type V and rated 600V, minimum length 4 inches (100 mm) and with a minimum 1 inch (25 mm) coverage over the XLP insulation, underwater grade.

Add the following to Article 817.05 of the Standard Specifications:

Basis of Payment.

The tracer cable shall be paid for separately as ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1C per foot (meter), which price shall include all associated labor and material for installation.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL AND FLASHING BEACON INSTALLATION

Effective: May 22, 2002

Revised: July 1, 2015

850.01TS

General.

1. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof. If Contract work is started prior to a traffic signal inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection.
2. The Contractor shall have electricians with IMSA Level II certification on staff to provide signal maintenance. A copy of the certification shall be immediately available upon request of the Engineer.
3. This item shall include maintenance of all traffic signal equipment and other connected and related equipment such as flashing beacons, emergency vehicle pre-emption equipment, master controllers, uninterruptable power supply (UPS and batteries), PTZ cameras, vehicle detection, handholes, lighted signs, telephone service installations, communication cables, conduits to adjacent intersections, and other traffic signal equipment.
4. Regional transit, County and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers, radios and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.
5. Maintenance shall not include Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, or peripheral equipment. This equipment is operated and maintained by the local municipality and should be de-activated while on contractor maintenance.
6. The energy charges for the operation of the traffic signal installation shall be paid for by the Contractor.

Maintenance.

1. The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. The Contractor shall check signal system communications and phone lines to assure proper operation. This item includes, as routine maintenance, all portions of emergency vehicle pre-emption equipment. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs. Prior to the traffic signal maintenance transfer, the contractor shall supply a detailed maintenance

schedule that includes dates, locations, names of electricians providing the required checks and inspections along with any other information requested by the Engineer.

2. The Contractor is advised that the existing and/or span wire traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shut down the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.
3. The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected or otherwise removed from normal operation, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs (R1-1-36) at each approach of the intersection as a temporary means of regulating traffic. When the signals operate in flash, the Contractor shall furnish and equip all their vehicles assigned to the maintenance of traffic signal installations with a sufficient number of stop signs as specified herein. The Contractor shall maintain a sufficient number of spare stop signs in stock at all times to replace stop signs which may be damaged or stolen.
4. The Contractor shall provide the Engineer with 2 (two) 24 hour telephone numbers for the maintenance of the traffic signal installation and for emergency calls by the Engineer.
5. Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of the Standard Specifications and these special provisions.
6. The Contractor shall respond to all emergency calls from the Department or others within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the contract. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work. The Contractor shall be responsible for all of the State's Electrical Maintenance Contractor's costs and liquidated damages of \$1000 per day per occurrence. The State's Electrical Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or

the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the Electrical Maintenance Contractor to make reviews of the Existing Traffic Signal Installation that has been transferred to the Contractor for Maintenance.

7. Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD) regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.
8. Equipment included in this item that is damaged or not operating properly from any cause shall be replaced with new equipment meeting current District One traffic signal specifications and provided by the Contractor at no additional cost to the Contract and/or owner of the traffic signal system, all as approved by the Engineer. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.
9. Automatic Traffic Enforcement equipment, such as Red Light Enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause, shall be the responsibility of the municipality or the Automatic Traffic Enforcement Company per Permit agreement.
10. The Contractor shall be responsible to clear snow, ice, dirt, debris or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.
11. The Contractor shall maintain the traffic signal in normal operation during short or long term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be paid for separately but shall be included in the contract.
12. Temporary replacement of damaged or knockdown of a mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

Basis of Payment.

This work will be paid for at the contract unit price per each for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION. Each intersection will be paid for separately. Maintenance of a standalone and or not connected flashing beacon shall be paid for at the contract unit price for MAINTENANCE OF EXISTING FLASHING BEACON INSTALLATION. Each flashing beacon will be paid for separately.

TRAFFIC SIGNAL PAINTING

Effective: May 22, 2002

Revised: July 1, 2015

851.01TS

Description.

This work shall include surface preparation, powder coated finish application and packaging of new galvanized steel traffic signal mast arm poles and posts assemblies. All work associated with applying the painted finish shall be performed at the vendor's facility for the pole assembly or post or at a painting facility approved by the Engineer. Traffic signal mast arm shrouds and post bases shall also be painted the same color as the pole assemblies and posts.

Surface Preparation.

All weld flux and other contaminants shall be mechanically removed. The traffic mast arms and post assemblies shall be degreased, cleaned, and air dried to assure all moisture is removed.

Painted Finish.

All galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a dry film thickness of 2.0 mils. Prior to application, the surface shall be mechanically etched by brush blasting (Ref. SSPC-SP7) and the zinc coated substrate preheated to 450 °F for a minimum one (1) hour. The coating shall be electrostatically applied and cured by elevating the zinc-coated substrate temperature to a minimum of 400 °F.

The finish paint color shall be one of the vendor's standard colors and shall be as selected by the local agency responsible for paint costs. The Contractor shall confirm, in writing, the color selection with the local responsible agency and provide a copy of the approval to the Engineer and a copy of the approval shall be included in the material catalog submittal.

Painting of traffic signal heads, pedestrian signal heads and controller cabinets is not included in this pay item.

Any damage to the finish after leaving the vendor's facility shall be repaired to the satisfaction of the Engineer using a method recommended by the vendor and approved by the Engineer. If while at the vendor's facility the finish is damaged, the finish shall be re-applied at no cost to the contract.

Warranty.

The Contractor shall furnish in writing to the Engineer, the paint vendor's standard warranty and certification that the paint system has been properly applied.

Packaging.

Prior to shipping, the poles and posts shall be wrapped in ultraviolet-inhibiting plastic foam or rubberized foam.

Basis of Payment.

This work shall be paid for at the contract unit price each for PAINT NEW MAST ARM AND POLE, UNDER 40 FEET (12.19 METER), PAINT NEW MAST ARM AND POLE, 40 FEET (12.19 METER) AND OVER, PAINT NEW COMBINATION MAST ARM AND POLE, UNDER 40 FEET (12.19 METER), PAINT NEW COMBINATION MAST ARM AND POLE, 40 FEET (12.19 METER) AND OVER, or PAINT NEW TRAFFIC SIGNAL POST of the length specified, which shall be payment in full for painting and packaging the traffic signal mast arm poles and posts described above including all shrouds, bases and appurtenances.

FULL-ACTUATED CONTROLLER (SPECIAL)

Effective: September 26, 1995

Revised: ~~July~~ July 1, 201~~8~~5

857.01TS

Description.

This work shall consist of furnishing and installing a(n) "_____" brand traffic actuated solid state digital controller meeting the requirements of the current District One Traffic Signal Special Provisions 857.02TS Full Actuated Controller and Cabinet, and 857.02TS Railroad, Full Actuated Controller and Cabinet~~-. This~~ pay item shall include furnishing and installing the controller complete including malfunction management unit, load switches and flasher relays, and all necessary connections for proper operation.

Materials.

Add the following to Article 857.02 of the Standard Specifications:

Controllers shall be NTCIP compliant, Econolite ~~ASC/3S-1000~~Cobalt or Eagle/Siemens M5~~200~~ unless specified otherwise on the plans or elsewhere on these specifications. A NTCIP compliant controller may be used at a traffic signal interconnected to railroad warning devices but only upon the approval of the Engineer. Only controllers supplied by one of the District One approved closed loop equipment supplier will be allowed. The controller shall be the most recent model and software version supplied by the equipment supplier at the time of the traffic signal TURN-ON and include data key. The traffic signal controller shall provide features to inhibit simultaneous display of a circular yellow ball and a yellow arrow display. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being omitted during program changes and after all preemption events.

Basis of Payment.

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER (SPECIAL).

FULL-ACTUATED CONTROLLER AND CABINET

Effective: January 1, 2002

Revised: July 1, ~~2015~~2018

857.02TS

Description.

This work shall consist of furnishing and installing a traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of Section 857 of the Standard Specifications, as modified herein, including malfunction management unit, load switches and flasher relays, with all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) "_____" brand traffic actuated solid state controller.

Materials.

Add the following to Article 857.02 of the Standard Specifications:

For installation as a stand-alone traffic signal, connected to a closed loop system or integrated into an advance traffic management system (ATMS), controllers shall be Econolite ~~ASC/3S-1000~~Cobalt or Eagle/Siemens M52 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment suppliers will be allowed. Unless specified otherwise on the plans or these specifications, the controller shall be of the most recent model and software version supplied by the equipment supplier at the time of the traffic signal TURN-ON. A removable controller data key shall also be provided. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being skipped during program changes and after all preemption events and shall inhibit simultaneous display of circular yellow and yellow arrow indications.

For integration into an ATMS such as Centrac, Tactics, or TransSuite, the controller shall have the latest version of NTCIP software installed. For operation prior to integration into an ATMS, the controller shall maintain existing close loop management communications.

Add the following to Article 1074.03 of the Standard Specifications:

- (a) (6) Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.
- (b) (1) Revise "conflict monitor" to read "Malfunction Management Unit"
- (b) (5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
- (b) (6) Controller Harness – Provide a TS2 Type 2 "A" wired harness in addition to the TS2 Type 1 harness.
- (b) (7) Surge Protection – Shall be a 120VAC Single phase Modular filter Plug-in type, supplied from an approved vendor.

- (b) (8) BIU – shall be secured by mechanical means.
- (b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
- (b) (10) Switch Guards – All switches shall be guarded.
- (b) (11) Heating – One (1) 200 watt, thermostatically-controlled, electric heater.
- (b) (12) Lighting – One (1) LED Panel shall be placed inside the cabinet top panel and one (1) LED Panel shall be placed on each side of the pull-out drawer/shelf assembly located beneath the controller support shelf. The LED Panels shall be controlled by a door switch. The LED Panels shall be provided from an approved vendor.
- (b) (13) The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch (38mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches (610mm) wide.
- (b) (14) Plan & Wiring Diagrams – 12" x 15" (305mm x 406mm) moisture sealed container attached to door.
- (b) (15) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
- (b) (16) Field Wiring Labels – All field wiring shall be labeled.
- (b) (17) Field Wiring Termination – Approved channel lugs required.
- (b) (18) Power Panel – Provide a nonconductive shield.
- (b) (19) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
- (b) (20) Police Door – Provide wiring and termination for plug in manual phase advance switch.

Basis of Payment.

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET; FULL-ACTUATED CONTROLLER AND TYPE V CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET; FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET; FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL; FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET (SPECIAL); FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET (SPECIAL).

RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET

Effective: January 1, 2002

Revised: July 1, 2018⁵

857.03TS

Description.

This work shall consist of furnishing and installing a traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of Section 857 of the Standard Specifications as modified herein and including conflict monitor or MMU, load switches and flasher relays, with ~~monitoring interlock function and/or providing redundancy~~ to the railroad preemptor and all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) "_____" brand traffic actuated solid state controller.

Controller and cabinet shall be assembled only by an approved IDOT District One traffic signal equipment supplier. The equipment shall be tested and approved in the equipment supplier's District One's facility prior to field installation.

Materials.

Add the following to Article 857.02 of the Standard Specifications:

For installation as a stand-alone traffic signal, connected to a closed loop system or integrated into an advance traffic management system (ATMS), controllers shall be Econolite ~~ASC/3S-4000~~Cobalt or Eagle/Siemens M52 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment supplier will be allowed. The controller shall be the most recent model and software version approved by IDOT for use with railroad intersections supplied by the equipment supplier at the time of the traffic signal TURN-ON unless specified otherwise on plans or this specification, and include a removable data key. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being omitted during program changes and after all preemption events and shall inhibit simultaneous display of circular yellow and yellow arrow indications.

For integration into an ATMS such as Centrac, Tactics, or TransSuite, the controller shall have the latest version of NTCIP software installed. For operation prior to integration into an ATMS, the controller shall maintain existing communications.

Controller shall comply with Article 1073.01 as amended herein.

Controller Cabinet and Peripheral Equipment shall comply with Article 1074.03 as amended in these Traffic Signal Special Provisions.

Add the following to Articles 1073.01 (c) (2) and 1074.03 (a) (5) (e) of the Standard Specifications:

Controllers and cabinets shall be new and NEMA TS2 Type 1 or NEMA TS2 Type 2 design.

Railroad interconnected controllers and cabinets shall be assembled only by an approved traffic signal equipment supplier. All railroad interconnected (including temporary railroad interconnect) controllers and cabinets shall be new, built, tested and approved by the controller equipment vendor, in the vendor's District One facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

Add the following to Article 1074.03 of the Standard Specifications:

- (a) (6) Cabinets shall be designed for NEMA TS2 Type 1 or NEMA TS2 Type 2 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.
- (b) (1) Revise "conflict monitor" to read "Malfunction Management Unit"
- (b) (5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
- (b) (6) Controller Harness – Provide a TS2 Type 2 "A" wired harness in addition to the TS2 Type 1 harness.
- (b) (7) Surge Protection – Shall be a 120VAC Single phase Modular filter Plug-in type, supplied from an approved vendor.
- (b) (8) BIU – shall be secured by mechanical means.
- (b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
- (b) (10) Switch Guards – All switches shall be guarded.
- (b) (11) Heating – One (1) 200 watt, thermostatically-controlled, electric heater.
- (b) (12) Lighting – One (1) LED Panel shall be placed inside the cabinet top panel and one (1) LED Panel shall be placed on each side of the pull-out drawer/shelf assembly located beneath the controller support shelf. The LED Panels shall be controlled by a door switch. The LED Panels shall be provided from an approved vendor.
- (b) (13) The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1 ½ inch (38mm) deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one (1) complete set of cabinet prints and manuals. This drawer shall support 50 lbs. (23 kg) in weight when fully extended. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches (610mm) wide.
- (b) (14) Plan & Wiring Diagrams – 12" x 15" (3.05mm x 4.06mm) moisture sealed container attached to door.
- (b) (15) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
- (b) (16) Field Wiring Labels – All field wiring shall be labeled.
- (b) (17) Field Wiring Termination – Approved channel lugs required.
- (b) (18) Power Panel – Provide a nonconductive shield.

- (b) (19) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
- (b) (20) Police Door – Provide wiring and termination for plug in manual phase advance switch.
- (b) (21) Railroad Pre-Emption Test Switch – Shall be provided from an approved vendor

Installation.

Add the following to Article 857.03 of the Standard Specifications:

The Contractor shall arrange to install a standard voice-grade dial-up telephone line and all equipment to dial into the controller and have the controller dial out to the RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET as called for on the traffic signal installation plans. If the traffic signal installation is part of a traffic signal system, a telephone line is usually not required, unless a telephone line is called for on the traffic signal plans. The Contractor shall follow the requirements for the telephone service installation as contained in the current District One Traffic Signal Special Provision for Master Controller.

Basis of Payment.

This work will be paid for at the contract unit price each for RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE IV CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE V CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE IV CABINET, SPECIAL; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE V CABINET, SPECIAL; RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER P CABINET (SPECIAL) or RAILROAD, FULL-ACTUATED CONTROLLER AND TYPE SUPER R CABINET (SPECIAL).

MASTER CONTROLLER

Effective: May 22, 2002

Revised: July 1, ~~2015~~2018

860.01TS

General.

This work shall consist of furnishing and installing a master controller, meeting the requirements of the current District One Traffic Signal Special Provisions 857.01TS FULL-ACTUATED CONTROLLER (SPECIAL), 857.02TS FULL-ACTUATED CONTROLLER AND CABINET, and 857.02TS RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET, including all necessary connections for proper operation.

If the intersection is part of an existing system and/or when specified in the plans, this work shall consist of furnishing and installing a(n) "_____" brand master controller.

Materials and Installation.

Revise Articles 860.02 and 860.03 of the Standard Specifications to read:

Only controllers supplied by one of the District approved closed loop equipment supplier will be allowed. Only NEMA TS 2 Type 1 Eagle/Siemens and Econolite closed loop systems shall be supplied. The latest model and software version of master controller shall be supplied.

Functional requirements in addition to those in Section 863 of the Standard Specifications include:

The system commands shall consist of, as a minimum, six (6) cycle lengths, five (5) offsets, three (3) splits, and four (4) special functions. The system commands shall also include commands for free or coordinated operation.

Traffic Responsive operation shall consist of the real time acquisition of system detector data, data validation, and the scaling of acquired volumes and occupancies in a deterministic fashion so as to cause the selection and implementation of the most suitable traffic plan.

Upon request by the Engineer, each master shall be delivered with up to three (3) complete sets of the latest edition of registered remote monitoring software with full manufacture's support. Each set shall consist of software on CD, DVD, or other suitable media approved by the Engineer, and a bound set of manuals containing loading and operating instruction. One copy of the software and support data shall be delivered to the Agency in charge of system operation, if other than IDOT. One of these two sets will be provided to the Agency Signal Maintenance Contractor for use in monitoring the system.

The approved manufacturer of equipment shall loan the District one master controller and two intersection controllers of the most recent models and the newest software version to be used for instructional purposes in addition to the equipment to be supplied for the Contract.

The Contractor shall arrange to install a standard voice-grade dial-up telephone line to the master controller. This shall be accomplished through the following process utilizing District

One staff. This telephone line may be coupled with a DSL line and a phone filter to isolate the dial-up line. An E911 address is required.

The cabinet shall be provided with an Outdoor Network Interface for termination of the telephone service. It shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service at a later date.

Full duplex communication between the master and its local controllers is recommended, but at this time not required. The data rate shall be 1200 baud minimum and shall be capable of speeds to 38,400 or above as technology allows. The controller, when installed in an Ethernet topology, may operate non-serial communications.

The cabinet shall be equipped with a 9600 baud, auto dial/auto answer modem. It shall be a US robotics 33.6K baud rate or equal.

As soon as practical or within one week after the contract has been awarded, the Contractor shall contact ~~Raymond Eaves~~ Teresa Caldwell, ~~Administrative Support~~ Business Services Manager in the District One Business Services Section at ~~Raymond.Eaves@illinois.gov~~ or (847) 705-4010~~1~~ to request a phone line installation. A follow-up contact shall include all required information pertaining to the phone installation and should be made as soon as possible or within one week after the initial request has been made. A copy of this contact must be emailed by the Contractor to the Traffic Signal Systems Engineer. The required information to be supplied shall include (but not limited to): An E911 address for the new traffic signal controller (or nearby address); a nearby existing telephone number; what type of telephone service is needed; the name and number of the Contractor's employee for the telephone company to contact regarding site work and questions.

The usual time frame for the activation of the phone line will vary after the Business Services Section has received the Contractor's information and will depend on location and existing available facilities. It is, therefore, imperative that the phone line conduit and pull-string be installed by the Contractor as soon as possible. The contractor shall provide the Administrative Support Manager with an expected installation date

The telephone line shall be installed and activated one month before the system final inspection.

All costs associated with the telephone line installation and activation (not including the Contract specified conduit installation between the point of telephone service and the traffic signal controller cabinet) shall be paid for by the District One Business Services Section (i.e., this will be an IDOT phone number not a Contractor phone number).

Basis of Payment.

This work will be paid for at the contract unit price each for MASTER CONTROLLER or MASTER CONTROLLER (SPECIAL).

UNINTERRUPTABLE POWER SUPPLY, SPECIAL

Effective: January 1, 2013

Revised: May 19, 2016

862.01TS

This work shall be in accordance with section 862 of the Standard Specification except as modified herein

Add the following to Article 862.01 of the Standard Specifications:

The UPS shall have the power capacity to provide normal operation of a signalized intersection that utilizes all LED type signal head optics, for a minimum of 6 (six) hours.

Add the following to Article 862.02 of the Standard Specifications:

Materials shall be according to Article 1074.04 as modified in UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

Add the following to Article 862.03 of the Standard Specifications:

The UPS shall additionally include, but not be limited to, a battery cabinet, where applicable. For Super-P (Type IV) and Super-R (Type V) cabinets, the battery cabinet is integrated to the traffic signal cabinet, and shall be included in the cost for the traffic signal cabinet of the size and type indicated on the plans.

The UPS shall provide reliable emergency power to the traffic signals in the event of a power failure or interruption.

Revise Article 862.04 of the Standard Specifications to read:

Installation.

When a UPS is installed at an existing traffic signal cabinet, the UPS cabinet shall partially rest on the lip of the existing controller cabinet foundation and be secured to the existing controller cabinet by means of at least four (4) stainless steel bolts. The UPS cabinet shall be completely enclosed with the bottom and back constructed of the same material as the cabinet.

When a UPS is installed at a new signal cabinet and foundation, it shall be mounted as shown on the plans.

At locations where UPS is installed and an Emergency Vehicle Priority System is in use, any existing incandescent confirmation beacons shall be replaced with LED lamps in accordance with the District One Emergency Vehicle Priority System specification at no additional cost to the contract. A concrete apron shall be provided and be in accordance with Articles 424 and 202 of the Standard Specifications. The concrete apron shall also, follow the District 1 Standard Traffic Signal Design Detail, Type D for Ground Mounted Controller Cabinet and UPS Battery Cabinet.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the UPS including the addition of alarms.

Materials.

Revise Article 1074.04(a)(1) of the Standard Specifications to read:

The UPS shall be line interactive or double conversion and provide voltage regulation and power conditioning when utilizing utility power. The UPS shall be sized appropriately for the intersection(s) normal traffic signal operating load. The UPS must be able to maintain the intersection's normal operating load plus 20 percent (20%) of the intersection's normal operating load. When installed at a railroad-interconnected intersection the UPS must maintain the railroad pre-emption load, plus 20 percent (20%) of the railroad preemption-operating load. The total connected traffic signal load shall not exceed the published ratings for the UPS.

The UPS shall provide a minimum of 6 (six) hours of normal operation run-time for signalized intersections with LED type signal head optics at 77 °F (25 °C) (minimum 1000 W active output capacity, with 86 percent minimum inverter efficiency).

Revise the first paragraph of Article 1074.04(a)(3) of the Standard Specifications to read:

The UPS shall have a minimum of four (4) sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) relay contact closures, available on a panel mounted terminal block or locking circular connectors, rated at a minimum 120 V/1 A, and labeled so as to identify each contact according to the plans.

Revise Article 1074.04(a)(10) of the Standard Specifications to read:

The UPS shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.

Revise Article 1074.04(a)(17) of the Standard Specifications to read:

When the intersection is in battery backup mode, the UPS shall bypass all internal cabinet lights, ventilation fans, cabinet heaters, service receptacles, luminaires, any lighted street name signs, any automated enforcement equipment and any other devices directed by the Engineer.

Revise Article 1074.04(b)(2)b of the Standard Specifications to read:

Batteries, inverter/charger and power transfer relay shall be housed in a separate NEMA Type 3R cabinet. The cabinet shall be Aluminum alloy, 5052-H32, 0.125-inch thick and have a natural mill finish.

Revise Article 1074.04(b)(2)c of the Standard Specifications to read:

No more than three batteries shall be mounted on individual shelves for a cabinet housing six batteries and no more than four batteries per shelf for a cabinet housing eight batteries.

Revise Article 1074.04(b)(2)e of the Standard Specifications to read:

The battery cabinet housing shall have the following nominal outside dimensions: a width of 25 in. (785 mm), a depth of 16 in. (440 mm), and a height of 41 to 48 in. (1.1 to 1.3 m). Clearance between shelves shall be a minimum of 10 in. (250 mm).

End of paragraph 1074.04(b)(2)e

The door shall be equipped with a two position doorstop, one a 90° and one at 120°.

Revise Article 1074.04(b)(2)g of the Standard Specifications to read:

The door shall open to the entire cabinet, have a neoprene gasket, an Aluminum continuous piano hinge with stainless steel pin, and a three point locking system. The cabinet shall be provided with a main door lock which shall operate with a traffic industry conventional No. 2 key. Provisions for padlocking the door shall be provided.

Add the following to Article 1074.04(b)(2) of the Standard Specifications:

j. The battery cabinet shall have provisions for an external generator connection.

Add the following to Article 1074.04(c) of the Standard Specifications:

- (8) The UPS shall include a tip or kill switch installed in the battery cabinet, which shall completely disconnect power from the UPS when the switch is manually activated.
- (9) The UPS shall include standard RS-232 and internal Ethernet interface.
- (10) The UPS shall incorporate a flanged electric generator inlet for charging the batteries and operating the UPS. The generator connector shall be male type, twist-lock, rated as 15A, 125VAC with a NEMA L5-15P configuration and weatherproof lift cover plate. Access to the generator inlet shall be from a secured weatherproof lift cover plate or behind a locked battery cabinet police panel.
- (11) The bypass switch shall include an internal power transfer relay that allows removal of the battery back-up unit, while the traffic signal is connected to utility power, without impacting normal traffic signal operation.

Revise Article 1074.04(d)(3) of the Standard Specifications to read:

All batteries supplied in the UPS shall be either gel cell or AGM type, deep cycle, completely sealed, prismatic lead calcium based, silver alloy, valve regulated lead acid (VRLA) requiring no

maintenance. All batteries in a UPS installation shall be the same type; mixing of gel cell and AGM types within a UPS installation is not permitted.

Revise Article 1074.04(d)(4) of the Standard Specifications to read:

Batteries shall be certified by the manufacturer to operate over a temperature range of -13 to 160 °F (-25 to + 71 °C) for gel cell batteries and -40 to 140 °F (-40 to + 60 °C) for AGM type batteries.

Add the following to Article 1074.04(d) of the Standard Specifications:

- (9) The UPS shall consist of an even number of batteries that are capable of maintaining normal operation of the signalized intersection for a minimum of 6 (six) hours. Calculations shall be provided showing the number of batteries of the type supplied that are needed to satisfy this requirement. A minimum of four batteries shall be provided.
- (10) Battery Heater mats shall be provided, when gel cell type batteries are supplied.

Add the following to the Article 1074.04 of the Standard Specifications:

- (e) Warranty. The warranty for an uninterruptable power supply (UPS) and batteries (full replacement) shall cover a minimum of 5 years from date the equipment is placed in operation.
- (f) Installation. Bypass switch shall completely disconnect the traffic signal cabinet from the utility provider.
- (g) The UPS shall be set-up to run the traffic signal continuously, without going to a red flashing condition, when switched to battery power unless otherwise directed by the Engineer. The Contractor shall confirm set-up with the Engineer. The continuous operation mode when switched to battery may require modification to unit connections and these modifications are included in the unit price for this item.

Revise Article 862.05 of the Standard Specifications to read:

Basis of Payment.

This work will be paid for at the contract unit price per each for UNINTERRUPTABLE POWER SUPPLY, SPECIAL or UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL. Replacement of Emergency Vehicle Priority System confirmation beacons and any required modifications to the traffic signal controller shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, SPECIAL or UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL item. The concrete apron and earth excavation required shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY AND CABINET, SPECIAL item.

UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED

Effective: January 1, 2012

Revised: July 1, 2015

862.02TS

This item shall consist of furnishing and installing an uninterruptable power supply. This item shall meet the same requirements as the current District One Traffic Signal Special Provision 862.01TS UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

Materials shall be according to Article 1074.04 as modified in UNINTERRUPTABLE POWER SUPPLY, SPECIAL.

Installation.

The UPS shall be mounted on its own Type A square concrete foundation. The concrete foundation shall extend 2 inch past each side of the UPS cabinet and the edges shall have a continuous 1 inch chamfer at a 45 degree angle.

At locations where UPS is to be installed and Emergency Vehicle Priority System is in use, any existing incandescent confirmation beacons shall be replaced with LED lamps in accordance with the District One Emergency Vehicle Priority System specification at no additional cost to the contract. A concrete apron shall be provided with a dimension of 36 inches in front of the UPS cabinet, 5 inches deep, and a width sized appropriately to the width of the concrete foundation. The concrete apron shall follow Articles 424 and 202 of the Standard Specifications.

This item shall include any required modifications to an existing traffic signal controller.

Basis of Payment.

This item will be paid for at the contract unit price each for UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED. Replacement of Emergency Vehicle Priority System confirmation beacons and any required modifications to the traffic signal controller shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED item. The concrete foundation, concrete apron and earth excavation required shall be included in the cost of the UNINTERRUPTABLE POWER SUPPLY, GROUND MOUNTED item.

FIBER OPTIC CABLE

Effective: May 22, 2002

Revised: July 1, 2015

871.01TS

Add the following to Article 871.01 of the Standard Specifications:

The Fiber Optic cable shall be installed in conduit or as specified on the plans.

Add the following to Article 871.02 of the Standard Specifications:

The control cabinet distribution enclosure shall be 24 Port Fiber Wall Enclosure, unless otherwise indicated on plans. The fiber optic cable shall provide twelve fibers per tube for the amount of fibers called for in the Fiber Optic Cable pay item in the Contract. Fiber Optic cable may be gel filled or have an approved water blocking tape.

Add the following to Article 871.04 of the Standard Specifications:

A minimum of six multimode fibers from each cable shall be terminated with approved mechanical connectors at the distribution enclosure. Fibers not being used shall be labeled "spare." Fibers not attached to the distribution enclosure shall be capped.. A minimum of 13.0 feet (4m) of extra cable length shall be provided for controller cabinets. The controller cabinet extra cable length shall be stored as directed by the Engineer.

Add the following to Article 871.06 of the Standard Specifications:

The distribution enclosure and all connectors will be included in the cost of the fiber optic cable.

Testing shall be in accordance with Article 801.13(d). Electronic files of OTDR signature traces shall be provided in the Final project documentation with certification from the Contractor that attenuation of each fiber does not exceed 3.5 dB/km nominal at 850nm for multimode fiber and 0.4 bd/km nominal at 1300nm for single mode fiber.

ELECTRIC CABLE

Effective: May 22, 2002

Revised: July 1, 2015

873.01TS

Delete "or stranded, and No. 12 or" from the last sentence of Article 1076.04 (a) of the Standard Specifications.

Add the following to the Article 1076.04(d) of the Standard Specifications:

Service cable may be single or multiple conductor cable.

GROUNDING EXISTING HANDHOLE FRAME AND COVER

Effective: May 22, 2002

Revised: July 1, 2015

873.02TS

Description.

This work shall consist of all materials and labor required to bond the equipment grounding conductor to the existing handhole frame and handhole cover. All installations shall meet the requirements of the details in the "District One Standard Traffic Signal Design Details," and applicable portions of the Standard Specifications and District One Traffic Signal Special Provisions 806.01TS GROUNDING OF TRAFFIC SIGNAL SYSTEMS and 817.01TS GROUNDING CABLE.

The equipment grounding conductor shall be bonded to the handhole frame and to the handhole cover. Two (2) ½-inch diameter x 1 ¼-inch long hex-head stainless steel bolts, spaced 1.75-inches apart center-to-center shall be fully welded to the frame and to the cover to accommodate a heavy duty UL listed grounding compression terminal. The grounding compression terminal shall be secured to the bolts with stainless steel split-lock washers and nylon-insert locknuts.

Welding preparation for the stainless steel bolt hex-head to the frame and to the cover shall include thoroughly cleaning the contact and weldment area of all rust, dirt and contaminants. The Contractor shall assure a solid strong weld. The welds shall be smooth and thoroughly cleaned of flux and spatter. The grounding installation shall not affect the proper seating of the cover when closed.

The grounding cable shall be paid for separately.

Method of Measurement.

Units measured for payment will be counted on a per handhole basis, regardless of the type of handhole and its location.

Basis of Payment.

This work shall be paid for at the contract unit price each for GROUNDING EXISTING HANDHOLE FRAME AND COVER which shall be payment in full for grounding the handhole complete.

EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C

Effective: January 1, 2013

Revised: July 1, 2015

873.03TS

This work shall consist of furnishing and installing lead-in cable for light detectors installed at existing and/or proposed traffic signal installations as part of an emergency vehicle priority system. The work includes installation of the lead-in cables in existing and/or new conduit. The electric cable shall be shielded and have (3) stranded conductors, colored blue, orange, and yellow with a stranded tinned copper drain wire. The cable shall meet the requirements of the vendor of the Emergency Vehicle Priority System Equipment.

Basis of Payment.

This work will be paid for at the contract unit price per foot for EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C, which price shall be payment in full for furnishing, installing and making all electrical connections necessary for proper operations.

RAILROAD INTERCONNECT CABLE

Effective: May 22, 2002

Revised: July 1, 2015

873.04TS

The cable shall meet the requirements of Section 873 of the Standard Specifications, except for the following:

Add to Article 873.02 of the Standard Specifications:

- c) The railroad interconnect cable shall be three conductor stranded #14 copper cable in a clear polyester binder, shielded with #36 AWG tinned copper braid with 85% coverage, and insulated with .016" polyethylene (black, blue, red). The jacket shall be black 0.045 PVC or polyethylene.

Add the following to Article 873.06 of the Standard Specifications:

Basis of Payment.

This work shall be paid for at the contract unit price per foot (meter) for ELECTRIC CABLE IN CONDUIT, RAILROAD, NO. 14 3C, which price shall be payment in full for furnishing, installing, and making all electrical connections in the traffic signal controller cabinet. Connections in the railroad controller cabinet shall be performed by railroad personnel.

TRAFFIC SIGNAL POST

Effective: May 22, 2002

Revised: July 01, 2015

875.01TS

Add the following to Article 1077.01 (c) of the Standard Specifications:

Washers for post bases shall be the same size or larger than the nut.

Revise the first sentence of Article 1077.01 (d) of the Standard Specifications to read:

All posts and bases shall be steel and hot dipped galvanized according to AASHTO M 111. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

PEDESTRIAN PUSH-BUTTON POST

Effective: May 22, 2002

Revised: July 01, 2015

876.01TS

Revise the first sentence of Article 1077.02 (a) of the Standard Specifications to read:

The steel post shall be according to Article 1077.01. Washers for post bases shall be the same size or larger than the nut.

Revise the first sentence of Article 1077.02 (a) of the Standard Specifications to read:

All posts and bases shall be steel and hot dipped galvanized according to AASHTO M 111. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

MAST ARM ASSEMBLY AND POLE

Effective: May 22, 2002

Revised: July 01, 2015

877.01TS

Revise the second sentence of Article 1077.03 (a)(3) of the Standard Specifications to read:

Traffic signal mast arms shall be one piece construction, unless otherwise approved by the Engineer.

Add the following to Article 1077.03 (a)(3) of the Standard Specifications:

If the Department approves painting, powder coating by the manufacturer will be required over the galvanization in accordance with 851.01TS TRAFFIC SIGNAL PAINTING Special Provisions.

CONCRETE FOUNDATIONS

Effective: May 22, 2002

Revised: July 01, 2015

878.01TS

Add the following to Article 878.03 of the Standard Specifications:

All anchor bolts shall be according to Article 1006.09, with all anchor bolts hot dipped galvanized a minimum of 12 in. (300 mm) at the threaded end.

Foundations used for Combination Mast Arm Poles shall provide an extra 2-1/2 inch (65 mm) raceway.

No foundation is to be poured until the Resident Engineer gives his/her approval as to the depth of the foundation.

Add the following to the first paragraph of Article 878.05 of the Standard Specifications:

The price shall include a concrete apron in front of the cabinet and UPS as shown in the plans or as directed by the engineer.

REMOVE AND REPLACE ANCHOR BOLTS

Effective: January 1, 2014

Revised: July 1, 2015

878.02TS

This item shall consist of replacing anchor rods at existing concrete foundations for traffic signal posts. At locations specified on the plans for new traffic signal post installation, the Contractor shall inspect the existing post foundations prior to removing the existing traffic signal post. The Contractor shall verify that the pattern, spacing, and condition of the existing anchor bolts are acceptable for reuse with a new post. The Contractor shall replace unacceptable anchor bolts as approved by the Engineer.

Anchor bolts shall be according to Article 1006.09 and shall be hot dipped galvanized.

Installation.

Existing anchor bolts shall be cut flush with the top of concrete foundation.

The bolt circle of the new anchor bolts shall be rotated a minimum of 2.5-inches away from the existing anchor bolts. New anchor bolts shall be $\frac{3}{4}$ -inch diameter with minimum 9-inch embedment into the existing concrete foundation and 3-inch threaded length above the top of foundation. New anchor bolts shall be installed using a HIT-RE 500 exposed adhesive anchoring system.

Method of Measurement.

The removal and replacement of anchor bolts will be measured for payment as per each foundation requiring anchor bolt replacement. This shall include all anchor bolts replaced, labor, equipment, and materials required for replacing anchor bolts at an existing foundation as specified herein.

Basis of Payment.

This item will be paid for at the contract unit price each for REMOVE AND REPLACE ANCHOR BOLTS.

LIGHT EMITTING DIODE (LED) SIGNAL HEAD AND OPTICALLY PROGRAMMED LED SIGNAL HEAD

Effective: May 22, 2002

Revised: July 1, 2015

880.01TS

Materials.

Add the following to Section 1078 of the Standard Specifications:

1. LED modules proposed for use and not previously approved by IDOT District One will require independent testing for compliance to current VTCSH-ITE standards for the product and be Intertek ETL Verified. This would include modules from new vendors and new models from IDOT District One approved vendors.
2. The proposed independent testing facility shall be approved by IDOT District One. Independent testing must include a minimum of two (2) randomly selected modules of each type of module (i.e. ball, arrow, pedestrian, etc.) used in the District and include as a minimum Luminous Intensity and Chromaticity tests. However, complete module performance verification testing may be required by the Engineer to assure the accuracy of the vendor's published data and previous test results. An IDOT representative will select sample modules from the local warehouse and mark the modules for testing. Independent test results shall meet current ITE standards and vendor's published data. Any module failures shall require retesting of the module type. All costs associated with the selection of sample modules, testing, reporting, and retesting, if applicable, shall be the responsibility of the LED module vendor and not be a cost to this contract.
3. All signal heads shall provide 12" (300 mm) displays with glossy yellow or black polycarbonate housings. All head housings shall be the same color (yellow or black) at the intersection. For new signalized intersections and existing signalized intersections where all signals heads are being replaced, the proposed head housings shall be black. Where only selected heads are being replaced, the proposed head housing color (yellow or black) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on. Post top mounting collars are required on all posts, and shall be constructed of the same material as the brackets.
4. The LED signal modules shall be replaced or repaired if an LED signal module fails to function as intended due to workmanship or material defects within the first 7 years from the date of traffic signal TURN-ON. LED signal modules which exhibit luminous intensities less than the minimum values specified in Table 1 of the ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 27, 2005) [VTSCH], or applicable successor ITE specifications, or show signs of entrance of moisture or contaminants within the first 7 years of the date of traffic signal TURN-ON shall be replaced or repaired. The vendor's written warranty for the LED signal modules

shall be dated, signed by a vendor's representative and included in the product submittal to the State.

(a) Physical and Mechanical Requirements

1. Modules can be manufactured under this specification for the following faces:
 - a. 12 inch (300 mm) circular, multi-section
 - b. 12 inch (300 mm) arrow, multi-section
2. The maximum weight of a module shall be 4 lbs. (1.8 kg).
3. Each module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.
5. The lens of the module shall be tinted with a wavelength-matched color to reduce sun phantom effect and enhance on/off contrast. The tinting shall be uniform across the lens face. Polymeric lens shall provide a surface coating or chemical surface treatment applied to provide abrasion resistance. The lens of the module shall be integral to the unit, convex with a smooth outer surface and made of plastic. The lens shall have a textured surface to reduce glare.
6. The use of tinting or other materials to enhance ON/OFF contrasts shall not affect chromaticity and shall be uniform across the face of the lens.
7. Each module shall have a symbol of the type of module (i.e. circle, arrow, etc.) in the color of the module. The symbol shall be 1 inch (25.4 mm) in diameter. Additionally, the color shall be written out in 1/2 inch (12.7mm) letters next to the symbol.

(b) Photometric Requirements

4. The LEDs utilized in the modules shall be AlInGaP technology for red and InGaN for green and amber indications, and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.

(c) Electrical

1. Maximum power consumption for LED modules is per Table 2.
2. Operating voltage of the modules shall be 120 VAC. All parameters shall be measured at this voltage.
3. The modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers, and conflict monitors).

4. When a current of 20 mA AC (or less) is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.
5. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.
6. LED arrows shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(d) Retrofit Traffic Signal Module

1. The following specification requirements apply to the Retrofit module only. All general specifications apply unless specifically superseded in this section.
2. Retrofit modules can be manufactured under this specification for the following faces:
 - a. 12 inch (300 mm) circular, multi-section
 - b. 12 inch (300 mm) arrow, multi-section
3. Each Retrofit module shall be designed to be installed in the doorframe of a standard traffic signal housing. The Retrofit module shall be sealed in the doorframe with a one-piece EPDM (ethylene propylene rubber) gasket.
4. The maximum weight of a Retrofit module shall be 4 lbs. (1.8 kg).
5. Each Retrofit module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.
6. Electrical conductors for modules, including Retrofit modules, shall be 39.4 inches (1m) in length, with quick disconnect terminals attached.
7. The lens of the Retrofit module shall be integral to the unit, shall be convex with a smooth outer surface and made of plastic or of glass.

(e) The following specification requirements apply to the 12 inch (300 mm) arrow module only. All general specifications apply unless specifically superseded in this section.

1. The arrow module shall meet specifications stated in Section 9.01 of the Equipment and Material Standards of the Institute of Transportation Engineers (November 1998) [ITE Standards], Chapter 2 (Vehicle Traffic Control Signal Heads) or applicable successor ITE specifications for arrow indications.
2. The LEDs arrow indication shall be a solid display with a minimum of three (3) outlining rows of LEDs and at least one (1) fill row of LEDs.

(f) The following specification requirement applies to the 12 inch (300 mm) programmed visibility (PV) module only. All general specifications apply unless specifically superseded in this section.

1. The LED module shall be a module designed and constructed to be installed in a programmed visibility (PV) signal housing without modification to the housing.

Basis of Payment.

Add the following to the first paragraph of Article 880.04 of the Standard Specifications:

The price shall include furnishing the equipment described above, all mounting hardware and installing them in satisfactory operating condition.

Revise the second paragraph of Article 880.04 of the Standard Specifications to read:

If the work consists of retrofitting an existing polycarbonate traffic signal head with light emitting diodes (LEDs), it will be paid for as a SIGNAL HEAD, LED, RETROFIT, of the type specified, and of the particular kind of material, when specified. Price shall be payment in full for removal of the existing module, furnishing the equipment described above including LED modules, all mounting hardware, and installing them in satisfactory operating condition. The type specified will indicate the number of signal faces, the number of signal sections in each signal face and the method of mounting.

FLASHING BEACON INSTALLATION, RELOCATION AND REMOVAL

Effective: January 1, 2007

Revised: July 1, 2015

880.02TS

This work shall consist of furnishing and installing a new flashing beacon installation, solar powered flashing beacon installation, relocation of existing flashing beacon, and/or the removal of the existing flashing beacon installation as shown on the plans and as described herein. The energy charges for the operation of the flashing beacon installation shall be paid for by the Department unless otherwise directed by the Engineer.

The installation, relocation and removal of flashing beacon installation shall be according to the applicable portions of Sections 800 and 1000 of the Standard Specifications for Road and Bridge Construction and District 1 Flashing Beacon Installation Details except as revised herein. LED signal heads shall be as modified in 880.01TS LED SIGNAL HEAD AND OPTICALLY PROGRAMMED LED SIGNAL HEAD Special Provision.

- (a) Flashing Beacon Installation. This item shall consist of installing a post mounted 12 inch (300 mm) L.E.D. single section red or yellow flashing beacon on a new or existing post as shown on the plans or as directed by the Engineer. This item shall include furnishing and installing a flasher controller in an aluminum cabinet, or integrated within the signal head, 12 inch (300 mm) L.E.D. red or yellow signal section with a dimmer if required by the Engineer, and all other hardware necessary to complete the installation.
- (b) Solar Powered Flashing Beacon Installation. This item shall consist of installation of a solar powered flashing beacon, post mounted as shown on the plans or as directed by the Engineer. This item shall consist of furnishing and installing a 12 inch (300 mm) single red or yellow flashing module on a new or existing post as shown on the plans or as directed by the Engineer. This item shall include furnishing and installing a flasher controller that is integrated within the signal head, with discrete solar panels, LED module, battery, electronics, compact housing and be capable of operating 24 hours, 7 days a week. The flasher unit shall be installed on standard wood or metal posts. The flash pattern shall be MUTCD compliant and have alternate flash patterns available. The battery shall have a life span of a minimum of 5 years and be field replaceable. The battery and electronics may be located inside the solar panel housing or signal head. The sections of the flasher unit shall be secured with tamper resistant stainless steel hardware and unless otherwise noted, the housing shall be black in color.
- (c) Relocate Existing Flashing Beacon. Relocation of an existing flashing beacon installation, as shown on the plans or as directed by the Engineer, shall meet the above requirements. This work shall include the complete relocation of the existing flashing beacon installation, the backfilling of the holes created by the removal of the poles, restoration of the surface to match the adjoining area.
- (d) Remove Existing Flashing Beacon Installation Complete. Removal of an existing flashing beacon installation shall be as shown on the plans or as directed by the Engineer and shall be according to applicable portions of Section 895 of the Standard Specifications. This work shall include a complete removal of an existing flashing beacon installation, backfilling of the holes created by the removal of the poles and restoration of the surface to match the

adjoining area. The flashing beacon installation will be removed only after the permanent signal installation is accepted for maintenance, or as directed by the Engineer.

Basis of Payment.

This work shall be paid for at the contract unit price each for FLASHING BEACON INSTALLATION; SOLAR POWERED FLASHING BEACON INSTALLATION; RELOCATE EXISTING FLASHING BEACON or REMOVE EXISTING FLASHING BEACON INSTALLATION COMPLETE. The price shall be payment in full for all labor and material necessary to complete the work described above.

LIGHT EMITTING DIODE (LED) PEDESTRIAN SIGNAL HEAD

Effective: May 22, 2002

Revised: July 1, 2015

881.01TS

Add the following to the third paragraph of Article 881.03 of the Standard Specifications:

No mixing of different types of pedestrian traffic signals or displays will be permitted.

Add the following to Article 881.03 of the Standard Specifications:

(a) Pedestrian Countdown Signal Heads.

- (1) Pedestrian Countdown Signal Heads shall not be installed at signalized intersections where traffic signals and railroad warning devices are interconnected.
- (2) Pedestrian Countdown Signal Heads shall be 16 inch (406mm) x 18 inch (457mm), for single units with glossy yellow or black polycarbonate housings. All pedestrian head housings shall be the same color (yellow or black) at the intersection. For new signalized intersections and existing signalized intersections where all pedestrian heads are being replaced, the proposed head housings shall be black. Where only selected heads are being replaced, the proposed head housing color (yellow or black) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on.
- (3) Each pedestrian signal LED module shall be fully MUTCD compliant and shall consist of double overlay message combining full LED symbols of an Upraised Hand and a Walking Person. "Egg Crate" type sun shields are not permitted. Numerals shall measure 9 inches (229mm) in height and easily identified from a distance of 120 feet (36.6m).

Materials.

Add the following to Article 1078.02 of the Standard Specifications:

General.

1. The module shall operate in one mode: Clearance Cycle Countdown Mode Only. The countdown module shall display actual controller programmed clearance cycle and shall start counting when the flashing clearance signal turns on and shall countdown to "0" and turn off when the steady Upraised Hand (symbolizing Don't Walk) signal turns on. Module shall not have user accessible switches or controls for modification of cycle.
2. At power on, the module shall enter a single automatic learning cycle. During the automatic learning cycle, the countdown display shall remain dark.

3. The module shall re-program itself if it detects any increase or decrease of Pedestrian Timing. The counting unit will go blank once a change is detected and then take one complete pedestrian cycle (with no counter during this cycle) to adjust its buffer timer.
4. If the controller preempts during the Walking Person (symbolizing Walk), the countdown will follow the controller's directions and will adjust from Walking Person to flashing Upraised Hand. It will start to count down during the flashing Upraised Hand.
5. If the controller preempts during the flashing Upraised Hand, the countdown will continue to count down without interruption.
6. The next cycle, following the preemption event, shall use the correct, initially programmed values.
7. If the controller output displays Upraised Hand steady condition and the unit has not arrived to zero or if both the Upraised Hand and Walking Person are dark for some reason, the unit suspends any timing and the digits will go dark.
8. The digits will go dark for one pedestrian cycle after loss of power of more than 1.5 seconds.
9. The countdown numerals shall be two (2) "7 segment" digits forming the time display utilizing two rows of LEDs.
10. The LED module shall meet the requirements of the Institute of Transportation Engineers (ITE) LED purchase specification, "Pedestrian Traffic Control Signal Indications - Part 2: LED Pedestrian Traffic Signal Modules," or applicable successor ITE specifications, except as modified herein.
11. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.
12. In the event of a power outage, light output from the LED modules shall cease instantaneously.
13. The LEDs utilized in the modules shall be AlInGaP technology for Portland Orange (Countdown Numerals and Upraised Hand) and GaN technology for Lunar White (Walking Person) indications.
14. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

Basis of Payment.

Add the following to the first paragraph of Article 881.04 of the Standard Specifications:

The price shall include furnishing the equipment described above, all mounting hardware and installing them in satisfactory operating condition.

Add the following to Article 881.04 of the Standard Specifications:

If the work consists of retrofitting an existing polycarbonate pedestrian signal head and pedestrian countdown signal head with light emitting diodes (LEDs), it will be paid for as a PEDESTRIAN SIGNAL HEAD, LED, RETROFIT, of the type specified, and of the particular kind of material, when specified. Price shall be payment in full for furnishing the equipment described above including LED modules, all mounting hardware, and installing them in satisfactory operating condition.

TRAFFIC SIGNAL BACKPLATE

Effective: May 22, 2002

Revised: July 1, 2015

882.01TS

Delete 1st sentence of Article 1078.03 of the Standard Specifications and add "All backplates shall be louvered, formed ABS plastic".

Add the following to the third paragraph of Article 1078.03 of the Standard Specifications. The retroreflective backplate shall not contain louvers.

Delete second sentence of the fourth paragraph of Article 1078.03 the Standard Specifications.

Add the following to the fourth paragraph of Article 1078.03 of the Standard Specifications:

When retro reflective sheeting is specified, it shall be Type ZZ sheeting according to Article 1091.03 and applied in preferred orientation for the maximum angularity according to the vendor's recommendations. The retroreflective sheeting shall be installed under a controlled environment at the vendor/equipment supplier before shipment to the contractor. The formed plastic backplate shall be prepared and cleaned, following recommendations of the retroreflective sheeting manufacturer.

DETECTOR LOOP

Effective: May 22, 2002

Revised: ~~July~~ July 14, 2018~~5~~

886.01TS

Procedure.

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall mark the proposed loop locations and contact the Area Traffic Signal Maintenance and Operations Engineer (847) 705-4424 to inspect and approve the layout. When preformed detector loops are installed, the Contractor shall have them inspected and approved prior to the pouring of the Portland cement concrete surface, using the same notification process as above.

Installation.

Revise Article 886.04 of the Standard Specifications to read:

Loop detectors shall be installed according to the requirements of the "District One Standard Traffic Signal Design Details." Saw-cuts (homeruns on preformed detector loops) from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut (homerun on preformed detector loops) unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a water proof tag, from an approved vendor, secured to each wire with nylon ties.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

- (a) Type I. All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement, curb and handhole shall be cut with a 1/4 inch (6.3 mm) deep x 4 inches (100 mm) saw cut to mark location of each loop cable.
- (b) Loop sealant shall be two-component thixotropic chemically cured polyurethane from an approved vendor. The sealant shall be installed 1/8 inch (3 mm) below the pavement surface. If installed above the surface the excess shall be removed immediately.
- (c) Preformed. This work shall consist of furnishing and installing a rubberized or cross linked polyethylene heat resistant preformed traffic signal loop in accordance with the Standard Specifications, except for the following:
 - (d) Preformed detector loops shall be installed in ~~new pavement constructed of Portland cement concrete using mounting chairs or tied to re-bar or the preformed detector loops may be placed in the sub-base.~~ the sub-base under the Portland cement concrete pavement. Loop lead-ins shall be extended to a temporary protective enclosure near the proposed handhole

location. The protective enclosure shall provide sufficient protection from other construction activities and may be buried for additional protection.

- (e) Handholes shall be placed next to the shoulder or back of curb when preformed detector loops enter the handhole. CNC, included in this pay item, shall be used to protect the preformed lead-ins from back of curb to the handhole.
- (f) Preformed detector loops shall be factory assembled with ends capped and sealed against moisture and other contaminants. The loop configurations and homerun lengths shall be assembled for the specific application. The loop and homerun shall be constructed using ~~11/16~~ 5/8 inch (~~17.2~~ 16 mm) outside diameter (minimum), 3/8 inch (9.5 mm) inside diameter (minimum) Class A oil resistant synthetic cord reinforced hydraulic hose with 250 psi (1,720 kPa) internal pressure rating or a similarly sized XLPE cable jacket. Hose for the loop and homerun assembly shall be one continuous piece. No joints or splices shall be allowed in the hose except where necessary to connect homeruns to the loops. This will provide maximum wire protection and loop system strength. Hose tee connections shall be heavy duty high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose, minimizing glue joints. The tee shall have the same flexible properties as the hose to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking. For XLPE jacketed preformed loops, all splice connections shall be soldered, sealed, and tested before being sealed in a high impact glass impregnated plastic splice enclosure. The wire used shall be #16 THWN stranded copper. The number of turns in the loop shall be application specific. Homerun wire pairs shall be twisted a minimum of ~~four~~ eight turns per foot. No wire splices will be allowed in the preformed loop assembly. The loop and homeruns shall be filled and sealed with a flexible sealant to insure complete moisture blockage and further protect the wire. The preformed loops shall be constructed to allow a minimum of 6.5 feet of extra cable in the handhole.

Method of Measurement.

Add the following to Article 886.05 of the Standard Specifications:

Preformed detector loops will be measured along the detector loop embedded in the pavement, rather than the actual length of the wire. Detector loop measurements shall include the saw cut and the length of the detector loop wire to the edge of pavement. The detector loop wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be included in the price of the detector loop. ~~Unit duct~~CNC, trench and backfill, and drilling of pavement or handholes shall be included in detector loop quantities.

Basis of Payment.

This work shall be paid for at the contract unit price per foot (meter) for DETECTOR LOOP, TYPE I or PREFORMED DETECTOR LOOP as specified in the plans, which price shall be payment in full for furnishing and installing the detector loop and all related connections for proper operation.

DETECTOR LOOP REPLACEMENT AND/OR INSTALLATION (ROADWAY GRINDING, RESURFACING, & PATCHING OPERATIONS)

Effective: January 1, 1985

Revised: ~~July~~ January 15, 20165

886.02TS

The following Traffic Signal Special Provisions and the "District 1 Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction" Sections 810, 886, 1079 and ~~1079~~88.

The intent of this Special Provision is to prescribe the materials and construction methods commonly used to replace traffic signal detector loops and replace magnetic signal detectors with detector loops during roadway resurfacing, grinding and patching operations. Loop detector replacement will not require the transfer of traffic signal maintenance from the District Electrical Maintenance Contractor to this contract's electrical contractor. Replacement of magnetic detector will require wiring revisions inside the control cabinet and therefore the transfer of maintenance will be required. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer.

The work to be provided under this contract consists of furnishing and installing all traffic signal work as specified on the Plans and as specified herein in a manner acceptable and approved by the Engineer.

Notification of Intent to Work.

Contracts such as pavement grinding or patching which result in the destruction of traffic signal detection require a notification of intent to work and an inspection. A minimum of seven (7) working days prior to the detection removal, the Contractor shall notify the:

- Traffic Signal Maintenance and Operations Engineer at (847)705-4424
- IDOT Electrical Maintenance Contractor at (773) 287-7600

at which time arrangements will be made to adjust the traffic controller timing to compensate for the absence of detection.

Failure to provide proper notification may require the District's Electrical Maintenance Contractor to be called to investigate complaints of inadequate traffic signal timing. All costs associated with these expenses will be paid for by the Contractor at no additional expense to the Department according to Section 109 of the "Standard Specifications."

Acceptance of Material.

The Contractor shall provide:

1. All material approval requests shall be submitted a minimum of seven (7) days prior to the delivery of equipment to the job site, or within 30 consecutive calendar days after the contract is awarded, or within 15 consecutive calendar days after the preconstruction meeting, whichever is first.
2. Four (4) copies of a letter listing the vendor's name and model numbers of the proposed equipment shall be supplied. The letter will be reviewed by the Traffic Design Engineer to determine whether the equipment to be used is approved. The

- letters will be stamped as approved or not approved accordingly and returned to the Contractor.
3. One (1) copy of material catalog cuts.
 4. The contract number, permit number or intersection location must be on each sheet of the letter and material catalog cuts as required in items 2 and 3.

Inspection of Construction.

When the road is open to traffic, except as otherwise provided in Section 801 and 850 of the Standard Specifications, the Contractor must request a turn-on and inspection of the completed detector loop installation at each separate location. This request must be made to the Traffic Signal Maintenance and Operations Engineer at (847)705-4424 a minimum of seven (7) working days prior to the time of the requested inspection.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal "turn on." If approved, traffic signal acceptance shall be verbal at the "turn on" inspection followed by written correspondence from the Engineer. If this work is not completed in time, the Department reserves the right to have the work completed by others at the Contractor's expense.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid price, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements will be subject to removal and disposal at the Contractor's expense.

Restoration of Work Area.

Restoration of the traffic signal work area due to the detector loop installation and/or replacement shall be included in the cost of this item. All roadway surfaces such as shoulders, medians, sidewalks, pavement shall be replaced as shown in the plans or in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded.

Removal, Disposal and Salvage of Existing Traffic Signal Equipment.

The removal, disposal, and salvage of existing traffic signal equipment shall be included in the cost of this item. All material and equipment removed shall become the property of the Contractor and disposed of by the Contractor outside the State's right-of-way. No additional compensation shall be provided to the Contractor for removal, disposal or salvage expense for the work in this contract.

DETECTOR LOOP REPLACEMENT.

This work shall consist of replacing existing detector loops which are destroyed during grinding, resurfacing, or patching operations.

If damage to the detector loop is unavoidable, replacement of the existing detection system will be necessary. This work shall be completed by an approved Electrical Contractor as directed by the Engineer.

Replacement of the loops shall be accomplished in the following manner: The Engineer shall mark the location of the replacement loops. The Traffic Signal Maintenance and Operations Engineer shall be called to approve loop locations prior to the cutting of the pavement. The

Contractor may reuse the existing coilable non-metallic conduit (CNC) located between the existing handhole and the pavement if it hasn't been damaged. CNC meeting the requirements of NEC Article 353 shall be used for detector loop raceways to the handholes. All burrs shall be removed from the edges of the existing conduit which could cause damage to the new detector loop during installation. If the existing conduit is damaged beyond repair, if it cannot be located, or if additional conduits are required for each proposed loop; the Contractor shall be required to drill through the existing pavement into the appropriate handhole, and install 1" (25 mm) CNC. This work and the required materials shall not be paid for separately but shall be included in the pay item Detector Loop Replacement. Once suitable CNC raceways is established, the loop may be cut, installed, sealed and spliced to the twisted-shielded lead-in cable in the handhole. All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement or the curb shall be cut with a 1/4" (6.3 mm) deep x 4" (100 mm) saw-cut to mark location of each loop lead-in.

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall have the proposed loop locations marked and contact the Traffic Signal Maintenance and Operations Engineer (847)705-4424 to inspect and approve the layout.

Loop detectors shall be installed according to the requirements of the "District 1 Standard Traffic Signal Design Details." Saw-cuts from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a water proof tag, from an approved vendor, secured to each wire with nylon ties. The lead-in wire, including all necessary connections for proper operation, from the edge of pavement to the handhole, shall be included in the detector loop pay item.

Loop sealant shall be a two-component thixotropic chemically cured polyurethane. The sealant shall be installed 1/8" (3 mm) below the pavement surface. If installed above the surface the excess shall be removed immediately.

Round loop(s) 6 ft (1.8 m) diameter may be substituted for 6 ft (1.8 m) by 6 ft (1.8 m) square loop(s) and shall be paid for as 24 feet (7.2 m) of detector loop.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

Heat shrink splices shall be used according to the "District 1 Standard Traffic Signal Design Details."

Detector loop replacement shall be measured along the sawed slot in the pavement containing the loop cable up to the edge of pavement, rather than the actual length of the wire in the slot. Drilling handholes, sawing the pavement, furnishing and installing CNC to the appropriate

handhole, cable splicing to provide a fully operable detector loop, testing and all trench and backfill shall be included in this item.

Basis of Payment.

Detector Loop Replacement shall be paid for at the contract unit price per foot (meter) of DETECTOR LOOP REPLACEMENT.

MAGNETIC DETECTOR REMOVAL AND DETECTOR LOOP INSTALLATION.

This work shall consist of the removal of existing magnetic detectors, magnetic detector lead-in cable and magnetic detection amplifiers and related control equipment wiring, installation of detector lead-in cable, detector loops, detector amplifiers and related equipment wiring. The detector loop, cable, and amplifier shall be installed according to the applicable portions of the "Standard Specifications" and the applicable portions of the Special Provision for "Detector Loop Replacement." All drilling of handholes, furnishing and installing CNC, cable splicing, trench and backfill, removal of equipment, and removing cable from conduit shall be included in this item.

Basis of Payment.

Magnetic Detector Removal and Detector Loop Installation shall be paid for at the contract unit price per foot (meter) for DETECTOR LOOP, TYPE I, per each for INDUCTIVE LOOP DETECTOR, and foot (meter) for ELECTRIC CABLE IN CONDUIT, LEAD-IN, NO. 14 1 PAIR.

RADAR VEHICLE DETECTION SYSTEM

Effective: July 01, 2015

Revised: May 9, 2017

886.03TS

Description.

This work shall consist of furnishing and installing a radar vehicle detection system as specified and/or as shown on the plan. This pay item shall include all necessary work and equipment required to have a fully operational system including but not limited to the detector unit/s, the interface unit and all the necessary hardware, cable and accessories required to complete the installation in accordance with the manufacturer's specifications.

The radar vehicle detection system shall work under all weather conditions, including rain, freezing rain, snow, wind, dust, fog, and changes in temperature and light. It shall work in an ambient temperature range of -34 to 74 degrees Celsius. It shall have a max power output of 75 watts or less.

The radar vehicle detection system shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation. The radar vehicle detection system shall provide a minimum of one interface unit that has Ethernet connectivity, surge protection and shall be capable of supporting a minimum of 2 detector units.

The stop bar radar vehicle detection system shall have true presence capabilities in which it can detect stopped, slow moving or turning vehicles similar to the Departments in-pavement detection. This is especially important at side streets where driveways are near the intersection. The radar shall be able to drop the call if the vehicle leaves the detection zone. A manufacture statement confirming proper operation is required along each catalog cut submittal. The Department will not allow substitutes for other types of detection.

The far back radar detection shall have a detection range of 400 feet or better.

A representative from the supplier of the radar vehicle detection system shall supervise the installation and testing of the radar vehicle detection system and shall be present at the traffic signal turn-on inspection. Once the radar vehicle detection system is configured, it shall not need reconfiguration to maintain performance, unless the roadway configuration or the application requirements change.

The mounting location/s of the detector unit/s shall be per the manufacturer's recommendations. If an extension mounting assembly is needed, it shall be included in this item. All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

The radar vehicle detection system shall be warrantied, free from material and workmanship defects for a period of two years from final inspection.

Basis of Payment.

This work shall be paid for at the contract unit price each for RADAR VEHICLE DETECTION SYSTEM, SINGLE APPROACH, STOP BAR; RADAR VEHICLE DETECTION SYSTEM, SINGLE APPROACH, FAR BACK; RADAR VEHICLE DETECTION SYSTEM, SINGLE APPROACH, STOP BAR AND FAR BACK, the price of which shall include the cost for all of the work and material described herein and includes furnishing, installing, delivery, handling, testing, set-up and all appurtenances and mounting hardware necessary for a fully operational radar vehicle detection system.

EMERGENCY VEHICLE PRIORITY SYSTEM

Effective: May 22, 2002

Revised: July 1, 2015

887.01TS

Revise Section 887 of the Standard Specifications to read:

It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle pre-emption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency.

All new installations shall be equipped with Confirmation Beacons as shown on the "District One Standard Traffic Signal Design Details." The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, or a 7 watt Par 30 LED flood lamp with a 15 degree or greater spread, maximum 7 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets. In order to maintain uniformity between communities, the confirmation beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signalized by a flashing indication at the rate specified by Section 4L.01 of the "Manual on Uniform Traffic Control Devices," and other applicable sections of future editions. The stopped pre-empted movements shall be signalized by a continuous indication.

All light operated systems shall include security and transit preemption software and operate at a uniform rate of 14.035 Hz \pm 0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District.

This item shall include any required modifications to an existing traffic signal controller as a result of the addition of the EMERGENCY VEHICLE PRIORITY SYSTEM.

Basis of Payment.

The work shall be paid for at the contract unit price each for furnishing and installing LIGHT DETECTOR and LIGHT DETECTOR AMPLIFIER. Furnishing and installing the confirmation beacon shall be included in the cost of the Light Detector. Any required modifications to the traffic signal controller shall be included in the cost of the LIGHT DETECTOR AMPLIFIER. The preemption detector amplifier shall be paid for on a basis of (1) one each per intersection controller and shall provide operation for all movements required in the pre-emption phase sequence.

RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, DETECTOR UNIT

Effective: January 1, 2002

Revised: July 1, 2015

887.02TS

This item shall consist of relocating the existing emergency vehicle priority system, detector unit (single channel or dual channel) from its existing location to a new traffic signal post or mast arm assembly and pole, and connecting it to an emergency vehicle priority system, phasing unit. If the existing Emergency Vehicle Priority System, Detector Unit Assembly includes a Confirmation Beacon, the Confirmation Beacon shall also be relocated and connected to the Emergency Vehicle Priority System, Detector Unit and shall be included at no cost in this item.

The emergency vehicle system is not to be inoperative for more than 8 hours and the Contractor must notify the Municipality or Fire Protection District 72 hours prior to the disconnection of the equipment.

Basis of Payment.

This item will be paid for at the contract unit price each for RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, DETECTOR UNIT.

RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, PHASING UNIT

Effective: January 1, 2002

Revised: July 1, 2015

887.03TS

This item shall consist of relocating the existing emergency vehicle priority system phasing unit from an existing traffic signal controller cabinet to a new traffic signal controller cabinet, as indicated in the plans or as directed by the Engineer.

The work shall include disconnecting the emergency vehicle priority system phasing unit(s) and reconnecting it into the new traffic signal controller cabinet.

The emergency vehicle system is not to be inoperative for more than 8 hours and the Contractor must notify the Municipality or Fire Protection District 72 hours prior to the disconnection of the equipment. The Contractor must demonstrate to the satisfaction of the Engineer that the emergency vehicle system operates properly.

Basis of Payment.

This item will be paid for on a basis of one (1) each per intersection for RELOCATE EXISTING EMERGENCY VEHICLE PRIORITY SYSTEM, PHASING UNIT.

CONFIRMATION BEACON

Effective: January 1, 2002

Revised: July 1, 2015

887.04TS

This item shall consist of furnishing and installing a Traffic Signal Emergency Confirmation Beacon (single channel or dual channel) at the locations specified on the plans and as described as follows for intersections which have existing emergency preemption systems previously installed.

Confirmation Beacon, Single Channel - Where the light detector is used to detect a single direction of traffic, one LED lamp for only that direction shall be provided. In cases where the detector covers opposing directions of traffic and has a single output, a separate lamp for each direction shall be provided but they shall have identical indications.

Confirmation Beacon, Dual Channel - A separate LED lamp with appropriate separate indications for each direction shall be provided.

It shall be the Contractor's responsibility to verify the existing brand of emergency vehicle equipment at the intersection and the confirmation beacons must be completely compatible with all existing components. The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, or a 7 watt Par 30 LED flood lamp with a 15 degree or greater spread, maximum 7 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. No new holes may be drilled into signal poles, mast arms, or posts. The Confirmation Beacon shall be mounted to the existing light detector hardware as shown on the mounting detail in the plans. In order to maintain uniformity between communities, the Confirmation Beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signaled by a flashing indication at the rate specified by Section 4L.01 of the "Manual on Uniform Traffic Control Devices," and other applicable sections of future editions. The stopped pre-empted movements shall be signaled by a continuous indication.

Any modification required to the existing light detector installation to meet the requirements of the mounting detail shown in the plans shall be included in this item.

Basis of Payment.

This work will be paid for at the contract unit price per each for CONFIRMATION BEACON.

PEDESTRIAN PUSH-BUTTON

Effective: May 22, 2002

Revised: July 1, 2015

888.01TS

Description.

Revise Article 888.01 of the Standard Specifications to read:

This work shall consist of furnishing and installing a latching (single call) or non-latching (dual call) pedestrian push-button and a regulatory pedestrian instruction sign according to MUTCD, sign series R10-3e 9" x 15" sign with arrow(s) for a count-down pedestrian signal. The pedestrian station sign size without count-down pedestrian signals shall accommodate a MUTCD sign series R10-3b or R10-3d 9" x 12" sign with arrow(s).

Installation.

Add the following to Article 888.03 of the Standard Specifications:

A mounting bracket and/or extension shall be used to assure proper orientation when two pedestrian push buttons are required for one post. The price of the bracket and/or extension shall be included in the cost of the pedestrian push button. The contractor is not allowed to install a push-button assembly with the sign below the push-button in order to meet mounting requirements.

Materials.

Revise Article 1074.02(a) of the Standard Specifications to read:

The pedestrian push-button housing shall be constructed of aluminum alloy according to ASTM B 308 6061-T6 and powder coated yellow, unless otherwise noted on the plans. The housing shall be furnished with suitable mounting hardware.

Revise Article 1074.02(e) of the Standard Specifications to read:

Stations shall be designed to be mounted to a post, mast arm pole or wood pole. The station shall be aluminum and shall accept a 3 inch (75mm) round push-button assembly and a regulatory pedestrian instruction sign according to MUTCD, sign series R10-3e 9" x 15" sign with arrow(s) for a count-down pedestrian signal. The pedestrian station size without count-down pedestrian signals shall accommodate a MUTCD sign series R10-3b or R10-3d 9" x 12" sign with arrow(s).

Add the following to Article 1074.02 of the Standard Specifications:

- (f) Location. Pedestrian push-buttons and stations shall be mounted to a post, mast arm pole or wood pole as shown on the plans and shall be fully ADA accessible from a paved or concrete surface. See the District's Detail sheets for orientation and mounting details.

Basis of Payment.

Revise Article 888.04 of the Standard Specifications to read:

This work will be paid for at the contract unit price per each for PEDESTRIAN PUSH-BUTTON or PEDESTRIAN PUSH-BUTTON, NON-LATCHING.

ACCESSIBLE PEDESTRIAN SIGNALS

Effective: April 1, 2003

Revised: July 1, 2015

888.02TS

Description.

This work shall consist of furnishing and installing pedestrian push button accessible pedestrian signals (APS) type. Each APS shall consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a light emitting diode (LED) indicator light, a solid state electronic control board, a power supply, wiring, and mounting hardware. The APS shall meet the requirements of the MUTCD and Sections 801 and 888 of the Standard Specifications, except as modified herein.

Electrical Requirements.

The APS shall operate with systems providing 95 to 130 VAC, 60 Hz and throughout an ambient air temperature range of -29 to +160 °F (-34 to +70 °C).

The APS shall contain a power protection circuit consisting of both fuse and transient protection.

Audible Indications.

A pushbutton locator tone shall sound at each pushbutton with volume settings a maximum of 5 dBA louder than ambient sound.

If two accessible pedestrian pushbuttons are placed less than 10 ft (3 m) apart or placed on the same pole, the audible walk indication shall be a speech walk message.

A clear, verbal message shall be used to communicate the pedestrian walk interval. This message shall sound throughout the WALK interval only. The verbal message shall be modeled after: "Street Name." Walk Sign is on to cross "Street Name." No other messages shall be used to denote the WALK interval.

Where two accessible pedestrian pushbuttons are separated by at least 10 ft (3 m), the walk indication shall be an audible percussive tone. It shall repeat at 8 to 10 ticks per second with a dominant frequency of 880 Hz.

Automatic volume adjustments in response to ambient traffic sound level shall be provided up to a maximum volume of 100 dBA. Locator tone and verbal messages shall be no more than 5 dB louder than ambient sound.

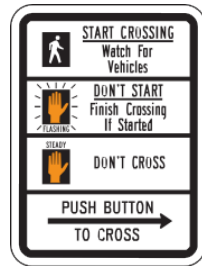
Pedestrian Pushbutton.

Pedestrian pushbuttons shall be at least 2 in. (50 mm) in diameter or width. The force required to activate the pushbutton shall be no greater than 3.5 lb (15.5 N).

A red LED indicator shall be located on or near the pushbutton which, when activated, acknowledges the pedestrians request to cross the street. The recorded messages and roadway designations shall be confirmed with the engineer and included with submitted product data.

Signage.

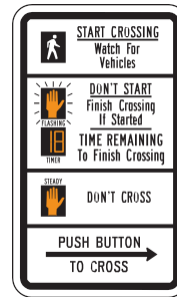
A sign shall be located immediately above the pedestrian pushbutton and parallel to the crosswalk controlled by the pushbutton. The sign shall be one of the following standard MUTCD designs: R10-3b, R10-3d, or R10-3e.



R10-3b



R10-3d



R10-3e

Tactile Arrow.

A tactile arrow, pointing in the direction of travel controlled by a pushbutton, shall be provided either on the pushbutton or its sign.

Vibrotactile Feature.

The pushbutton shall pulse when depressed and shall vibrate continuously throughout the WALK interval.

Training.

The Contractor shall provide APS onsite training for Department personnel and person(s) or group that requested the installation of the APS. APS features and operation shall be demonstrated during the training. The training shall be presented by the APS equipment supplier. Time, date, and location of the training and demonstration shall be coordinated with the Engineer.

Basis of Payment.

This work will be paid for at the contract unit price each for a pedestrian push button, ACCESSIBLE PEDESTRIAN SIGNALS type and shall include furnishing, installation, mounting hardware, message programming, and training.

TEMPORARY TRAFFIC SIGNAL INSTALLATION

Effective: May 22, 2002

Revised: ~~July 1, 2015~~ January 1, 2017

890.01TS

Revise Section 890 of the Standard Specifications to read:

Description.

This work shall consist of furnishing, installing, maintaining, and removing a temporary traffic signal installation as shown on the plans, including but not limited to temporary signal heads, emergency vehicle priority systems, interconnect, vehicle detectors, uninterruptable power supply, and signing. Temporary traffic signal controllers and cabinets interconnected to railroad traffic control devices shall be new. When temporary traffic signals will be operating within a county or local agency Traffic Management System, the equipment must be NTCIP compliant and compatible with the current operating requirements of the Traffic Management System.

General.

Only an approved controller equipment supplier will be allowed to assemble temporary traffic signal and railroad traffic signal cabinet. Traffic signal inspection and TURN-ON shall be according to 800.01TS TRAFFIC SIGNAL GENERAL REQUIREMENTS special provision.

Construction Requirements.

(a) Controllers.

1. Only controllers supplied by one of the District approved closed loop equipment supplier will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software approved by IDOT District 1, installed in NEMA TS2 cabinets with 8 phase back panels, capable of supplying 255 seconds of cycle length and individual phase length settings up to 99 seconds. On projects with one lane open and two way traffic flow, such as bridge deck repairs, the temporary signal controller shall be capable of providing an adjustable all red clearance setting of up to 30 seconds in length. All controllers used for temporary traffic signals shall meet or exceed the requirements of Section 857 of the Standard Specifications with regards to internal time base coordination and preemption. All railroad interconnected temporary controllers and cabinets shall be new and shall satisfy the requirements of Article 857.02 of the Standard Specifications and as modified herein.
2. Only control equipment, including controller cabinet and peripheral equipment, supplied by one of the District approved closed loop equipment suppliers will be approved for use at temporary traffic signal locations. All control equipment for the temporary traffic signal(s) shall be furnished by the Contractor unless otherwise stated in the plans. On projects with multiple temporary traffic signal installations, all controllers shall be the same manufacturer brand and model

number with the latest version software installed at the time of the signal TURN-ON.

- (b) Cabinets. All temporary traffic signal cabinets shall have a closed bottom made of aluminum alloy. The bottom shall be sealed along the entire perimeter of the cabinet base to ensure a water, dust and insect-proof seal. The bottom shall provide a minimum of two (2) 4 inch (100 mm) diameter holes to run the electric cables through. The 4 inch (100 mm) diameter holes shall have a bushing installed to protect the electric cables and shall be sealed after the electric cables are installed.
- (c) Grounding. Grounding shall be provided for the temporary traffic signal cabinet meeting or exceeding the applicable portions of the National Electrical Code, Section 806 of the Standard Specifications and shall meet the requirements of the 806.01TS GROUNDING OF TRAFFIC SIGNAL SYSTEMS special provision.
- (d) Traffic Signal Heads. All traffic signal sections shall be 12 inches (300 mm). Pedestrian signal sections shall be 16 inch (406mm) x 18 inch (457mm). Traffic signal sections shall be LED with expandable view, unless otherwise approved by the Engineer. Pedestrian signal heads shall be Light Emitting Diode (LED) Pedestrian Countdown Signal Heads except when a temporary traffic signal is installed at an intersection interconnected with a railroad grade crossing. When a temporary traffic signal is installed at an intersection interconnected with a railroad grade crossing, Light Emitting Diode (LED) Pedestrian Signal Heads shall be furnished. The temporary traffic signal heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. If no traffic staging is in place or will not be staged on the day of the turn on, the temporary traffic signal shall have the signal head displays, signal head placements and controller phasing match the existing traffic signal or shall be as directed by the engineer. The Contractor shall furnish enough extra cable length to relocate heads to any position on the span wire or at locations illustrated on the plans for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.
- (e) Interconnect.
 - 1. Temporary traffic signal interconnect shall be provided using fiber optic cable or wireless interconnect technology as specified in the plans. The Contractor may request, in writing, to substitute the fiber optic temporary interconnect indicated in the contract documents with a wireless interconnect. The Contractor must provide assurances that the radio device will operate properly at all times and during all construction staging. If approved for use by the Engineer, the Contractor shall submit marked-up traffic signal plans indicating locations of radios and antennas and installation details. If wireless interconnect is used, and in the opinion of the engineer, it is not viable, or if it fails during testing or operations, the Contractor shall be responsible for installing all necessary poles,

fiber optic cable, and other infrastructure for providing temporary fiber optic interconnect at no cost to the contract.

2. The existing system interconnect and phone lines are to be maintained as part of the Temporary Traffic Signal Installation specified for on the plan. The interconnect, including any required fiber splices and terminations, shall be installed into the temporary controller cabinet as per the notes or details on the plans. All labor and equipment required to install and maintain the existing interconnect as part of the Temporary Traffic Signal Installation shall be included in the cost of TEMPORARY TRAFFIC SIGNAL INSTALLATION. When shown in the plans, temporary traffic signal interconnect equipment shall be furnished and installed. The temporary traffic signal interconnect shall maintain interconnect communications throughout the entire signal system for the duration of the project. Any temporary signal within an existing closed loop traffic signal system shall be interconnected to that system using similar brand control equipment at no additional cost to the contract.
3. Temporary wireless interconnect. The radio interconnect system shall be compatible with Eagle or Econolite controller closed loop systems. This work shall include all temporary wireless interconnect components, at the adjacent existing traffic signal(s) to provide a completely operational closed loop system. This work shall include all materials, labor and testing to provide the completely operational closed loop system as shown on the plans. The radio interconnect system shall include the following components:
 - a. Rack or Shelf Mounted RS-232 Frequency Hopping Spread Spectrum (FHSS) Radio
 - b. Software for Radio Configuration (Configure Frequency and Hopping Patterns)
 - c. Antennas (Omni Directional or Yagi Directional)
 - d. Antenna Cables, LMR400, Low Loss. Max. 100-ft from controller cabinet to antenna
 - e. Brackets, Mounting Hardware, and Accessories Required for Installation
 - f. RS232 Data Cable for Connection from the radio to the local or master controller
 - g. All other components required for a fully functional radio interconnect system

All controller cabinet modifications and other modifications to existing equipment that are required for the installation of the radio interconnect system components shall be included in the cost of TEMPORARY TRAFFIC SIGNAL INSTALLATION.

The radio interconnect system may operate at 900Mhz (902-928) or 2.4 Ghz depending on the results of a site survey. The telemetry shall have an

acceptable rate of transmission errors, time outs, etc. comparable to that of a hardwire system.

The proposed or existing master controller and telemetry module shall be configured for use with the radio interconnect at a minimum rate of 9600 baud.

The radio interconnect system shall include all other components required for a complete and fully functional telemetry system and shall be installed in accordance to the vendors recommendations.

- (f) Emergency Vehicle Pre-Emption. All emergency vehicle preemption equipment (light detectors, light detector amplifiers, confirmation beacons, etc.) as shown on the temporary traffic signal plans shall be provided by the Contractor. It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle preemption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency. All light operated systems shall operate at a uniform rate of 14.035 hz \pm 0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District. All labor and material required to install and maintain the Emergency Vehicle Preemption installation shall be included in the item Temporary Traffic Signal Installation.
- (g) Vehicle Detection. All temporary traffic signal installations shall have vehicular detection installed at all approaches of the intersection and as directed by the Engineer. Pedestrian push buttons shall be provided for all pedestrian signal heads/phases as directed by the Engineer. Microwave vehicle sensors or video vehicle detection system shall be approved by IDOT prior to Contractor furnishing and installing. The Contractor shall install, wire, and adjust the alignment of the microwave vehicle sensor or video vehicle detection system in accordance to the manufacturer's recommendations and requirements. The Contractor shall be responsible for adjusting the alignment of the microwave vehicle sensor or video vehicle detection system for all construction staging changes and for maintaining proper alignment throughout the project. An equipment supplier shall be present and assist the contractor in setting up and maintaining the microwave vehicle sensor or video vehicle detection system. An in-cabinet video monitor shall be provided with all video vehicle detection systems and shall be included in the item Temporary Traffic Signal Installation.
- (h) Uninterruptable Power Supply. All temporary traffic signal installations shall have Uninterruptable Power Supply (UPS). The UPS cabinet shall be mounted to the temporary traffic signal cabinet and shall be according to the applicable portions of Section 862 of the Standard Specifications and as modified in 862.01TS UNINTERRUPTABLE POWER SUPPLY, SPECIAL Special Provision.

- (i) Signs. All existing street name and intersection regulatory signs shall be removed from existing poles and relocated to the temporary signal span wire. If new mast arm assembly and pole(s) and posts are specified for the permanent signals, the signs shall be relocated to the new equipment at no extra cost. Any intersection regulatory signs that are required for the temporary traffic signal shall be provided as shown on the plans or as directed by the Engineer. Relocation, removing, bagging and installing the regulatory signs for the various construction stages shall be provided as shown on the plans or as directed by the Engineer. If Illuminated Street Name Signs exist they shall be taken down and stored by the contractor and reflecting street name signs shall be installed on the temporary traffic signal installation.
- (j) Energy Charges. The electrical utility energy charges for the operation of the temporary traffic signal installation shall be paid for by others if the installation replaces an existing signal. Otherwise charges shall be paid for under 109.05 of the Standard Specifications.
- (k) Maintenance. Maintenance shall meet the requirements of the Standard Specifications and 850.01TS MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION Special Provisions. Maintenance of temporary signals and of the existing signals shall be included in the cost of the TEMPORARY TRAFFIC SIGNAL INSTALLATION pay item. When temporary traffic signals are to be installed at locations where existing signals are presently operating, the Contractor shall be fully responsible for the maintenance of the existing signal installation as soon as he begins any physical work on the Contract or any portion thereof. In addition, a minimum of seven (7) days prior to assuming maintenance of the existing traffic signal installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact the Bureau of Traffic Operations (847) 705-4424 for an inspection of the installation(s).
- (l) Temporary Traffic Signals for Bridge Projects. Temporary Traffic Signals for bridge projects shall follow the State Standards, Standard Specifications, Special Provisions and any plans for Bridge Temporary Traffic Signals included in the plans. The installation shall meet the Standard Specifications and all other requirements in this TEMPORARY TRAFFIC SIGNAL INSTALLATION specification. In addition all electric cable shall be aerially suspended, at a minimum height of 18 feet (5.5m) on temporary wood poles (Class 5 or better) of 45 feet (13.7 m) minimum height. The signal heads shall be span wire mounted or bracket mounted to the wood pole or as directed by the Engineer. The Controller cabinet shall be mounted to the wood pole as shown in the plans, or as directed by the Engineer. Microwave vehicle sensors or video vehicle detection system may be used in place of detector loops as approved by the Engineer.
- (m) Temporary Portable Traffic Signal for Bridge Projects.

~~1. Unless otherwise directed by the Engineer, temporary portable traffic signals shall be restricted to use on roadways of less than 8000 ADT that have limited access to electric utility service, shall not be installed on projects where the estimated need exceeds ten (10) weeks, and shall not be in operation during the period of November through March. The Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract if the bridge project or Engineer requires temporary traffic signals to remain in operation into any part of period of November through March. If, in the opinion of the Engineer, the reliability and safety of the temporary portable traffic signal is not similar to that of a temporary span wire traffic signal installation, the Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals at no cost to the contract.~~

21. The controller and cabinet shall be NEMA type designed for NEMA TS2 Type 1 operation. Controller and ~~and~~ LED signal displays ~~shall~~ meet the applicable Standard Specifications and all other requirements in this TEMPORARY TRAFFIC SIGNAL INSTALLATION special provision.

32. Work shall be according to Article 701.18(b) of the Standard Specifications except as noted herein.

43. General.

- a. The temporary portable bridge traffic signals shall be trailer-mounted units. The trailer-mounted units shall be set up securely and level. Each unit shall be self-contained and consist of two signal heads. The left signal head shall be mounted on a mast arm capable of extending over the travel lane. Each unit shall contain a solar cell system to facilitate battery charging. There shall be a minimum of 12 days backup reserve battery supply and the units shall be capable of operating with a 120 V power supply from a generator or electrical service.
- b. All signal heads located over the travel lane shall be mounted at a minimum height of 17 feet (5m) from the bottom of the signal back plate to the top of the road surface. All far right signal heads located outside the travel lane shall be mounted at a minimum height of 8 feet (2.5m) from the bottom of the signal back plate to the top of the adjacent travel lane surface.
- c. The long all red intervals for the traffic signal controller shall be adjustable up to 250 seconds in one-second increments.
- d. As an alternative to detector loops, temporary portable bridge traffic signals may be equipped with microwave sensors or other approved methods of vehicle detection and traffic actuation.

- e. All portable traffic signal units shall be interconnected using hardwire communication cable. Radio communication equipment may be used only with the approval of the Engineer. If radio communication is used, a site analysis shall be completed to ensure that there is no interference present that would affect the traffic signal operation. The radio equipment shall meet all applicable FCC requirements.
- f. The temporary portable bridge traffic signal system shall meet the physical display and operational requirements of conventional traffic signals as specified in Part IV and other applicable portions of the currently adopted version of the Manual on Uniform Traffic Control Devices (MUTCD) and the Illinois MUTCD. The signal system shall be designed to continuously operate over an ambient temperature range between -30 °F (-34 °C) and 120 °F (48 °C). When not being utilized to inform and direct traffic, portable signals shall be treated as ~~nonoperating~~non-operating equipment according to Article 701.11.

~~g. Basis of Payment. This work will be paid for according to Article 701.20(e).~~

Basis of Payment.

This work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL INSTALLATION, TEMPORARY BRIDGE TRAFFIC SIGNAL INSTALLATION, or TEMPORARY PORTABLE BRIDGE TRAFFIC SIGNAL INSTALLATION, the price of which shall include all costs for the modifications required for traffic staging, changes in signal phasing as required in the Contract plans, microwave vehicle sensors, video vehicle detection system, any maintenance or adjustment to the microwave vehicle sensors/video vehicle detection system, the temporary wireless interconnect system, temporary fiber optic interconnect system, all material required, the installation and complete removal of the temporary traffic signal, and any changes required by the Engineer. Each intersection will be paid for separately.

TEMPORARY TRAFFIC SIGNAL TIMING

Effective: May 22, 2002

Revised: July 1, 2015

890.02TS

Description.

This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the duration of the temporary signalized condition, as well as impact to existing traffic signal timings caused by detours or other temporary conditions.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMING.

- (a) Consultant shall attend temporary traffic signal inspection (turn-on) and/or detour meeting and conduct on-site implementation of the traffic signal timings.
- (b) Consultant shall be responsible for making fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.
- (c) Consultant shall provide monthly observation of traffic signal operations in the field.
- (d) Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.
- (e) Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.
- (f) Return original timing plan once construction is complete.

Basis of Payment.

The work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL TIMING, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on and/or detour implemented, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation and/or detour.

ILLUMINATED SIGN, LED

Effective: May 22, 2002

Revised: July 1, 2015

891.01TS

Revise the second paragraph of Article 1084.01(a) to read:

The exterior surface of the housing shall be acid-etched and shop painted with one coat of zinc-chromate primer and two coats of exterior enamel. The housing shall be the same color (yellow or black) to match the existing or proposed signal heads. The painting shall be according to Section 851 of the Standard Specifications.

Add the following to Article 1084.01 (b) of the Standard Specifications:

The message shall be formed by rows of LEDs. The sign face shall be 24 inches (600 mm) by 24 inches (600 mm).

Revise Article 1084.01(d) to read:

Mounting hardware shall be black polycarbonate or galvanized steel and similar to mounting Signal Head hardware and bracket specified herein and shall provide tool free access to the interior.

LED INTERNALLY ILLUMINATED STREET NAME SIGN

Effective: May 22, 2002

Revised: July 1, ~~2015~~2018

891.02TS

Description.

This work shall consist of furnishing and installing a LED internally illuminated street name sign.

Materials.

The illuminated street name sign shall be as follows.

(a) Description.

The LEDs shall be white in color. The LED internally illuminated street name sign shall display the designated street name clearly and legibly in the daylight hours without being energized and at night when energized. White translucent Type ZZ reflective sheeting sign faces with the street name applied in transparent green shall be installed on the street sign acrylic panels which shall be affixed to the interior of the sign enclosure. Sheeting material shall be of one continuous piece. Paneling shall not be allowed. Hinged door(s) shall be provided for easy access to perform general cleaning and maintenance operations. Illumination shall occur with LED Light Engine as specified.

(b) Environmental Requirements.

The LED lamp shall be rated for use in the ambient operating temperature range of -40 to +50°C (-40 to +122°F) for storage in the ambient temperature range of -40 to +75°C (-40 to +167°F).

(c) General Construction.

1. The LED components, power supply, and wiring harness shall be arranged as to allow for maintenance, up to and including the replacement of all three components. The LED Light Engine shall be mounted in the top and/or bottom of the sign housing and no components of the light source shall sit between the sign faces.
2. The assembly and manufacturing processes of the LED Light Engine shall be designed to ensure that all LED and electronic components are adequately supported to withstand mechanical shocks and vibrations in compliance with the specifications of the ANSI C136.31-2001 standards.

(d) Mechanical Construction.

1. The sign shall be constructed using a weatherproof, aluminum housing consisting of an extruded aluminum with the maximum sign dimensions of 30" in height, 96" in length, 10.75" in depth (including the drip edge) and shall not weight more than 110 pounds. All housing corners are continuous TIG (Tungsten Inert Gas) welded to provide a weatherproof seal.
2. The sign doors shall be continuous TIG welded along the two corners with the other two screwed together to make one side of the door removable for installation of the sign

face. The door is fastened to the housing on the bottom by a full length stainless steel hinge. The sign shall also be fabricated in a way to ensure that no components fall out while a technician is opening or working inside the sign enclosure. The door shall be held secure onto a 1" wide by 5/32" thick neoprene gasket by an appropriate number of quarter-turn fasteners to form a watertight seal between the door and the housing.

3. The sign face shall be constructed of .125" white translucent polycarbonate or acrylic. Sign legend shall be according to D1 Mast Arm Mounted Street Name Sign detail and MUTCD. The sign face legend background shall consist of translucent Type ZZ white reflective sheeting and transparent green film applied to the front of the sign face. The legend shall be framed by a white border. A logo symbol and/or name of the community may be included with approval of the Engineer.

~~4. All surfaces of the sign shall be powder coated black.~~

~~5.4.~~ All fasteners and hardware shall be corrosion resistant stainless steel. No special tools shall be required for routine maintenance.

~~6.5.~~ All wiring shall be secured by insulated wire compression nuts or barrier type terminal blocks.

~~7.6.~~ A wire entrance junction box shall be supplied with the sign assembly. The box may be supplied mounted to the exterior or interior of the sign and shall provide a weather tight seal.

~~8.7.~~ A photoelectric switch shall be mounted inside control cabinet to control lighting functions for day and night display. Each sign shall be individually fused.

~~9.8.~~ Brackets and Mounting: LED internally illuminated street name signs will be factory drilled to accommodate mast arm two-point support assembly mounting brackets unless indicated otherwise in the plans.

(e) Electrical.

1. Photocell shall be rated 105-305V, turn on at 1.5 fcs. with a 3-5 second delay. A manufacturer's warranty of six (6) years shall be provided. Power consumption shall be no greater than 1 watt at 120V.
2. The LED Light Engine shall operate from a 60 +/- 3 cycle AC line power over a voltage range of 80 to 135 Vac rms. Fluctuations in line voltage over the range of 80 to 135 Vac shall not affect luminous intensity by more than +/- 10%.
3. Total harmonic distortion induced into the AC power line by the LED Light Engine, operated at a nominal operating voltage and at a temperature of +25°C (+77°F), shall not exceed 20%.

4. The LED Light Engine shall be cycled ON and OFF with a photocell as shown on the detail sheet and shall not exceed 120 Watts. The signs shall be installed such that they are not energized when traffic signals are powered by an alternate energy source such as a generator or uninterruptable power supply (UPS).

(f) Photometric Requirements.

1. The entire surface of the sign panel shall be evenly illuminated. The average maintained luminous intensity measured across the letters, operating under the conditions defined in Environmental Requirements and Wattage Sections shall be of a minimum value of 100 cd/m².
2. The manufacturer shall make available independent laboratory test results to verify compliance to Voltage Range and Luminous Intensity Distribution Sections.
3. LED shall have a color temperature of 5200k nominal, CRI of 80 with a life expectancy of 75,000 hrs.

(g) Quality Assurance.

The LED Light Engine shall be manufactured in accordance with a vendor quality assurance (QA) program. The production QA shall include statistically controlled routine tests to ensure minimum performance levels of the LED Light Engine build to meet this specification. QA process and test result documentations shall be kept on file for a minimum period of seven (7) years. The LED Light Engine that does not satisfy the production QA testing performance requirements shall not be labeled, advertised, or sold as conforming to these specifications. Each LED Light Engine shall be identified by a manufacturer's serial number for warranty purposes. LED Light Engines shall be replaced or repaired if they fail to function as intended due to workmanship or material defects within the first sixty (60) months from the date of acceptance. LED Light Engines that exhibit luminous intensities less than the minimum value specified in Photometric Section within the first thirty-six (36) months from the date of acceptance shall be replaced or repaired.

Installation.

The sign shall be located on a steel traffic signal mast arm no further than 8-feet from the center of the pole to the center of the sign at a height of between 16 to 18-feet above traveled pavement. Mounting hardware shall be from an approved vendor, utilizing stainless steel components.

Basis of Payment.

This work will be paid for at the contract unit price each for LED INTERNALLY ILLUMINATED STREET NAME SIGN, of the length as specified in the contract plans which shall be payment in full for furnishing and installing the LED internally illuminated street name sign, complete with circuitry and mounting hardware including photo cell, circuit breaker, fusing, relay, connections and cabling as shown on the plans for proper operation and installation.

The Illuminated street name sign cable will be paid for at the contract unit price per foot for ELECTRIC CABLE IN CONDUIT, STREET NAME SIGN, NO. 14 3C, TYPE SOOW, which price

shall be payment in full for furnishing, installing and making all electrical connections necessary
for proper operations.

MODIFY EXISTING CONTROLLER CABINET

Effective: May 22, 2002

Revised: July 1, 2015

895.01TS

The work shall consist of modifying an existing controller cabinet as follows:

- (a) Uninterruptable Power Supply (UPS). The addition of uninterruptable power supply (UPS) to an existing controller cabinet could require the relocation of the existing controller cabinet items to allow for the installation of the uninterruptable power supply (UPS) components inside the existing controller cabinet as outlined under Sections 862 and 1074.04 of the Standard Specifications and the wiring of UPS alarms.
- (b) Light Emitting Diode (LED) Signal Heads, Light Emitting Diode (LED) Optically Programmed Signal Heads and Light Emitting Diode (LED) Pedestrian Signal Heads. The contractor shall verify that the existing load switches meet the requirements of Section 1074.03(b)(2) of the Standard Specifications and the recommended load requirements of the light emitting diode (LED) signal heads that are being installed at the existing traffic signal. If any of the existing load switches do not meet these requirements, they shall be replaced, as directed by the Engineer.
- (c) Light Emitting Diode (LED), Signal Head, Retrofit. The contractor shall verify that the existing load switches meet the requirements of Section 1074.03(b)(2) of the Standard Specifications and the recommended load requirements of light emitting diode (LED) traffic signal modules, pedestrian signal modules, and pedestrian countdown signal modules as specified in the plans. If any of the existing load switches do not meet these requirements, they shall be replaced, as directed by the Engineer.
- (d) This item shall include the upgrade of all non-railroad controller software to the latest version available at the time of the signal TURN-ON.

Basis of Payment.

Modifying an existing controller cabinet will be paid for at the contract unit price per each for MODIFY EXISTING CONTROLLER CABINET. This shall include all material and labor required to complete the work as described above, the removal and disposal of all items removed from the controller cabinet, as directed by the Engineer. The equipment for the Uninterruptable Power Supply (UPS) and labor to install it in the existing controller cabinet shall be included in the pay item Uninterruptable Power Supply, Special or Uninterruptable Power Supply, Ground Mounted.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

Effective: May 22, 2002

Revised: July 1, 2015

895.02TS

Add the following to Article 895.05 of the Standard Specifications:

The traffic signal equipment which is to be removed and is to become the property of the Contractor shall be disposed of outside the right-of-way at the Contractor's expense.

All equipment to be returned to the State shall be delivered by the Contractor to the State's Traffic Signal Maintenance Contractor's main facility. The Contractor shall contact the State's Electrical Maintenance Contractor to schedule an appointment to deliver the equipment. No equipment will be accepted without a prior appointment. All equipment shall be delivered within 30 days of removing it from the traffic signal installation. The Contractor shall provide one hard copy and one electronic file of a list of equipment that is to remain the property of the State, including model and serial numbers, where applicable. The Contractor shall also provide a copy of the Contract plan or special provision showing the quantities and type of equipment. Controllers and peripheral equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. If equipment is not returned according to these requirements, it will be rejected by the State's Electrical Maintenance Contractor. The Contractor shall be responsible for the condition of the traffic signal equipment from the time Contractor takes maintenance of the signal installation until the acceptance of a receipt drawn by the State's Electrical Maintenance Contractor indicating the items have been returned in good condition.

The Contractor shall safely store and arrange for pick up or delivery of all equipment to be returned to agencies other than the State. The Contractor shall package the equipment and provide all necessary documentation as stated above.

Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications at no cost to the contract.

MODIFY EXISTING TYPE "D" FOUNDATION

Effective: January 1, 2002

Modified: July 1, 2015

895.03TS

This item shall consist of the partial removal of an existing Type "D" Foundation at the location shown on the plans, or as directed by the Engineer. The existing foundation shall be removed to a depth of at least twelve (12) inches below finished grade. All concrete debris shall be disposed of outside the right-of-way. The existing conduit shall remain in place and shall be carefully protected. The new conduits from the double handhole shall be installed, if required, as shown on the plans.

The removal of the existing traffic signal controller and cabinet shall be included in this pay item, as well as the removing and reinstalling of the existing cable(s) from conduit.

Upon completion of the above work, holes for steel dowels of the size indicated shall be drilled in the remaining concrete where indicated on the drawings.

The adjacent area shall be excavated and forming with anchor bolts and new conduit stubs provided to provide a concrete foundation for a Type IV or Type V cabinet. The Contractor shall follow the recommendations of the vendor, subject to approval of the Engineer, in forming and constructing the foundation.

Provide a three (3) foot by four (4) foot wide Portland cement concrete apron sidewalk, five (5) inches thick, on the side of the access door to the controller to facilitate servicing the controller and cabinet.

Anchor bolts shall be new and shall meet all the requirements of Section 1006.09 of the Standard Specifications.

Basis of Payment.

This work shall be paid for at the contract unit price each for MODIFY EXISTING TYPE "D" FOUNDATION.

REBUILD EXISTING HANDHOLE

Effective: January 1, 2002

Revised: July 1, 2015

895.04TS

This item shall consist of rebuilding and bringing to grade a handhole at a location shown on the plans or as directed by the Engineer. The work shall consist of removing the handhole frame and cover and the walls of the handhole to a depth of eight (8) inches below the finished grade.

Upon completion of the above work, four (4) holes, four (4) inches in depth and one half (1/2) inch in diameter, shall be drilled into the remaining concrete; one hole centered on each of the four handhole walls. Four (4) #3 steel dowels, eight (8) inches in length, shall be furnished and shall be installed in the drilled holes with a masonry epoxy.

All concrete debris shall be disposed of outside the right-of-way.

The area adjacent to each side of the handhole shall be excavated to allow forming. All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt handhole according to applicable portions of Section 814 of the Standard Specification and as modified in 814.01TS HANDHOLES Special Provision. The existing frame and cover shall be replaced if it was damaged during removal or as determined by the Engineer.

Basis of Payment.

This work shall be paid for at the contract unit price each for REBUILD EXISTING HANDHOLE, which price shall be payment in full for all labor, materials, and equipment necessary to complete the work described above and as indicated on the drawings.

REBUILD EXISTING HANDHOLE TO HEAVY-DUTY HANDHOLE

Effective: January 1, 2002

Revised: July 1, 2015

895.05TS

This item shall consist of partial removal of an existing concrete traffic signal handhole, reconstruction to the specifications of heavy duty handhole including new frame and cover, and bringing it to grade at location(s) shown in the plans or as directed by the Engineer. This work shall consist of removing the existing handhole frame and cover and the walls of the handhole to a depth of fifteen (15) inches below the finished grade.

Upon completion of the above work, four (4) holes, four (4) inches in depth, and one-half (1/2) inch in diameter shall be drilled into the top of the remaining concrete; one hole centered into each of the four handhole walls. Four (4) #3 steel dowels eight inches in length, shall be furnished and installed in the drilled holes with a masonry epoxy.

All concrete debris shall be disposed of outside the right-of-way.

Any pavement or asphalt surface removal required to install the new concrete shall have straight and neat edges using a method approved by the Engineer. Care shall be taken to protect the existing traffic signal cable. Any cable damage shall be reported immediately and repaired as directed by the Area Traffic Signal Engineer.

All steel hooks, handhole frame, cover, and concrete shall be provided to construct a rebuilt heavy duty handhole according to applicable portions of Section 814 of the Standard Specification and as modified in 814.01TS HANDHOLES Special Provision.

Basis of Payment.

This work shall be paid for at the contract unit price each for REBUILD EXISTING HANDHOLE TO HEAVY-DUTY HANDHOLE.

RELOCATE EXISTING PEDESTRIAN PUSH-BUTTON

Effective: August 4, 2017

895.06TS

Relocation.

Revise the last paragraph of Article 895.02 of the Standard Specifications to read:

When relocating an existing pedestrian push-button, the related sign shall be removed and installed at the new location. The push-button shall be installed according to Article 888.03. Mounting / extension brackets shall be used to assure that the push button is accessible from a paved or concrete surface and is in full compliance with ADA. Mounting / extension brackets shall not be paid for separately but shall be included in the cost of the RELOCATE EXISTING PEDESTRIAN PUSH-BUTTON pay item.

State of Illinois
Department of Transportation
Bureau of Local Roads and Streets
SPECIAL PROVISION
FOR
CONSTRUCTION AND MAINTENANCE SIGNS

Effective: January 1, 2004
Revised: June 1, 2007

All references to Sections or Articles in this specification shall be construed to mean a specific Section or Article of the Standard Specifications for Road and Bridge Construction, adopted by the Department of Transportation.

701.14. Signs. Add the following paragraph to Article 701.14:

All warning signs shall have minimum dimensions of 1200 mm x 1200 mm (48" x 48") and have a black legend on a fluorescent orange reflectorized background, meeting, as a minimum, Type AP reflectivity requirements of Table 1091-2 in Article 1091.02.

Kane County Prevailing Wage Rates posted on 7/15/2019

Trade Title	Rg	Type	C	Base	Foreman	Overtime				H/W	Pension	Vac	Trng	Other Ins
						M-F	Sa	Su	Hol					
ASBESTOS ABT-GEN	All	ALL		43.72	44.72	1.5	1.5	2.0	2.0	14.05	14.55	0.00	0.90	
ASBESTOS ABT-MEC	All	BLD		37.88	40.38	1.5	1.5	2.0	2.0	13.42	12.20	0.00	0.72	
BOILERMAKER	All	BLD		50.51	55.05	2.0	2.0	2.0	2.0	6.97	14.65	0.00	1.10	
BRICK MASON	All	BLD		46.88	51.57	1.5	1.5	2.0	2.0	10.85	19.31	0.00	0.95	
CARPENTER	All	ALL		48.55	50.55	1.5	1.5	2.0	2.0	11.79	21.85	0.00	0.73	
CEMENT MASON	All	ALL		47.01	49.01	2.0	1.5	2.0	2.0	10.65	22.86	0.00	0.50	
CERAMIC TILE FINISHER	All	BLD		40.56	40.56	1.5	1.5	2.0	2.0	11.00	12.80	0.00	0.86	
COMMUNICATION TECHNICIAN	N	BLD		40.20	42.60	1.5	1.5	2.0	2.0	13.07	13.85	0.00	0.70	
COMMUNICATION TECHNICIAN	S	BLD		40.12	42.52	1.5	1.5	2.0	2.0	15.45	11.23	0.00	1.40	
ELECTRIC PWR EQMT OP	All	ALL		43.71	59.52	1.5	1.5	2.0	2.0	6.00	13.55	0.00	0.77	1.31
ELECTRIC PWR EQMT OP	All	HWY		41.45	56.38	1.5	1.5	2.0	2.0	5.50	12.87	0.00	0.73	
ELECTRIC PWR GRNDMAN	All	ALL		33.69	59.52	1.5	1.5	2.0	2.0	6.00	10.44	0.00	0.59	1.01
ELECTRIC PWR GRNDMAN	All	HWY		32.00	56.38	1.5	1.5	2.0	2.0	5.50	9.92	0.00	0.66	
ELECTRIC PWR LINEMAN	All	ALL		52.44	59.52	1.5	1.5	2.0	2.0	6.00	16.27	0.00	0.93	1.58
ELECTRIC PWR LINEMAN	All	HWY		49.67	56.38	1.5	1.5	2.0	2.0	5.50	15.40	0.00	0.88	
ELECTRIC PWR TRK DRV	All	ALL		34.90	59.52	1.5	1.5	2.0	2.0	6.00	10.83	0.00	0.62	1.05
ELECTRIC PWR TRK DRV	All	HWY		33.14	56.38	1.5	1.5	2.0	2.0	5.50	10.29	0.00	0.59	
ELECTRICIAN	N	ALL		49.99	54.39	1.5	1.5	2.0	2.0	15.30	17.50	0.00	1.00	
ELECTRICIAN	S	BLD		49.29	53.54	1.5	1.5	2.0	2.0	17.85	13.80	0.00	1.73	
ELEVATOR CONSTRUCTOR	All	BLD		56.61	63.69	2.0	2.0	2.0	2.0	15.58	17.51	4.53	0.62	
FENCE ERECTOR	All	ALL		47.00	50.76	2.0	2.0	2.0	2.0	12.26	23.65	0.00	0.88	
GLAZIER	All	BLD		44.85	46.35	1.5	2.0	2.0	2.0	14.49	22.29	0.00	0.94	
HEAT/FROST INSULATOR	All	BLD		50.50	53.00	1.5	1.5	2.0	2.0	13.42	13.66	0.00	0.72	
IRON WORKER	All	ALL		47.00	50.76	2.0	2.0	2.0	2.0	12.26	23.65	0.00	0.88	
LABORER	All	ALL		43.72	44.47	1.5	1.5	2.0	2.0	14.05	14.55	0.00	0.90	
LATHER	All	ALL		48.55	50.55	1.5	1.5	2.0	2.0	11.79	21.85	0.00	0.73	
MACHINIST	All	BLD		48.93	51.43	1.5	1.5	2.0	2.0	7.68	8.95	1.85	1.32	
MARBLE FINISHER	All	ALL		35.15	48.33	1.5	1.5	2.0	2.0	10.85	17.66	0.00	0.52	
MARBLE MASON	All	BLD		46.03	50.63	1.5	1.5	2.0	2.0	10.85	18.78	0.00	0.64	
MATERIAL TESTER I	All	ALL		33.72		1.5	1.5	2.0	2.0	14.05	14.55	0.00	0.90	
MATERIALS TESTER II	All	ALL		38.72		1.5	1.5	2.0	2.0	14.05	14.55	0.00	0.90	

MILLWRIGHT	All	ALL		48.55	50.55	1.5	1.5	2.0	2.0	11.79	21.85	0.00	0.73	
OPERATING ENGINEER	All	BLD	1	51.10	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	2	49.80	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	3	47.25	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	4	45.50	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	5	54.85	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	6	52.10	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	BLD	7	54.10	55.10	2.0	2.0	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	FLT		38.00	38.00	1.5	1.5	2.0	2.0	19.65	15.10	2.00	1.40	
OPERATING ENGINEER	All	HWY	1	49.30	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	2	48.75	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	3	46.70	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	4	45.30	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	5	44.10	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	6	52.30	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
OPERATING ENGINEER	All	HWY	7	50.30	53.30	1.5	1.5	2.0	2.0	20.50	16.85	2.00	1.65	
ORNAMENTAL IRON WORKER	All	ALL		45.06	48.66	2.0	2.0	2.0	2.0	10.52	20.76	0.00	0.70	
PAINTER	All	ALL		47.30	49.30	1.5	1.5	1.5	2.0	12.43	8.65	0.00	1.45	
PAINTER - SIGNS	All	BLD		39.06	43.86	1.5	1.5	2.0	2.0	2.67	3.32	0.00	0.00	
PILEDRIIVER	All	ALL		48.55	50.55	1.5	1.5	2.0	2.0	11.79	21.85	0.00	0.73	
PIPEFITTER	All	BLD		49.60	52.60	1.5	1.5	2.0	2.0	10.75	19.85	0.00	2.67	
PLASTERER	All	BLD		44.50	47.17	1.5	1.5	2.0	2.0	14.50	17.29	0.00	1.50	
PLUMBER	All	BLD		51.00	54.05	1.5	1.5	2.0	2.0	15.37	14.75	0.00	1.35	
ROOFER	All	BLD		44.60	48.60	1.5	1.5	2.0	2.0	10.38	12.74	0.00	0.58	
SHEETMETAL WORKER	All	BLD		48.87	51.31	1.5	1.5	2.0	2.0	10.78	17.51	0.00	0.93	2.31
SIGN HANGER	All	BLD		26.07	27.57	1.5	1.5	2.0	2.0	3.80	3.55	0.00	0.00	
SPRINKLER FITTER	All	BLD		50.15	52.65	1.5	1.5	2.0	2.0	13.50	16.60	0.00	0.65	
STEEL ERECTOR	All	ALL		45.56	49.20	2.0	2.0	2.0	2.0	11.02	21.51	0.00	0.70	
STONE MASON	All	BLD		46.88	51.57	1.5	1.5	2.0	2.0	10.85	19.31	0.00	0.95	
TERRAZZO FINISHER	All	BLD		42.54	42.54	1.5	1.5	2.0	2.0	11.00	14.64	0.00	0.88	
TERRAZZO MASON	All	BLD		46.38	49.88	1.5	1.5	2.0	2.0	11.00	16.09	0.00	0.93	
TILE MASON	All	BLD		47.50	51.50	1.5	1.5	2.0	2.0	11.00	16.06	0.00	0.93	
TRAFFIC SAFETY WORKER	All	HWY		37.75	39.35	1.5	1.5	2.0	2.0	9.30	9.87	0.00	0.30	
TRUCK DRIVER	All	ALL	1	37.61	38.16	1.5	1.5	2.0	2.0	9.08	11.36	0.00	0.15	
TRUCK DRIVER	All	ALL	2	37.76	38.16	1.5	1.5	2.0	2.0	9.08	11.36	0.00	0.15	
TRUCK DRIVER	All	ALL	3	37.96	38.16	1.5	1.5	2.0	2.0	9.08	11.36	0.00	0.15	

TRUCK DRIVER	All	ALL	4	38.16	38.16	1.5	1.5	2.0	2.0	9.08	11.36	0.00	0.15	
TUCKPOINTER	All	BLD		46.50	47.50	1.5	1.5	2.0	2.0	8.34	18.40	0.00	0.93	

Legend

Rg Region

Type Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers

C Class

Base Base Wage Rate

OT M-F Unless otherwise noted, OT pay is required for any hour greater than 8 worked each day, Mon through Fri. The number listed is the multiple of the base wage.

OT Sa Overtime pay required for every hour worked on Saturdays

OT Su Overtime pay required for every hour worked on Sundays

OT Hol Overtime pay required for every hour worked on Holidays

H/W Health/Welfare benefit

Vac Vacation

Trng Training

Other Ins Employer hourly cost for any other type(s) of insurance provided for benefit of worker.

Explanations KANE COUNTY

ELECTRICIANS AND COMMUNICATIONS TECHNICIAN (NORTH) - Townships of Burlington, Campton, Dundee, Elgin, Hampshire, Plato, Rutland, St. Charles (except the West half of Sec. 26, all of Secs. 27, 33, and 34, South half of Sec. 28, West half of Sec. 35), Virgil and Valley View CCC and Elgin Mental Health Center.

The following list is considered as those days for which holiday rates of wages for work performed apply: New Years Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day and Veterans Day in some classifications/counties. Generally, any of these holidays which fall on a Sunday is celebrated on the following Monday. This then makes work performed on that Monday payable at the appropriate overtime rate for holiday pay. Common practice in a given local may alter certain days of celebration. If in doubt, please check with IDOL.

EXPLANATION OF CLASSES

ASBESTOS - GENERAL - removal of asbestos material/mold and hazardous materials from any place in a building, including mechanical systems where those mechanical systems are to be removed. This includes the removal of asbestos materials/mold and hazardous materials from ductwork or pipes in a building when the building is to be demolished at the time or at some close future date.

ASBESTOS - MECHANICAL - removal of asbestos material from mechanical systems, such as pipes, ducts, and boilers, where the mechanical systems are to remain.

CERAMIC TILE FINISHER

The grouting, cleaning, and polishing of all classes of tile, whether for interior or exterior purposes, all burned, glazed or unglazed products; all composition materials, granite tiles, warning detectable tiles, cement tiles, epoxy composite materials, pavers, glass, mosaics, fiberglass, and all substitute materials, for tile made in tile-like units; all mixtures in tile like form of cement, metals, and other materials that are for and intended for use as a finished floor surface, stair treads, promenade roofs, walks, walls, ceilings, swimming pools, and all other places where tile is to form a finished interior or exterior. The mixing of all setting mortars

including but not limited to thin-set mortars, epoxies, wall mud, and any other sand and cement mixtures or adhesives when used in the preparation, installation, repair, or maintenance of tile and/or similar materials. The handling and unloading of all sand, cement, lime, tile, fixtures, equipment, adhesives, or any other materials to be used in the preparation, installation, repair, or maintenance of tile and/or similar materials. Ceramic Tile Finishers shall fill all joints and voids regardless of method on all tile work, particularly and especially after installation of said tile work. Application of any and all protective coverings to all types of tile installations including, but not be limited to, all soap compounds, paper products, tapes, and all polyethylene coverings, plywood, masonite, cardboard, and any new type of products that may be used to protect tile installations, Blastrac equipment, and all floor scarifying equipment used in preparing floors to receive tile. The clean up and removal of all waste and materials. All demolition of existing tile floors and walls to be re-tiled.

COMMUNICATIONS TECHNICIAN

Construction, installation, maintenance and removal of telecommunication facilities (voice, sound, data and video), telephone, security systems, fire alarm systems that are a component of a multiplex system and share a common cable, and data inside wire, interconnect, terminal equipment, central offices, PABX and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area network), LAN (local area networks), and ISDN (integrated system digital network), pulling of wire in raceways, but not the installation of raceways.

MARBLE FINISHER

Loading and unloading trucks, distribution of all materials (all stone, sand, etc.), stocking of floors with material, performing all rigging for heavy work, the handling of all material that may be needed for the installation of such materials, building of scaffolding, polishing if needed, patching, waxing of material if damaged, pointing up, caulking, grouting and cleaning of marble, holding water on diamond or Carborundum blade or saw for setters cutting, use of tub saw or any other saw needed for preparation of material, drilling of holes for wires that anchor material set by setters, mixing up of molding plaster for installation of material, mixing up thin set for the installation of material, mixing up of sand to cement for the installation of material and such other work as may be required in helping a Marble Setter in the handling of all material in the erection or installation of interior marble, slate, travertine, art marble, serpentine, alberene stone, blue stone, granite and other stones (meaning as to stone any foreign or domestic materials as are specified and used in building interiors and exteriors and customarily known as stone in the trade), carrara, sanionyx, vitrolite and similar opaque glass and the laying of all marble tile, terrazzo tile, slate tile and precast tile, steps, risers treads, base, or any other materials that may be used as substitutes for any of the aforementioned materials and which are used on interior and exterior which are installed in a similar manner.

MATERIAL TESTER I: Hand coring and drilling for testing of materials; field inspection of uncured concrete and asphalt.

MATERIAL TESTER II: Field inspection of welds, structural steel, fireproofing, masonry, soil, facade, reinforcing steel, formwork, cured concrete, and concrete and asphalt batch plants; adjusting proportions of bituminous mixtures.

OPERATING ENGINEER - BUILDING

Class 1. Asphalt Plant; Asphalt Spreader; Autograde; Backhoes with Caisson Attachment; Batch Plant; Benoto (requires Two Engineers); Boiler and Throttle Valve; Caisson Rigs; Central Redi-Mix Plant; Combination Back Hoe Front End-loader Machine; Compressor and Throttle Valve; Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Conveyor (Truck Mounted); Concrete Paver Over 27E cu. ft; Concrete Paver 27E cu. ft. and Under; Concrete Placer; Concrete Placing Boom; Concrete Pump (Truck Mounted); Concrete Tower; Cranes, All; Cranes, Hammerhead; Cranes, (GCI and similar Type); Creter Crane; Spider Crane; Crusher, Stone, etc.; Derricks, All; Derricks, Traveling; Formless Curb and Gutter Machine; Grader, Elevating; Grouting Machines; Heavy Duty Self-Propelled Transporter or Prime Mover; Highlift Shovels or Front Endloader 2-1/4 yd. and over; Hoists, Elevators, outside type rack and pinion and similar machines; Hoists, One, Two and Three Drum; Hoists, Two Tugger One Floor; Hydraulic Backhoes; Hydraulic Boom Trucks; Hydro Vac (and similar equipment); Locomotives, All; Motor Patrol; Lubrication Technician; Manipulators; Pile Drivers and Skid Rig; Post Hole Digger; Pre-Stress Machine; Pump Cretes Dual Ram; Pump Cretes: Squeeze

Cretes-Screw Type Pumps; Gypsum Bulker and Pump; Raised and Blind Hole Drill; Roto Mill Grinder; Scoops - Tractor Drawn; Slip-Form Paver; Straddle Buggies; Operation of Tie Back Machine; Tournapull; Tractor with Boom and Side Boom; Trenching Machines.

Class 2. Boilers; Broom, All Power Propelled; Bulldozers; Concrete Mixer (Two Bag and Over); Conveyor, Portable; Forklift Trucks; Highlift Shovels or Front Endloaders under 2-1/4 yd.; Hoists, Automatic; Hoists, Inside Elevators; Hoists, Sewer Dragging Machine; Hoists, Tugger Single Drum; Laser Screed; Rock Drill (Self-Propelled); Rock Drill (Truck Mounted); Rollers, All; Steam Generators; Tractors, All; Tractor Drawn Vibratory Roller; Winch Trucks with "A" Frame.

Class 3. Air Compressor; Combination Small Equipment Operator; Generators; Heaters, Mechanical; Hoists, Inside Elevators (remodeling or renovation work); Hydraulic Power Units (Pile Driving, Extracting, and Drilling); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Low Boys; Pumps, Well Points; Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 4. Bobcats and/or other Skid Steer Loaders; Oilers; and Brick Forklift.

Class 5. Assistant Craft Foreman.

Class 6. Gradall.

Class 7. Mechanics; Welders.

OPERATING ENGINEERS - HIGHWAY CONSTRUCTION

Class 1. Asphalt Plant; Asphalt Heater and Planer Combination; Asphalt Heater Scarfire; Asphalt Spreader; Autograder/GOMACO or other similar type machines; ABG Paver; Backhoes with Caisson Attachment; Ballast Regulator; Belt Loader; Caisson Rigs; Car Dumper; Central Redi-Mix Plant; Combination Backhoe Front Endloader Machine, (1 cu. yd. Backhoe Bucket or over or with attachments); Concrete Breaker (Truck Mounted); Concrete Conveyor; Concrete Paver over 27E cu. ft.; Concrete Placer; Concrete Tube Float; Cranes, all attachments; Cranes, Tower Cranes of all types: Creter Crane: Spider Crane; Crusher, Stone, etc.; Derricks, All; Derrick Boats; Derricks, Traveling; Dredges; Elevators, Outside type Rack & Pinion and Similar Machines; Formless Curb and Gutter Machine; Grader, Elevating; Grader, Motor Grader, Motor Patrol, Auto Patrol, Form Grader, Pull Grader, Subgrader; Guard Rail Post Driver Truck Mounted; Hoists, One, Two and Three Drum; Heavy Duty Self-Propelled Transporter or Prime Mover; Hydraulic Backhoes; Backhoes with shear attachments up to 40' of boom reach; Lubrication Technician; Manipulators; Mucking Machine; Pile Drivers and Skid Rig; Pre-Stress Machine; Pump Cretes Dual Ram; Rock Drill - Crawler or Skid Rig; Rock Drill - Truck Mounted; Rock/Track Tamper; Roto Mill Grinder; Slip-Form Paver; Snow Melters; Soil Test Drill Rig (Truck Mounted); Straddle Buggies; Hydraulic Telescoping Form (Tunnel); Operation of Tieback Machine; Tractor Drawn Belt Loader; Tractor Drawn Belt Loader (with attached pusher - two engineers); Tractor with Boom; Tractaire with Attachments; Traffic Barrier Transfer Machine; Trenching; Truck Mounted Concrete Pump with Boom; Raised or Blind Hole Drills (Tunnel Shaft); Underground Boring and/or Mining Machines 5 ft. in diameter and over tunnel, etc; Underground Boring and/or Mining Machines under 5 ft. in diameter; Wheel Excavator; Widener (APSCO).

Class 2. Batch Plant; Bituminous Mixer; Boiler and Throttle Valve; Bulldozers; Car Loader Trailing Conveyors; Combination Backhoe Front Endloader Machine (Less than 1 cu. yd. Backhoe Bucket or over or with attachments); Compressor and Throttle Valve; Compressor, Common Receiver (3); Concrete Breaker or Hydro Hammer; Concrete Grinding Machine; Concrete Mixer or Paver 7S Series to and including 27 cu. ft.; Concrete Spreader; Concrete Curing Machine, Burlap Machine, Belting Machine and Sealing Machine; Concrete Wheel Saw; Conveyor Muck Cars (Haglund or Similar Type); Drills, All; Finishing Machine - Concrete; Highlift Shovels or Front Endloader; Hoist - Sewer Dragging Machine; Hydraulic Boom Trucks (All Attachments); Hydro-Blaster; Hydro Excavating (excluding hose work); Laser Screed; All Locomotives, Dinky; Off-Road Hauling Units (including articulating) Non Self-Loading Ejection Dump; Pump Cretes: Squeeze Cretes - Screw Type Pumps, Gypsum Bulker and Pump; Roller, Asphalt; Rotary Snow Plows; Rototiller, Seaman, etc., self-propelled; Self-Propelled Compactor; Spreader - Chip - Stone, etc.; Scraper - Single/Twin Engine/Push and Pull; Scraper - Prime Mover in Tandem (Regardless of Size); Tractors pulling attachments, Sheeps Foot, Disc,

Compactor, etc.; Tug Boats.

Class 3. Boilers; Brooms, All Power Propelled; Cement Supply Tender; Compressor, Common Receiver (2); Concrete Mixer (Two Bag and Over); Conveyor, Portable; Farm-Type Tractors Used for Mowing, Seeding, etc.; Forklift Trucks; Grouting Machine; Hoists, Automatic; Hoists, All Elevators; Hoists, Tugger Single Drum; Jeep Diggers; Low Boys; Pipe Jacking Machines; Post-Hole Digger; Power Saw, Concrete Power Driven; Pug Mills; Rollers, other than Asphalt; Seed and Straw Blower; Steam Generators; Stump Machine; Winch Trucks with "A" Frame; Work Boats; Tamper-Form-Motor Driven.

Class 4. Air Compressor; Combination - Small Equipment Operator; Directional Boring Machine; Generators; Heaters, Mechanical; Hydraulic Power Unit (Pile Driving, Extracting, or Drilling); Light Plants, All (1 through 5); Pumps, over 3" (1 to 3 not to exceed a total of 300 ft.); Pumps, Well Points; Vacuum Trucks (excluding hose work); Welding Machines (2 through 5); Winches, 4 Small Electric Drill Winches.

Class 5. SkidSteer Loader (all); Brick Forklifts; Oilers.

Class 6. Field Mechanics and Field Welders

Class 7. Dowell Machine with Air Compressor; Gradall and machines of like nature.

OPERATING ENGINEERS - FLOATING

Diver. Diver Wet Tender, Diver Tender, ROV Pilot, ROV Tender

TRAFFIC SAFETY - Effective November 30, 2018, the description of the traffic safety worker trade in this County is as follows:
Work associated with barricades, horses and drums used to reduce lane usage on highway work, the installation and removal of temporary, non-temporary or permanent lane, pavement or roadway markings, and the installation and removal of temporary road signs.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION Class 1. Two or three Axle Trucks. A-frame Truck when used for transportation purposes; Air Compressors and Welding Machines, including those pulled by cars, pick-up trucks and tractors; Ambulances; Batch Gate Lockers; Batch Hopperman; Car and Truck Washers; Carry-alls; Fork Lifts and Hoisters; Helpers; Mechanics Helpers and Greasers; Oil Distributors 2-man operation; Pavement Breakers; Pole Trailer, up to 40 feet; Power Mower Tractors; Self-propelled Chip Spreader; Skipman; Slurry Trucks, 2-man operation; Slurry Truck Conveyor Operation, 2 or 3 man; Teamsters; Unskilled Dumpman; and Truck Drivers hauling warning lights, barricades, and portable toilets on the job site.

Class 2. Four axle trucks; Dump Crets and Adgetors under 7 yards; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnapulls or Turnatrailers when pulling other than self-loading equipment or similar equipment under 16 cubic yards; Mixer Trucks under 7 yards; Ready-mix Plant Hopper Operator, and Winch Trucks, 2 Axles.

Class 3. Five axle trucks; Dump Crets and Adgetors 7 yards and over; Dumpsters, Track Trucks, Euclids, Hug Bottom Dump Turnatrailers or turnapulls when pulling other than self-loading equipment or similar equipment over 16 cubic yards; Explosives and/or Fission Material Trucks; Mixer Trucks 7 yards or over; Mobile Cranes while in transit; Oil Distributors, 1-man operation; Pole Trailer, over 40 feet; Pole and Expandable Trailers hauling material over 50 feet long; Slurry trucks, 1-man operation; Winch trucks, 3 axles or more; Mechanic--Truck Welder and Truck Painter.

Class 4. Six axle trucks; Dual-purpose vehicles, such as mounted crane trucks with hoist and accessories; Foreman; Master Mechanic; Self-loading equipment like P.B. and trucks with scoops on the front.

TERRAZZO FINISHER

The handling of sand, cement, marble chips, and all other materials that may be used by the Mosaic Terrazzo Mechanic, and the mixing, grinding, grouting, cleaning and sealing of all Marble, Mosaic, and Terrazzo work, floors, base, stairs, and wainscoting by

hand or machine, and in addition, assisting and aiding Marble, Masonic, and Terrazzo Mechanics.

Other Classifications of Work:

For definitions of classifications not otherwise set out, the Department generally has on file such definitions which are available. If a task to be performed is not subject to one of the classifications of pay set out, the Department will upon being contacted state which neighboring county has such a classification and provide such rate, such rate being deemed to exist by reference in this document. If no neighboring county rate applies to the task, the Department shall undertake a special determination, such special determination being then deemed to have existed under this determination. If a project requires these, or any classification not listed, please contact IDOL at 217-782-1710 for wage rates or clarifications.

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

MATERIAL TESTER & MATERIAL TESTER/INSPECTOR I AND II

Notwithstanding the difference in the classification title, the classification entitled "Material Tester I" involves the same job duties as the classification entitled "Material Tester/Inspector I". Likewise, the classification entitled "Material Tester II" involves the same job duties as the classification entitled "Material Tester/Inspector II".

Kane County Traffic Signal, ITS, and Roadway Lighting Locations

LIST #	IP #	LOCATION	NOTE	ROUTINE MAINTENANCE PAY ITEMS											NON-ROUTINE / EXTRA WORK PAY ITEMS**				
		LOCATION DESCRIPTION		A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	EW-1	EW-2	EW-3	EW-4	EW-5
1		ALLEN RD & US 20									1								
2	dsI	BIG TIMBER RD. & TIMBER TRAILS BLVD.		1	1	1					2								
3	dsI	BIG TIMBER RD. & TYRRELL RD.		1	1	1					4								
4		BLISS ROAD AND VIRGIL GILMAN TRAIL CROSSING (1/2 MILE EAST OF IL 47) RRFB					2												
5		BOWES RD. & LONGCOMMON PKWY		1	1	1					2								
6		BOWES RD. & MCLEAN BLVD.		1	1	1					10								
7	90	BOWES RD. & SHASTA DAISY / WAL-MART ENTRANCE		1	1	1													
8		BURLINGTON RD & IL 47 (ROUNDAABOUT SYSTEM + FLASHERS)					2				16								
9		BURLINGTON RD. & BOLCUM RD.									2								
10		BURLINGTON RD. & SILVER GLEN RD. SOLAR					2												
11	55	CORRON & BURLINGTON		1	1	1	2				2								
12		CORRON RD & MCDONALD RD					1												
13		DEAN ST./ARBOR CREEK RD. & IL RT. 64									2								
14		DITTMAN RD. & MCDONALD RD.					1												
15	133	DUNHAM RD. & ARMY TRAIL ROAD		1	1	1					2							1	
16		DUNHAM RD. & UP RR (3/4 MI N. OF ARMY TRAIL) SOLAR					1												
17	32	FABYAN PKWY & BENT TREE DR.	O	1	1	1					4								
18	30	FABYAN PKWY & BRANSON DR./VIKING DR.	O	1	1	1					2								
19	117	FABYAN PKWY & IL RT. 25 (N. WASHINGTON AVE./CHRISSY AVE.)		1	1	1													
20	116	FABYAN PKWY & IL RT. 31 (BATAVIA AVE.)		1	1	1						6							
21	119	FABYAN PKWY & KIRK RD.	O	1	1	1					8								
22	51	FABYAN PKWY & MILL CREEK DR.	O	1	1	1													
23	118	FABYAN PKWY & RADDANT RD.	O	1	1	1					4								
24		FABYAN PKWY & SETTLER'S HILL ENTRANCE		1	1	1					2								
25	31	FABYAN PKWY & WALMART ENTRANCE		1	1	1													
26	33	FABYAN PKWY & WESTERN AVE.	O	1	1	1					4								
27		FABYAN PKWY (WALMART ENTRANCE TO BENT TREE DR.)									40								
28		FABYAN PKWY @ FOX RIVER BRIDGE									15								
29	50	FABYAN PKWY. & KANEVILLE RD.		1	1	1					3								
30		HARTER RD & ESKER DR (KANEVILLE MID SCH ENT) SOLAR					2												
31		HARTER RD 100 FEET WEST OF MERRIL RD SOLAR							1										
32		HUGHES RD. & BUNKER RD.					1												
33	98	HUNTLEY RD. & BOYER RD. & LONGMEADOW PKWY		1	1	1					4								
34	100	HUNTLEY RD. & COMMERCIAL ENTRANCE (DOMINICK’S)		1	1													1	
35	93	HUNTLEY RD. & GALLIGAN RD.		1	1	1					4								
36		HUNTLEY RD. & KREUTZER SOLAR					1												
37	101	HUNTLEY RD. & MILLER RD.		1	1	1					4						1		
38	102	HUNTLEY RD. & SLEEPY HOLLOW RD.		1	1	1					4								
39	97	HUNTLEY RD. & SQUARE BARN RD.		1	1	1					2								

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Kane County Traffic Signal, ITS, and Roadway Lighting Locations

LIST #	IP #	LOCATION	NOTE	ROUTINE MAINTENANCE PAY ITEMS											NON-ROUTINE / EXTRA WORK PAY ITEMS**				
		LOCATION DESCRIPTION		A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	EW-1	EW-2	EW-3	EW-4	EW-5
40		KANE COUNTY D.O.T. (41W011 BURLINGTON RD) FIBER+SWITCHES+CONDUIT,ETC.												1					
41		KESLINGER RD. & ANDERSON RD.		1	1	1					2								
42		KESLINGER RD. & DAUBERMAN RD. SOLAR					6												
43		KIRK RD & STADIUM DRIVE (ST. CHARLES HIGH SCHOOL)					2												
44	124	KIRK RD. & AVERILL RD.		1	1	1					25							1	
45	120	KIRK RD. & CHERRY LN.	O	1	1	1												1	
46	125	KIRK RD. & DIVISION ST.		1	1	1												1	
47	127	KIRK RD. & DUKANE DR./OHIO AVE.		1	1	1												1	
48	132	KIRK RD. & FOX CHASE BLVD.		1	1	1													
49	131	KIRK RD. & FOXFIELD DR.		1	1	1												1	
50	115	KIRK RD. & HUBBARD ST.	O	1	1	1					2							1	
51	123	KIRK RD. & IL RT. 38 (ROOSEVELT RD.)		1	1	1													
52	129	KIRK RD. & LEGACY BLVD.		1	1	1												1	
53	112	KIRK RD. & MESA LN.	O	1	1	1					15								
54	135	KIRK RD. & PINE ST.	O	1	1	1					2							1	
55		KIRK RD. & PRAIRIE PATH CROSSING NORTH OF IL RT 38 SOLAR / RRFB					4												
56	126	KIRK RD. & TYLER RD.		1	1	1												1	
57	114	KIRK RD. & WILSON ST.		1	1	1					2							1	
58	113	KIRK RD. & WIND ENERGY PASS	O	1	1	1					9								
59	134	KIRK RD. BRIDGE BETWEEN IL RTE 38 & CHERRY LANE (RWIS+Lighting Systems)	X				0			0	14								
60		KIRK RD. BETWEEN ILLINOIS PRAIRIE PATH (N. OF AVERILL) TO DIVISON ST.									22								
61		LAFOX RD. & CAMPTON HILLS RD. SOLAR					2												
62		LAFOX RD. & IL RT. 38									2								
63		LAFOX ROAD CROSSING AT UNION PACIFIC RAILROAD (WHS, DOT No. 175004L, MP 40.67)						1											
64		LONGMEADOW PKWY AND BARRETT DR.					3												
65	151	LONGMEADOW PKWY AND SLEEP HOLLOW RD		1	1	1					2								
66		LONGMEADOW PKWY AND WHITE CHAPEL LN					3												
67		MAIN ST 200 FEET WEST OF MERRIL RD SOLAR							1										
68	dsl	MAIN ST. & BLISS RD.		1	1	1					2								
69		MAIN ST. & DEERPATH RD	O	1	1	1	2				4								
70	dsl	MAIN ST. & FABYAN PKWY		1	1	1					2							1	
71		MAIN ST. & SOUTH MILL CREEK DR.		1	1														
72	146	MCLEAN BLVD & STEARNS RD.		1	1	1													
73	dsl	MCLEAN BLVD. & SPRING ST.									12								
74	dsl	MCLEAN BLVD. & SUNDOWN RD.		1	1	1					12								
75		MONTGOMERY RD. & HOWELL PI.		1	1	1					1								
76		MONTGOMERY RD. & 600' EAST OF SOUTH BROADWAY RD.					1												
77	20	ORCHARD RD. & AUCUTT RD.		1	1	1					14								
78	4	ORCHARD RD. & COACH & SURREY LN.	O	1	1	1					8								

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Kane County Traffic Signal, ITS, and Roadway Lighting Locations

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		LOCATION DESCRIPTION		A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	EW-1	EW-2	EW-3	EW-4	EW-5
79	17	ORCHARD RD. & COMISKEY	O	1	1	1					15								
80	9	ORCHARD RD. & COMMERCIAL ENTRANCE (HOME DEPOT)	O	1	1						7								
81	5	ORCHARD RD. & GALENA BLVD.		1	1	1					10						1		
82	11	ORCHARD RD. & I-88 EB RAMP (SOUTH RAMP)	O	1	1														
83	12	ORCHARD RD. & I-88 WB RAMP (NORTH RAMP)	O	1	1														
84	6	ORCHARD RD. & ILLINOIS AVE.	O	1	1	1					10							1	
85	7	ORCHARD RD. & INDIAN TRAIL	O	1	1						13							1	
86	2	ORCHARD RD. & JERICO RD.	O	1	1	1					44								
87	14	ORCHARD RD. & OAK ST.	O	1	1	1					20							1	
88	13	ORCHARD RD. & ORCHARD GATEWAY BLVD.		1	1	1					25						1	1	
89	3	ORCHARD RD. & PRAIRIE ST.	O	1	1						16								
90	1	ORCHARD RD. & ROCHESTER DR.		1	1	1											1	1	
91	10	ORCHARD RD. & SULLIVAN RD.	O	1	1						12							1	
92	16	ORCHARD RD. & WHITE OAK DR.	O	1	1	1					14						1		
93		PECK RD. & IL RT. 38									2								
94		PECK RD. & KESLINGER RD.		1	1	1					28						1		
95		PELOW RD. & RAMM RD.					1												
96		PERRY RD. & WEST COUNTY LINE RD.					2												
97		PLANK RD. & BURLINGTON RD.		1	1						4								
98	91	RANDALL RD. BETWEEN BRIDGE BEWEEN BIG TIMBER RD & FLETCHER DR (RWIS)					0			0									
99	82	RANDALL RD. & ALFT LN.		1	1	1													
100	79	RANDALL RD. & BIG TIMBER RD.	O	1	1	1					25							1	
101	95	RANDALL RD. & BINNIE RD.	O	1	1						27							1	
102	63	RANDALL RD. & BOLCUM RD.		1	1	1					4							1	
103	71	RANDALL RD. & BOWES RD.		1	1	1					33							1	
104	39	RANDALL RD. & BRICHER RD. (STREET LIGHTING SOUTH OF BRICHER, WITHIN COUNTY ROW)	X	1	1	1					7							1	
105	78	RANDALL RD. & BRINKMAN WAY/ROYAL BLVD.	O	1	1	1					2								
106		RANDALL RD. & CARRINGTON									1								
107	35	RANDALL RD. & CHRISTINA DR.		1	1	1					4							1	
108	72	RANDALL RD. & COLLEGE GREEN DR.	O	1	1	1					15	2							
109	104	RANDALL RD. & COMMONS DR.	O	1	1	1					36							1	
110	103	RANDALL RD. & CORPORATE PKWY	O	1	1	1					25							1	
111	105	RANDALL RD. & COUNTY LINE RD.	O	1	1	1					12							1	
112	61	RANDALL RD. & CRANE RD.		1	1	1	2				2								
113	49	RANDALL RD. & DEAN RD.		1	1	1					38							1	
114	29	RANDALL RD. & FABYAN PKWY		1	1	1											1	1	
115	36	RANDALL RD. & FARGO BLVD.		1	1	1					2							1	
116	81	RANDALL RD. & FOX LN.	O	1	1	1													
117	34	RANDALL RD. & GLEN EAGLE DR.		1	1	1					2							1	

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Kane County Traffic Signal, ITS, and Roadway Lighting Locations

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118	69	RANDALL RD. & GYORR AVE.		1	1	1					4						1	1	
119	77	RANDALL RD. & HIGHLAND AVE.	O	1	1	1					15								
120	80	RANDALL RD. & HOLMES RD./SHERMAN HOSPITAL ENTRANCE -	O	1	1	1					27								
121	70	RANDALL RD. & HOPPS RD.	O	1	1	1	2				2								
122	99	RANDALL RD. & HUNTLEY RD.	O	1	1						53								
123	83	RANDALL RD. & I-90 EB RAMP (SOUTH RAMP)	O	1	1	1					22								
124	84	RANDALL RD. & I-90 WB RAMP (NORTH RAMP)	O	1	1	1													
125	42	RANDALL RD. & IL RT. 38		1	1	1													
126	48	RANDALL RD. & IL RT. 64		1	1	1					49								
127	88	RANDALL RD. & IL RT. 72	O	1	1	1	2												
128	37	RANDALL RD. & KESLINGER RD/KANEVILLE RD. (+ NB advanced Lighting)		1	1	1	2				6							1	
129	25	RANDALL RD. & MAIN ST. (BATAVIA)		1	1	1					3							1	
130	67	RANDALL RD. & MCDONALD RD. / STEARNS RD.	O	1	1	1													
131	27	RANDALL RD. & MCKEE ST.	O	1	1	1					4							1	
132	28	RANDALL RD. & MILL ST.		1	1	1					11							1	
133	96	RANDALL RD. & MILLER RD.		1	1													1	
134	87	RANDALL RD. & NORTHWEST PKWY/JOY LN.	O	1	1						14								
135	47	RANDALL RD. & OAK ST.		1	1	1					4							1	
136	18	RANDALL RD. & ORCHARD RD./MOOSEHEART RD.	O	1	1	1					4								
137	65	RANDALL RD. & PAMELA DR (SOUTH ELGIN)	O	1	1	1					10								
138	85	RANDALL RD. & POINT BLVD.	O	1	1	1													
139	46	RANDALL RD. & PRAIRIE ST.		1	1	1												1	
140	94	RANDALL RD. & RECREATION DR.	O	1	1	1					13						1	1	
141	62	RANDALL RD. & RED GATE RD.		1	1	1					4								
142	60	RANDALL RD. & RED HAW LN. / OAK CREST CIR.		1	1	1													
143	86	RANDALL RD. & SADDLE CLUB PKWY/AUTO MALL DRIVE	O	1	1	1					32								
144	64	RANDALL RD. & SILVER GLEN RD.	O	1	1	1					20								
145	73	RANDALL RD. & SOUTH ST. (ELGIN)	O	1	1	1													
146	66	RANDALL RD. & THORNWOOD DR.	O	1	1	1					10							1	
147	75	RANDALL RD. & U.S. 20 EB RAMP	O	1	1	1			2										
148	76	RANDALL RD. & U.S. 20 WB RAMP/FOOTHILL RD.	O	1	1	1	2												
149	89	RANDALL RD. & WAL-MART ENT (S.of BOWES)		1	1	1					14							1	
150	74	RANDALL RD. & WELD RD.	O	1	1	1					30								
151	38	RANDALL RD. & WILLIAMSBURG AVE.		1	1	1					15							1	
152	26	RANDALL RD. & WILSON ST.	O	1	1	1					4							1	
153	150	RANDALL RD. & LONGMEADOW PKWY		1	1	1					4								
154		RANDALL RD. OVER TYLER CREEK/UPRR (BRIDGE - Claude Hanson)									24								
155		RANDALL RD. PED./BIKE UNDERPASS LIGHTING AT SOUTH STREET, GENEVA									12								
156		RANDALL RD. PED./BIKE UNDERPASS LIGHTING N. OF DEAN ST ST. CHARLES									10								

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Kane County Traffic Signal, ITS, and Roadway Lighting Locations

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157		RANDALL ROAD - 1000 FEET SOUTH OF CRANE ROAD							2										
158		RANDALL ROAD - 500 FEET NORTH OF DEAN STREET							2										
159		RANDALL ROAD - 600 FEET NORTH OF MIDDLE CREEK LANE							2										
160		RANDALL ROAD - 600 FEET SOUTH OF SILVER GLENN ROAD							2										
161		SCOTT RD. & HARTER RD.					1												
162		SILVER GLEN RD. & CORRON RD.					1												
163		SILVER GLEN RD. & IL RT. 31 SOLAR					1												
164		STEARNS RD & IL RTE 25 BIKE WAY UNDERPASS LIGHTING									20								
165	144,149	STEARNS RD BRIDGE OVER THE FOX RIVER			2					1	12		2	2					
166	143	STEARNS RD & BREWSTER CREEK			1				2					1					
167	145	STEARNS RD & IL 31 OVERPASS			1				2					1					
168		STEARNS RD & IL RT. 31 DECORATIVE LIGHTING									14								
169	148	STEARNS RD & UMBDENSTOCK RD			1				2					1					
170		TANNER RD & LAKE RUN FOREST PRESERVE BIKE PATH SOLAR					2												
171	dsl	TYRRELL RD. & TOWN CENTER BLVD.		1	1	1					4								
		UNSPECIFIED LOCATION													165000	1050	9	23	3
TOTAL				120	125	107	56	1	18	1	1220	8	2	6	165000	1050	18	68	3
Approximate Total Monthly Quantities															(Total Contract Quantities)				

- O

- Location estimated to be off maintenance due to ongoing construction or other work, at the start of this contract (confirm with KDOT Traffic before December 1st)
- X

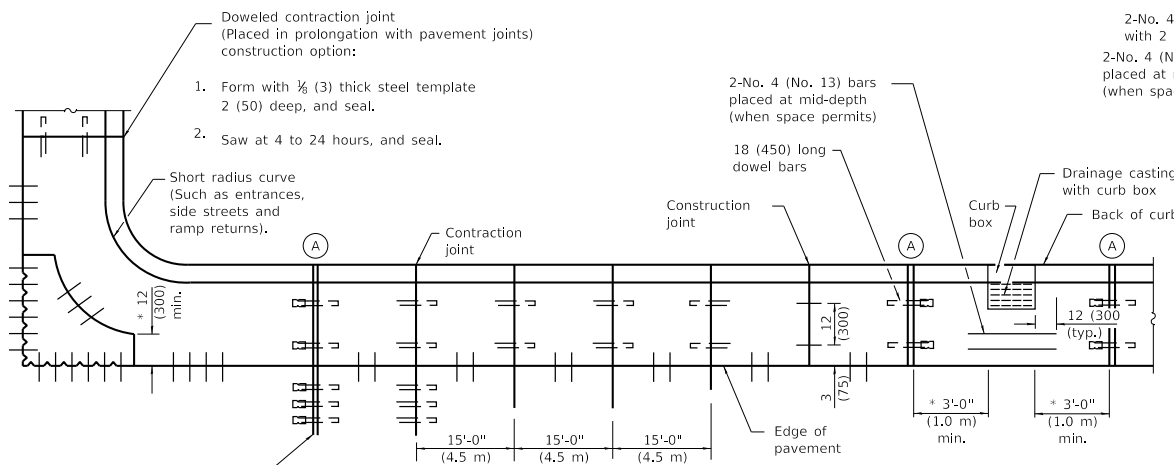
- Location may include one or more other agencies performing maintenance out of the same power center (Lighting Controller)
- **Extra Work Locations are subject to change. Final locations will be coordinated with Selected Contractor

- A-1 - TRAFFIC SIGNAL LOCATION
- A-2 - UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM LOCATION
- A-3 - EMERGENCY VEHICLE PRE-EMPTION (EVP) SYSTEM LOCATION
- A-4 - FLASHING BEACON LOCATION
- A-5 - WAYSIDE HORN SYSTEM (WHS) LOCATION
- A-6 - DRIVER FEEDBACK SPEED MONITORING SIGN LOCATION
- A-7 - ROADWAY WEATHER INFORMATION SYSTEM (RWIS) LOCATION
- A-8 - STREET LIGHT LOCATION
- A-9 - ILLUMINATED SIGN LOCATION
- A-10 - DYNAMIC MESSAGE SIGN (DMS) LOCATION
- A-11 - NON-TRAFFIC SIGNAL, INTELLIGENT TRANSPORTATION SYSTEM (I.T.S.) LOCATION
- EW-1 - ITEMS AS ORDERED BY THE ENGINEER
- EW-2 - REPLACEMENT OF INDUCTION LOOP (IN FEET)
- EW-3 - REPLACEMENT OF TRAFFIC SIGNAL LED, COMPLETE
- EW-4 - REPLACEMENT OF UNINTERRUPTIBLE POWER SUPPLY (U.PS.) BATTERIES & ANCILLARY COMPONENTS
- EW-5 - REPLACEMENT OF UNINTERRUPTIBLE POWER SUPPLY (U.PS.), COMPLETE

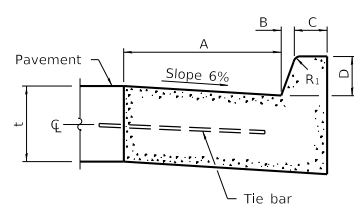
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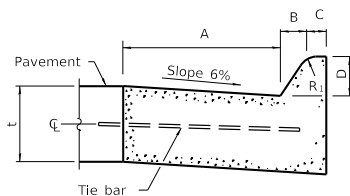
O - Location is anticipated to be maintained as-part of ongoing construction project by start of contract



PLAN
ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE



BARRIER CURB

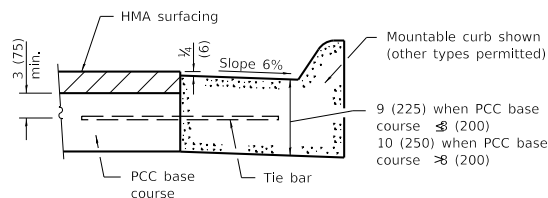


MOUNTABLE CURB

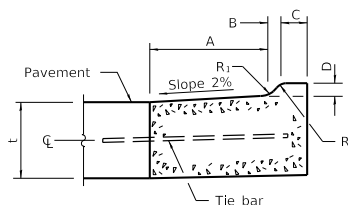
TYPE	A	B	C	D	R ₁
B-6.06 *	6	1	6	6	1
(B-15.15)	(150)	(25)	(150)	(150)	(25)
B-6.12	12	1	6	6	1
(B-15.3)	(300)	(25)	(150)	(150)	(25)
B-6.18	18	1	6	6	1
(B-15.45)	(450)	(25)	(150)	(150)	(25)
B-6.24	24	1	6	6	1
(B-15.60)	(600)	(25)	(150)	(150)	(25)
B-9.12	12	2	5	9	1
(B-22.30)	(300)	(50)	(125)	(225)	(25)
B-9.18	18	2	5	9	1
(B-22.45)	(450)	(50)	(125)	(225)	(25)
B-9.24	24	2	5	9	1
(B-22.60)	(600)	(50)	(125)	(225)	(25)

* For corner islands only.

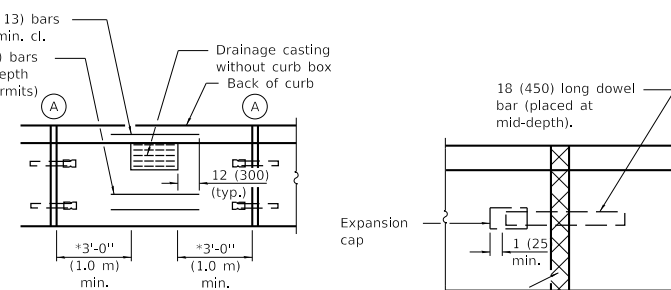
TYPE	A	B	C	D	R ₁	R ₂
M-2.06	6	2	4	2	3	2
(M-5.15)	(150)	(50)	(100)	(50)	(75)	(50)
M-2.12	12	2	4	2	3	2
(M-5.30)	(300)	(50)	(100)	(50)	(75)	(50)
M-4.06	6	4	3	4	3	NA
(M-10.15)	(150)	(100)	(75)	(100)	(75)	NA
M-4.12	12	4	3	4	3	NA
(M-10.30)	(300)	(100)	(75)	(100)	(75)	NA
M-4.18	18	4	3	4	3	NA
(M-10.45)	(450)	(100)	(75)	(100)	(75)	NA
M-4.24	24	4	3	4	3	NA
(M-10.60)	(600)	(100)	(75)	(100)	(75)	NA
M-6.06	6	6	2	6	2	NA
(M-15.15)	(150)	(150)	(50)	(150)	(50)	NA
M-6.12	12	6	2	6	2	NA
(M-15.30)	(300)	(150)	(50)	(150)	(50)	NA
M-6.18	18	6	2	6	2	NA
(M-15.45)	(450)	(150)	(50)	(150)	(50)	NA
M-6.24	24	6	2	6	2	NA
(M-15.60)	(600)	(150)	(50)	(150)	(50)	NA



**ADJACENT TO PCC BASE COURSE
WITH HMA SURFACING**

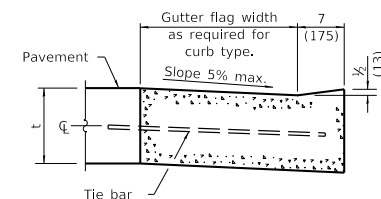


M-2.06 (M-5.15) and M-2.12 (M-5.30)



DETAIL A
EXPANSION JOINT

Full depth & width 1 (25) - thick (min.) preformed expansion joint filler.



**DEPRESSED CURB ADJACENT
TO CURB RAMP ACCESSIBLE
TO THE DISABLED**

GENERAL NOTES

The bottom slope of combination curb and gutter constructed adjacent to pcc pavement shall be the same slope as the subbase or 6% when subbase is omitted.

t = Thickness of pavement.

Longitudinal joint tie bars shall be No. 6 (No. 19) at 36 (900) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

A minimum clearance of 2 (50) between the end of the tie bar and the back of the curb shall be maintained.

The dowel bars shown in contraction joints will only be required for monolithic construction.

See Standard 606301 for details of corner islands.

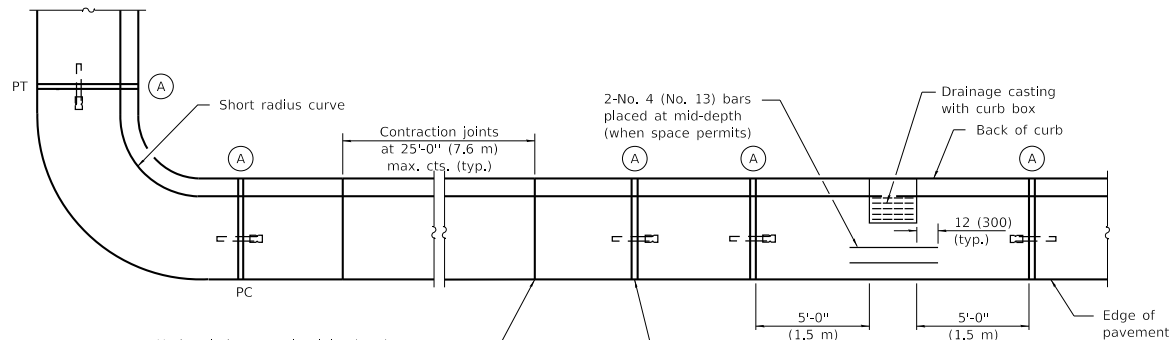
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-18	Revised General Note for tie bar spacing to 36 (900) cts.
1-1-15	Added B-6.06 (B-15.15) barrier curb and gutter to table (corner islands only).

CONCRETE CURB TYPE B AND COMBINATION CONCRETE CURB AND GUTTER

(Sheet 1 of 2)

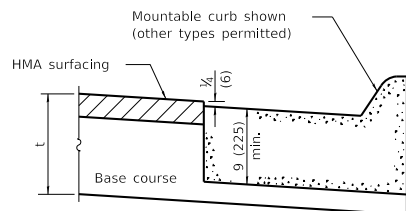
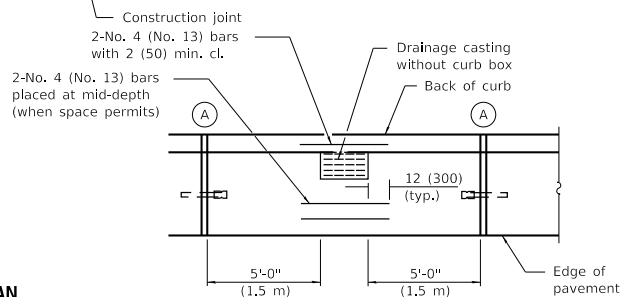
STANDARD 606001-07



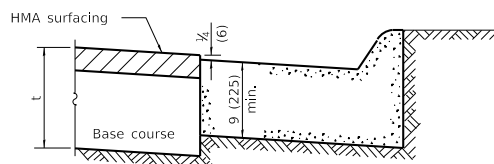
Undoweled contraction joint (typ.) construction options:

1. Form with $\frac{3}{8}$ (3) thick steel template 2 (50) deep, and seal.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert $\frac{3}{4}$ (20) thick preformed joint filler full depth and width.

PLAN

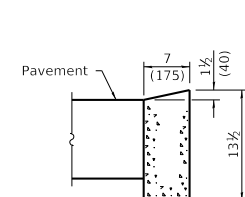


ON DISTURBED SUBGRADE

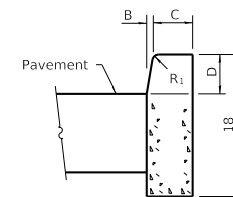


ON UNDISTURBED SUBGRADE

ADJACENT TO FLEXIBLE PAVEMENT

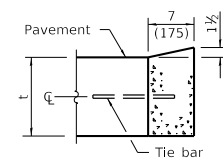


DEPRESSED CURB

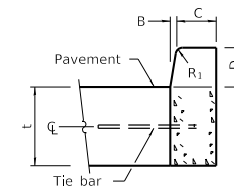


BARRIER CURB

ADJACENT TO FLEXIBLE PAVEMENT



DEPRESSED CURB



BARRIER CURB

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

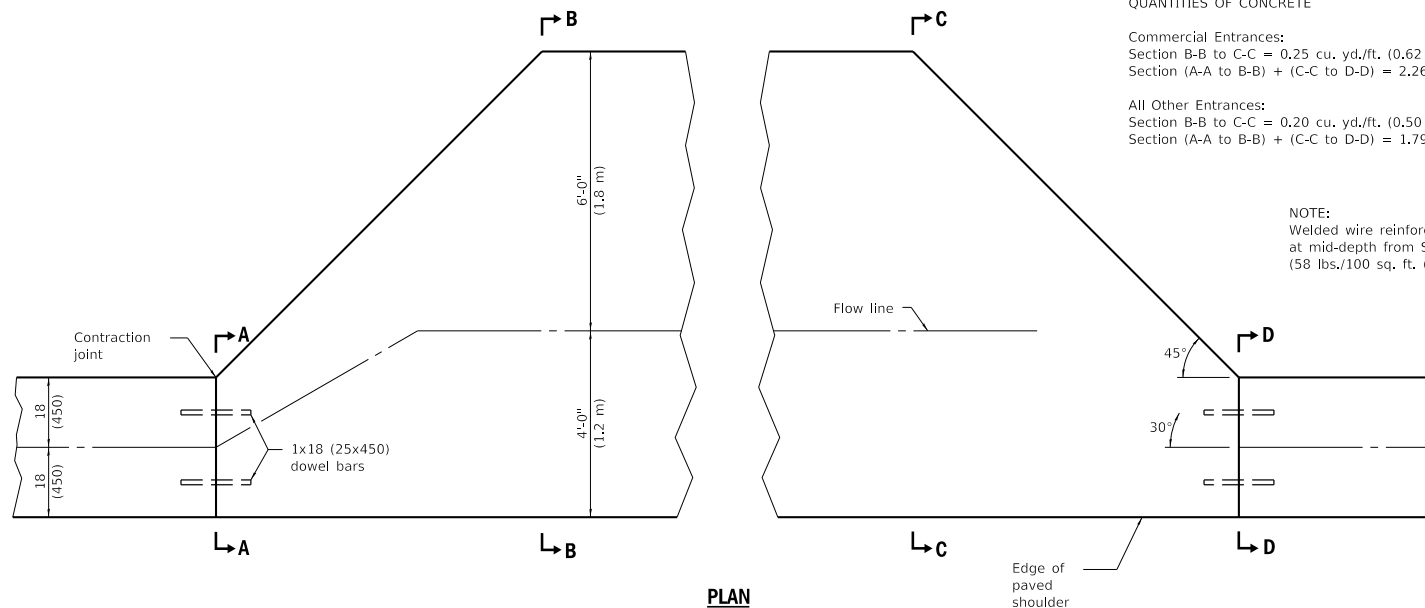
CONCRETE CURB TYPE B

CONCRETE CURB TYPE B AND COMBINATION CONCRETE CURB AND GUTTER

(Sheet 2 of 2)

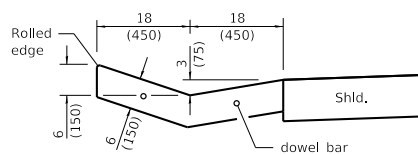
STANDARD 606001-07

Illinois Department of Transportation	
PASSED	January 1, 2018
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT	

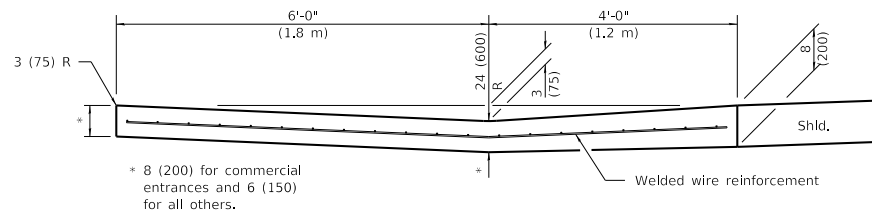


PLAN

ENTRANCE



SECTIONS A-A & D-D



SECTIONS B-B & C-C

QUANTITIES OF CONCRETE

Commercial Entrances:
 Section B-B to C-C = 0.25 cu. yd./ft. (0.62 m³/m).
 Section (A-A to B-B) + (C-C to D-D) = 2.26 cu. yd. (1.73 m³).

All Other Entrances:
 Section B-B to C-C = 0.20 cu. yd./ft. (0.50 m³/m).
 Section (A-A to B-B) + (C-C to D-D) = 1.79 cu. yd. (1.37 m³).

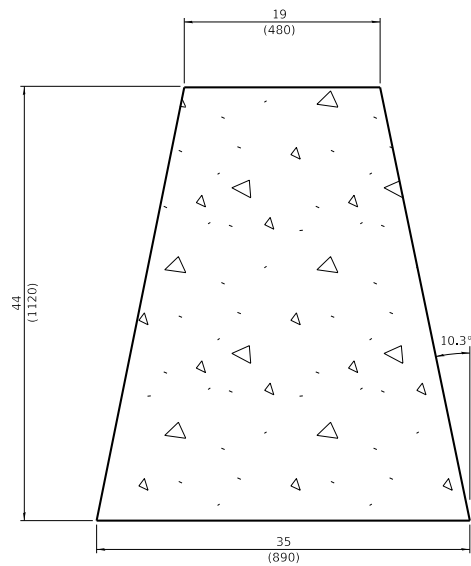
NOTE:
 Welded wire reinforcement shall be installed
 at mid-depth from Section A-A to D-D.
 (58 lbs./100 sq. ft. (2.83 kg/m²))

Illinois Department of Transportation	
PASSED	April 1, 2016
Michael Beard ENGINEER OF POLICY AND PROCEDURES	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

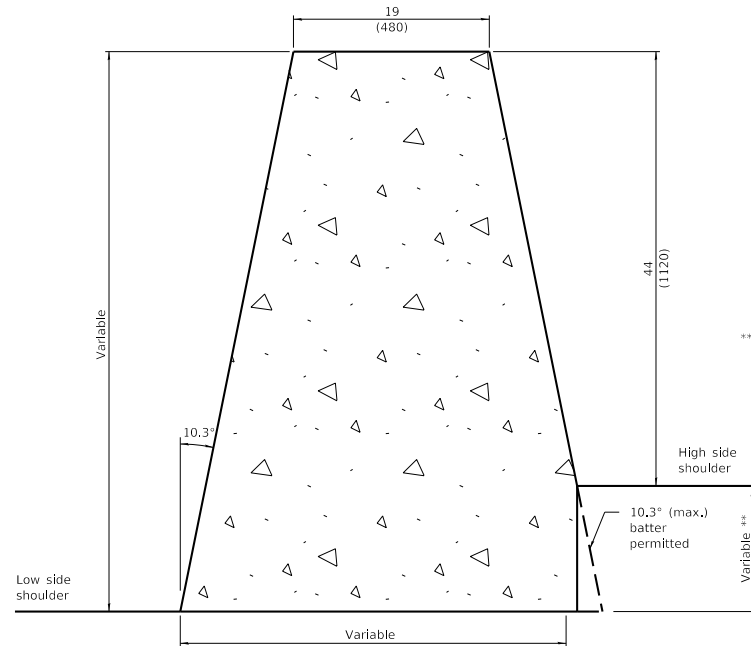
TYPE A GUTTER
(INLET, OUTLET & ENTRANCE)

(Sheet 2 of 3)

STANDARD 606101-05

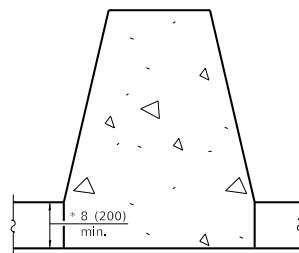


TYPICAL CROSS-SECTION



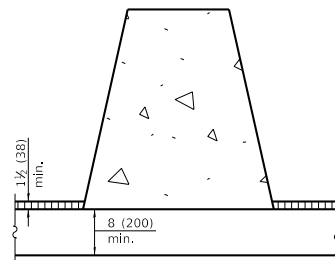
VARIABLE CROSS-SECTION

** When this dimension exceeds 12 (300), the barrier may be cast in two pours. No. 6 x 12 (No. 19 x 300) tie bars at 30 (760) centers, or a suitable keyway, shall be used between pours.

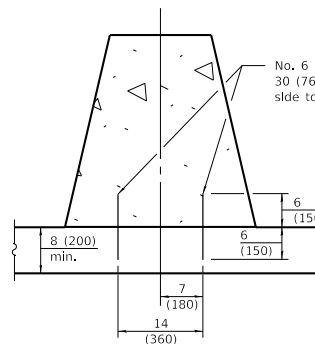


**NEW MONOLITHIC
PCC BASE**

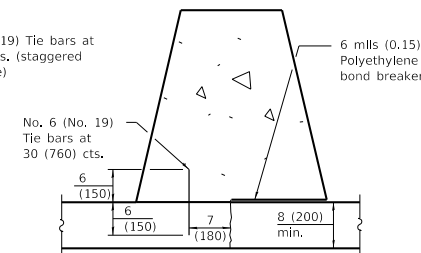
* This dimension shall be 10 (250) minimum when the barrier is confined by earth.



**NEW OR EXISTING
BIT./PCC BASE
WITH OVERLAY CONFINEMENT**



**NEW OR EXISTING
PCC BASE**



**EXISTING PCC BASE
WITH LONGITUDINAL JOINT**

GENERAL NOTES

The Variable Cross-Section shall be used when there is a difference in elevation between the two sides of the barrier.

See standard 836011 for additional light pole foundation details where required in concrete barrier.

All dimensions are in inches (millimeters) unless otherwise shown.

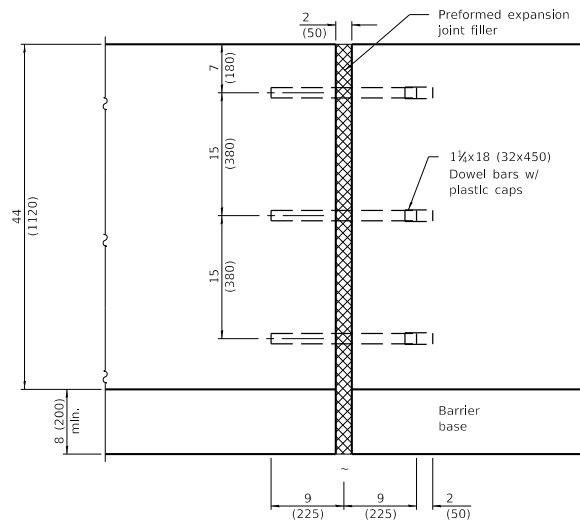
ANCHORING METHODS

DATE	REVISIONS
1-1-19	Revised from F-shape to constant slope, increased height, and renamed standard.
1-1-13	Revised general note to reference standard 836006 for light pole foundation.

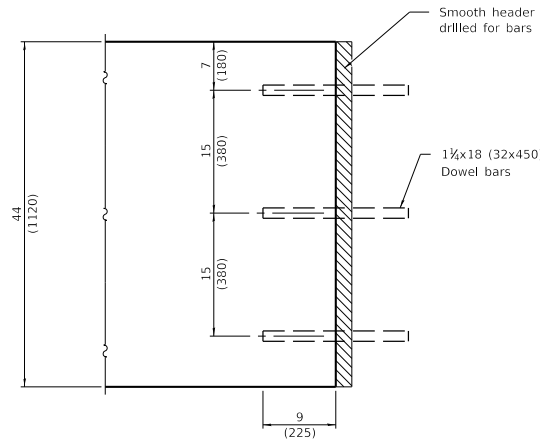
**CONCRETE BARRIER,
DOUBLE FACE,
44 in. (1120 mm) HEIGHT**
(Sheet 1 of 2)

STANDARD 637006-04

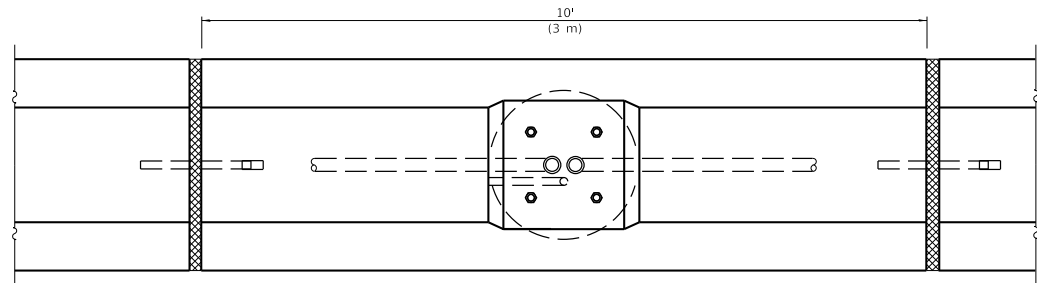
Illinois Department of Transportation	
PASSED <i>Michael B. D.</i> January 1, 2019 ENGINEER OF POLICY AND PROCEDURES APPROVED <i>John E. G.</i> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	DESIGNED 1-1-19 47



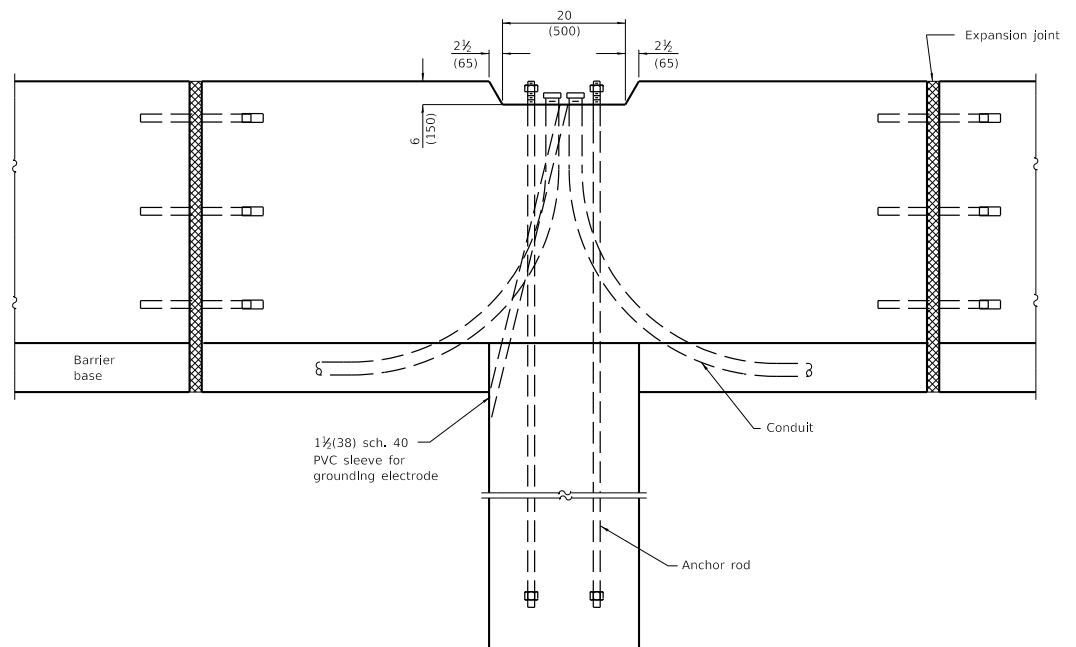
EXPANSION JOINT



CONSTRUCTION JOINT



PLAN AT LIGHTING FOUNDATION



ELEVATION AT LIGHTING FOUNDATION

	Illinois Department of Transportation	
	PASSED	January 1, 2019
	ENGINEER OF POLICY AND PROCEDURES	
	APPROVED	January 1, 2019
		48-111-1-1 155155
ENGINEER OF DESIGN AND ENVIRONMENT		

**CONCRETE BARRIER,
DOUBLE FACE,
44 in. (1120 mm) HEIGHT**
(Sheet 2 of 2)

STANDARD 637006-04

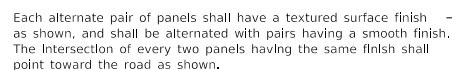


Figure 1: Typical cross-section of a bridge deck. The diagram shows a cross-section of a bridge deck with a central span and two side spans. The central span is labeled "6'-8" or 10' (1.8 m, 2.4 m or 3 m)" and has a "Finished grade" line. The side spans are labeled "36' (900)". The deck is supported by piers. Arrows labeled "A" indicate the direction of traffic flow.

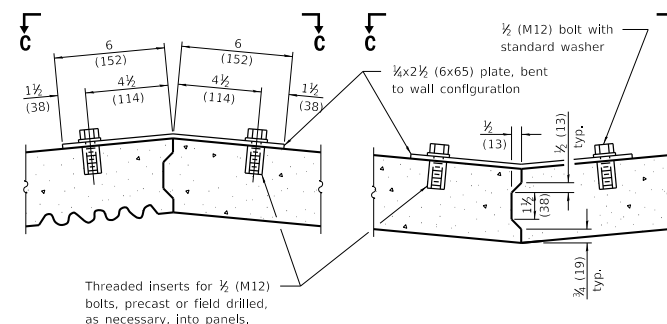
Top of wall

Finished grade

36 (900) min. embankment at low point of finished grade (typ.)

The diagram illustrates a cross-section of a wall and its foundation. The wall is shown with vertical hatching. The ground surface is indicated by a line with diagonal hatching, labeled 'Finished grade'. The foundation is shown with a dashed line. A specific detail is highlighted: a 36 (900) min. embankment at the low point of the finished grade. The embankment is shown with a cross-hatched pattern. The wall is shown with a vertical hatching pattern. The top of the wall is indicated by a horizontal line. The finished grade is indicated by a line with diagonal hatching. The embankment is indicated by a cross-hatched pattern. The foundation is indicated by a dashed line.

(Showing installation of wall in Irregular ground)



Showing typical metal band connector dimensions

Showing typical shear
key dimensions

Diagram illustrating the trench dimensions and backfill requirements for a vertical pipe. The trench is 15 (380) min. deep. The pipe is 36 (900) min. in diameter. The trench is filled with coarse aggregate backfill.

GENERAL NOTES

Loading for 80 mph (130 km/h) wind with 30% gust factor, normal to wall.

ALLOWABLE STRESSES:

Concrete:

 $f'_c = 3,500 \text{ psi (24 MPa)}$

$f'_{ci} = 2,250 \text{ psi (15 MPa)}$

Prestressing Steel:

 $f'_s = 270,000 \text{ psi (1860 MPa)}$

fsl = 189,000 psi (1300 MPa)

Reinforcing Steel:

 $f_y = 40,000 \text{ psi min. (270 MPa)}$

Structural Steel:

 $f_s = 20,000 \text{ psi (138 MPa)}$

Minimum allowable soil bearing pressure:

$$= 1.25 \text{ tsf (120 kPa)}$$

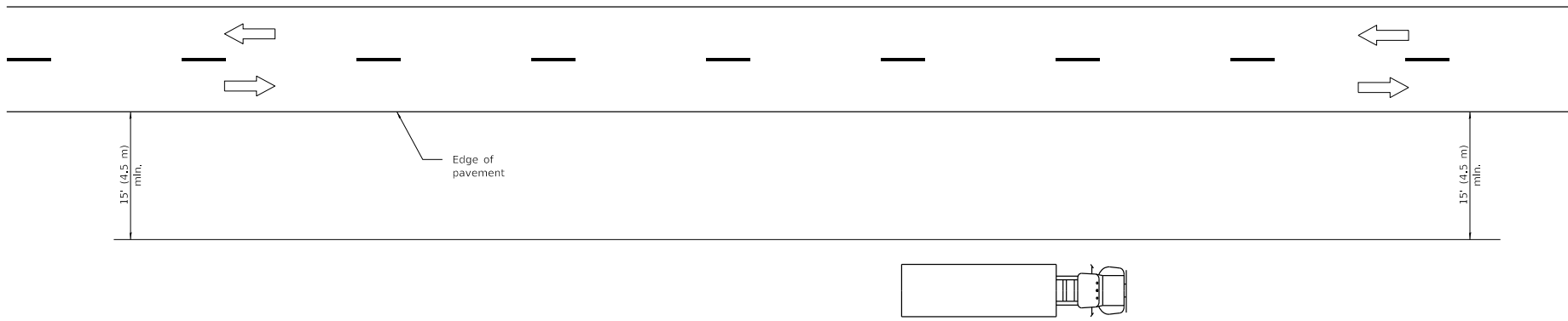
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to
	English (metric).
1-1-07	Soft converted metric
	reinforcement bars &
	corrected dimensions.

**SIGHT SCREEN
PRECAST PRESTRESSED
CONCRETE PANEL WALL**

(Sheet 1 of 2)

STANDARD 639001-02



TYPICAL APPLICATIONS

- Landscaping work
- Utility work
- Fencing contracts and maintenance
- Cleaning culverts

GENERAL NOTES

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701006.

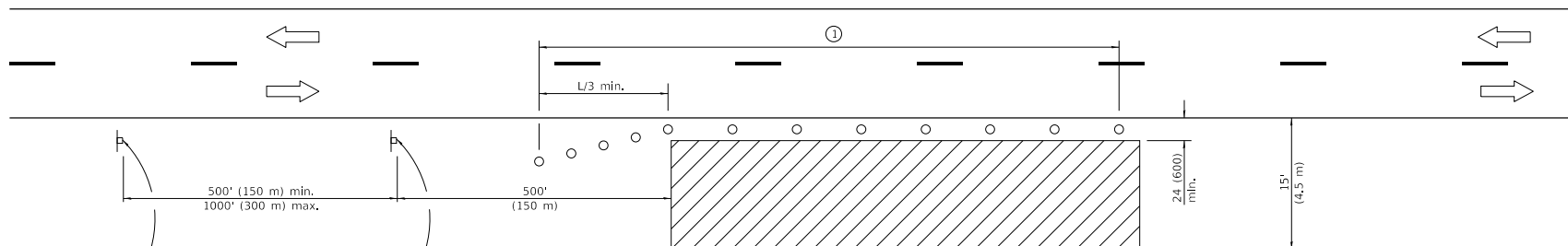
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-05	Revised title and notes.

**OFF-RD OPERATIONS,
2L, 2W, MORE THAN
15' (4.5 m) AWAY**

STANDARD 701001-02

Illinois Department of Transportation	
PASSED January 1, 2009	ISSUED 1-1-07
ENGINEER OF OPERATIONS	
APPROVED January 1, 2009	
ENGINEER OF DESIGN AND ENVIRONMENT	



For contract
construction
projects

W20-1(0)-48

For maintenance
and utility
projects

W20-1(0)-48

TYPICAL APPLICATIONS

Utility operations
Culvert extensions
Side slope changes
Guardrail installation and maintenance
Delineator installation
Landscaping operations
Shoulder repair
Sign installation and maintenance

SYMBOLS



Work area



Sign



Cone, drum or barricade

- ① When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

GENERAL NOTES

This Standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24' (600) from the edge of pavement.

Calculate L as follows:

SPEED LIMIT

FORMULAS
English (Metric)

40 mph (70 km/h)
or less:

$$L = \frac{WS^2}{60}$$

$$L = \frac{WS^2}{150}$$

45 mph (80 km/h)
or greater:

$$L = (W)(S)$$

$$L = 0.65(W)(S)$$

W = Width of offset
in feet (meters).

S = Normal posted speed
mph (km/h).

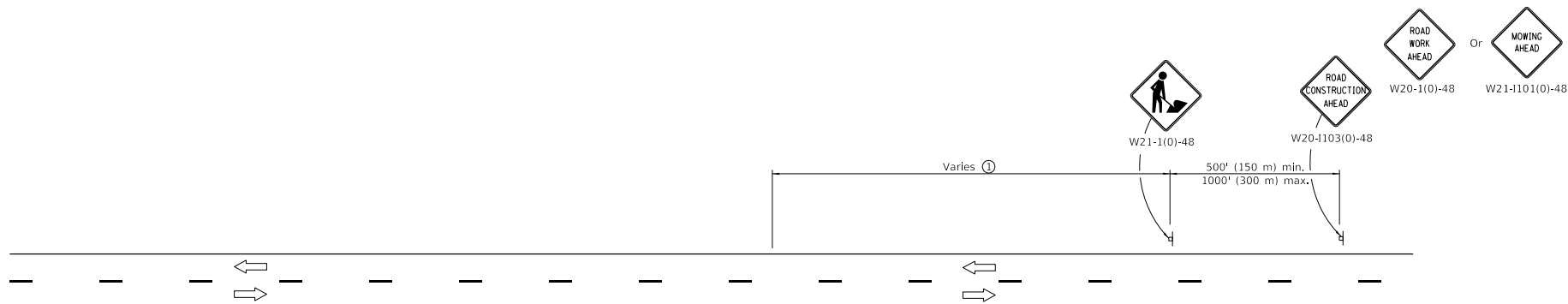
All dimensions are in inches (millimeters)
unless otherwise shown.

DATE	REVISIONS
1-1-14	Revised workers sign
	number to agree with
	current MUTCD.
1-1-13	Omitted text 'WORKERS'
	sign.

**OFF-RD OPERATIONS, 2L, 2W,
15' (4.5 m) TO 24" (600 mm)
FROM PAVEMENT EDGE**

STANDARD 701006-05

Illinois Department of Transportation	
PASSED <u>January 1, 2014</u> ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <u>January 1, 2014</u> ENGINEER OF DESIGN AND ENVIRONMENT	



TYPICAL APPLICATIONS

Shoulder work
Utility operations

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities require an intermittent or continuous moving operation on the shoulder, where the average speed is 1 mph (2 km/h) or less.

When the work operation does not exceed 60 minutes, traffic control may be according to Standard 701301.

All dimensions are in inches (millimeters) unless otherwise shown.

- ① Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but should not exceed $\frac{1}{2}$ the length required for one normal working day's operation, or 4 miles (6.4 km) whichever is less.

SYMBOLS



Work area



Sign



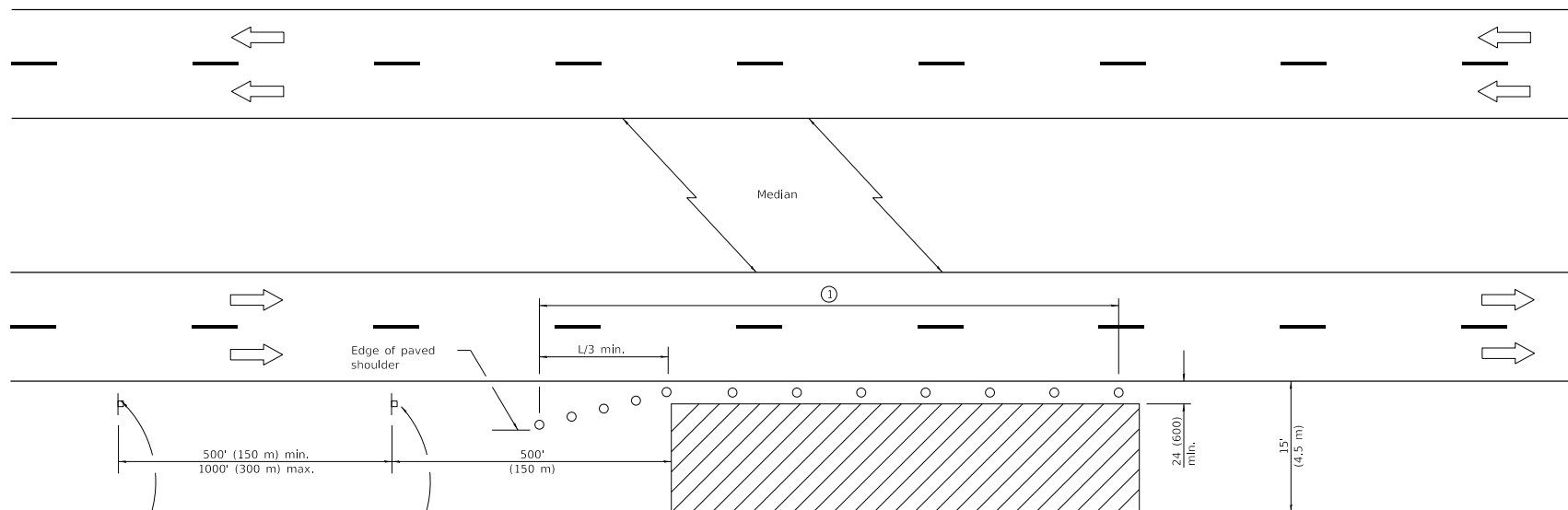
Flagger with traffic control sign when required

Illinois Department of Transportation	
PASSED <u>January 1, 2014</u> ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <u>January 1, 2014</u> ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-14	Revised workers sign
	number to agree with
	current MUTCD.
1-1-13	Omitted text 'WORKERS'
	sign.

OFF-ROAD MOVING OPERATIONS, 2L, 2W, DAY ONLY

STANDARD 701011-04



For contract
construction
projects



W20-1103(0)-48

For maintenance
and utility
projects



W20-1(0)-48

TYPICAL APPLICATIONS

Utility operations
Culvert extensions
Side slope changes
Guardrail Installation and maintenance
Delineator Installation
Landscaping operations
Shoulder repair
Sign installation and maintenance

① When the work operation exceeds one hour, cones, drums or barricades shall be placed at 25' (8 m) centers for L/3 distance, and at 50' (15 m) centers through the remainder of the work area.

SYMBOLS

- Work area
- Sign
- Cone, drum or barricade

GENERAL NOTES

This Standard is used where any vehicles, equipment, workers or their activities will encroach in the area 15' (4.5 m) to 24' (600) from the edge of pavement.

Calculate L as follows:

SPEED LIMIT

FORMULAS
English (Metric)

40 mph (70 km/h)
or less:

$$L = \frac{WS^2}{60} \quad L = \frac{WS^2}{150}$$

45 mph (80 km/h)
or greater:

$$L = (W)(S) \quad L = 0.65(W)(S)$$

W = Width of offset
in feet (meters).

S = Normal posted speed
mph (km/h).

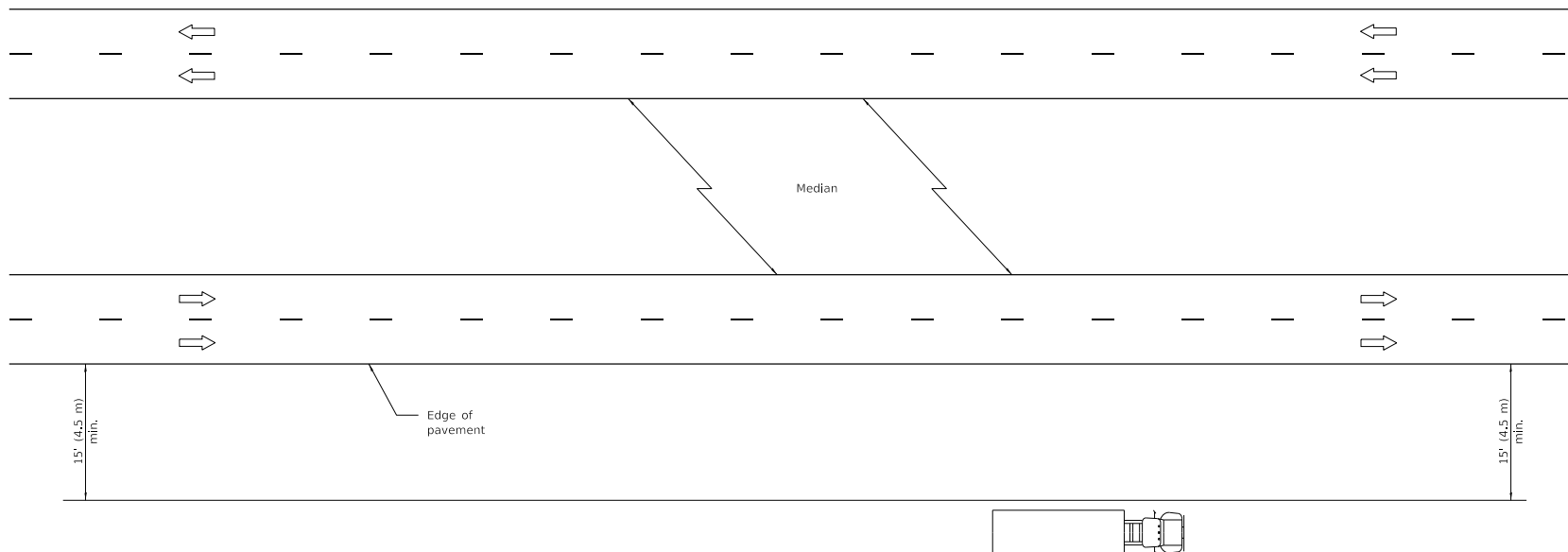
All dimensions are in inches (millimeters)
unless otherwise shown.

DATE	REVISIONS
4-1-16	Corrected typo in title.
1-1-14	Revised workers sign number to agree with current MUTCD.

**OFF-ROAD OPERATIONS, MULTILANE,
15' (4.5 m) TO 24' (600 mm)
FROM PAVEMENT EDGE**

STANDARD 701101-05

Illinois Department of Transportation	
PASSED <u>April 1, 2016</u> ENGINEER OF SAFETY ENGINEERING APPROVED <u>April 1, 2016</u> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-17



TYPICAL APPLICATIONS

Landscaping work
Utility work
Fencing contracts

GENERAL NOTES

This Standard is used where at all times all vehicles, equipment, workers or their activities are more than 15' (4.5 m) from the edge of pavement.

When the work operation requires that two or more work vehicles cross the 15' (4.5 m) clear zone in any one hour, traffic control shall be according to Standard 701101.

This Standard also applies to work performed in the median more than 15' (4.5 m) from either pavement.

All dimensions are in inches (millimeters) unless otherwise shown.

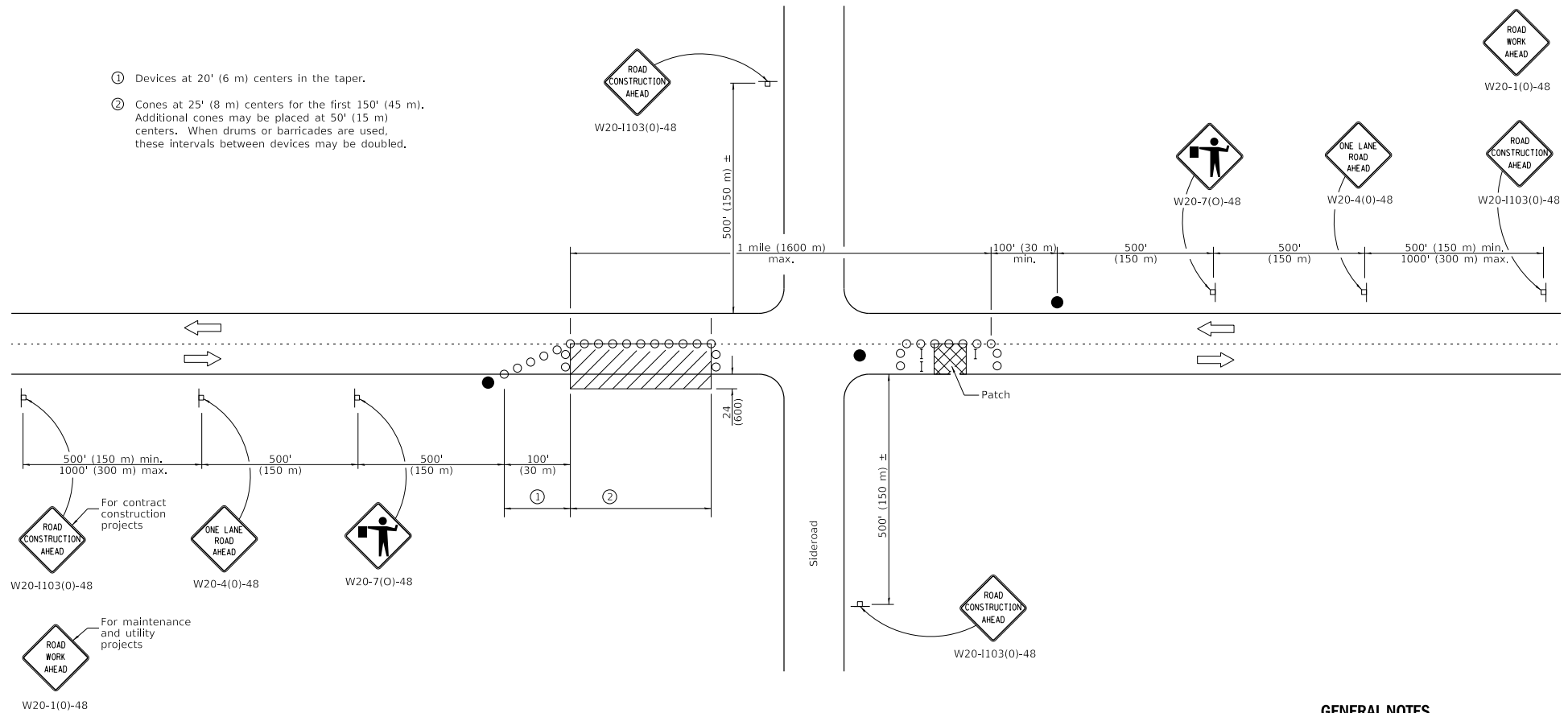
Illinois Department of Transportation	
PASSED <u>January 1, 2009</u> ENGINEER OF OPERATIONS	ISSUED 1-1-07
APPROVED <u>January 1, 2009</u> ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-05	Switched units to English (metric).
1-1-05	Revised title.

OFF-RD OPERATIONS, MULTILANE, MORE THAN 15' (4.5 m) AWAY

STANDARD 701106-02

- ① Devices at 20' (6 m) centers in the taper.
- ② Cones at 25' (8 m) centers for the first 150' (45 m). Additional cones may be placed at 50' (15 m) centers. When drums or barricades are used, these intervals between devices may be doubled.



TYPICAL APPLICATIONS

Isolated patching
Utility operations
Storm sewer
Culverts
Cable placement

SYMBOLS

- Work area
- Sign
- Barricade or drum
- Cone, drum or barricade
- Flagger with traffic control sign

GENERAL NOTES

This Standard is used where at any time, any vehicles, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) outside the edge of pavement for daylight operation.

When the distance between successive work areas exceeds 2000' (600 m), additional warning signs, flaggers, and taper shall be placed as shown.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-19	Revised device spacing in taper.
1-1-11	Revised flagger sign.

**LANE CLOSURE, 2L, 2W,
DAY ONLY,
FOR SPEEDS ≥ 45 MPH**

STANDARD 701201-05

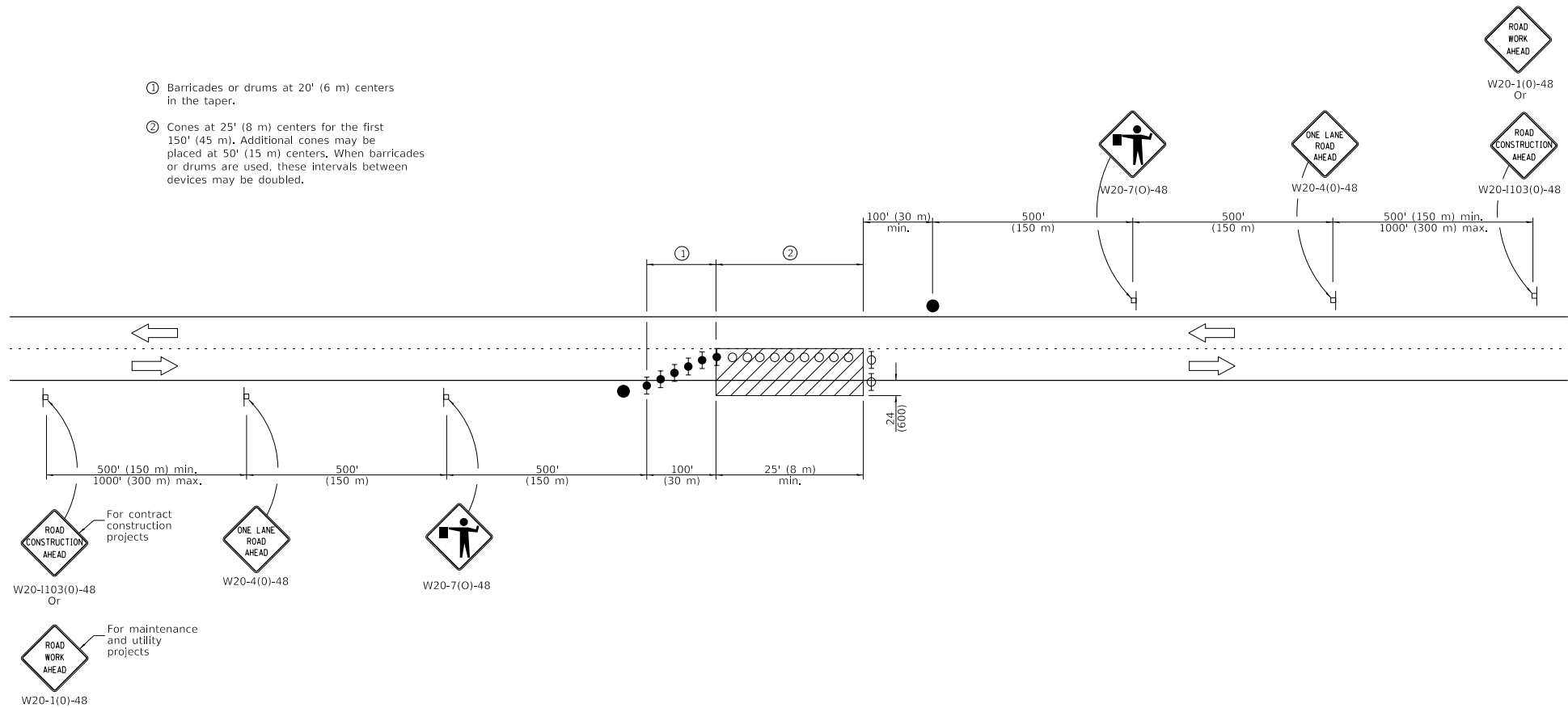
Illinois Department of Transportation

APPROVED January 1, 2019
ENGINEER OF SAFETY PROG. AND ENGINEERING

APPROVED January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-17

- ① Barricades or drums at 20' (6 m) centers in the taper.
- ② Cones at 25' (8 m) centers for the first 150' (45 m). Additional cones may be placed at 50' (15 m) centers. When barricades or drums are used, these intervals between devices may be doubled.



TYPICAL APPLICATIONS

Isolated patch
Installation of drainage structure
Utility operations

SYMBOLS

- Work area
- Sign
- Flagger with traffic control sign
- Cone, drum or barricade
- Barricade or drum with flashing light
- Barricade or drum with steady burning light

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach in the area between the center line and a line 24 (600) from the edge of pavement for nighttime operation.

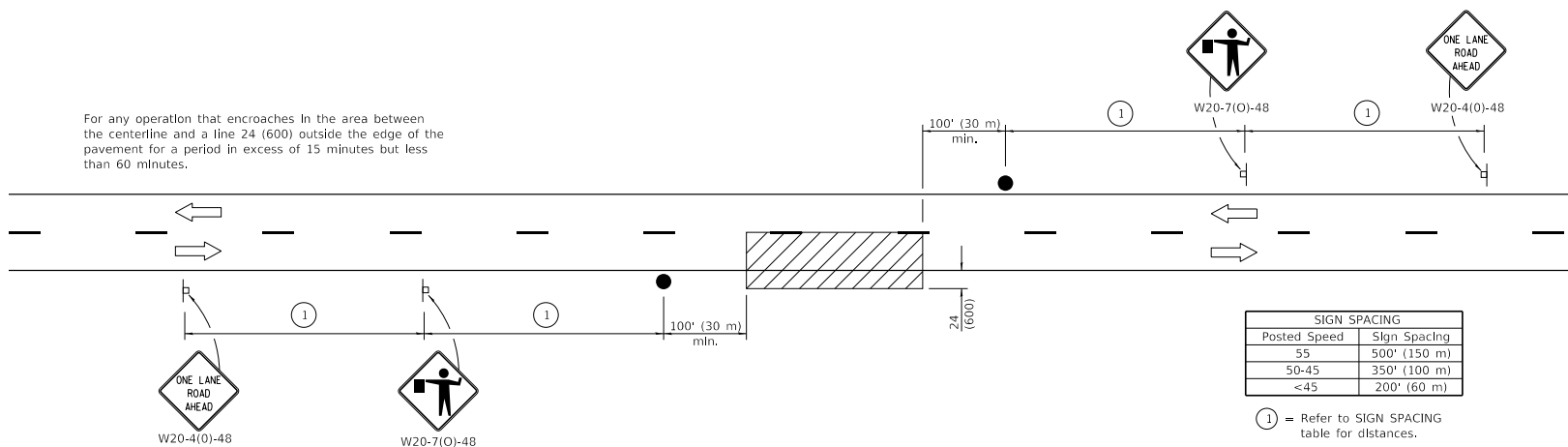
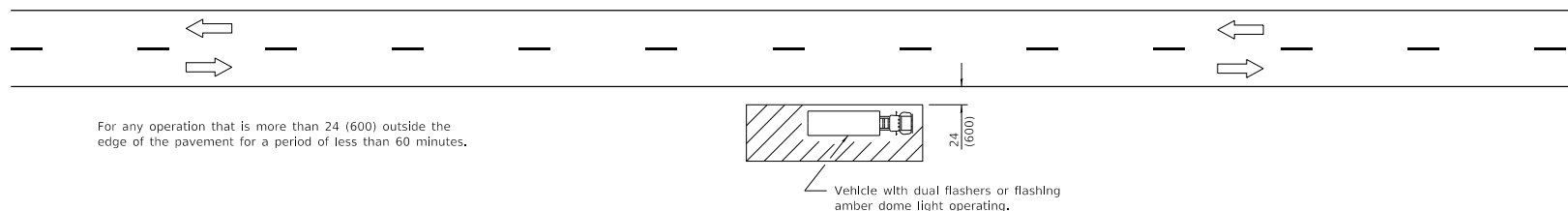
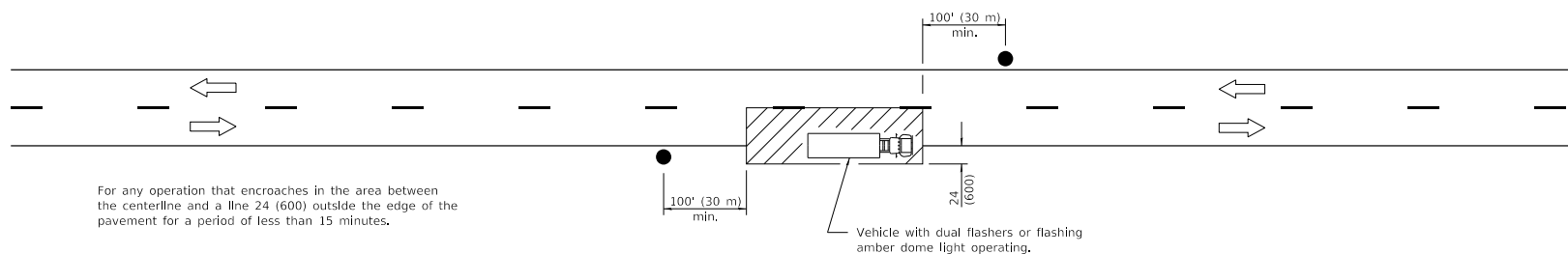
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-19	Revised device spacing in taper and added cones as an option.
1-1-18	Omitted steady burning lights in tangent.

**LANE CLOSURE, 2L, 2W,
NIGHT ONLY,
FOR SPEEDS ≥ 45 MPH**

STANDARD 701206-05

Illinois Department of Transportation	
APPROVED January 1, 2019 ENGINEER OF SAFETY, PROG. AND ENGINEERING	ISSUED 1-1-17
APPROVED January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	



TYPICAL APPLICATIONS

Marking patches
Field survey
String line
Utility operations
Cleaning up debris on pavement

SYMBOLS

- Work area
- Sign on portable or permanent support
- Flagger with traffic control sign

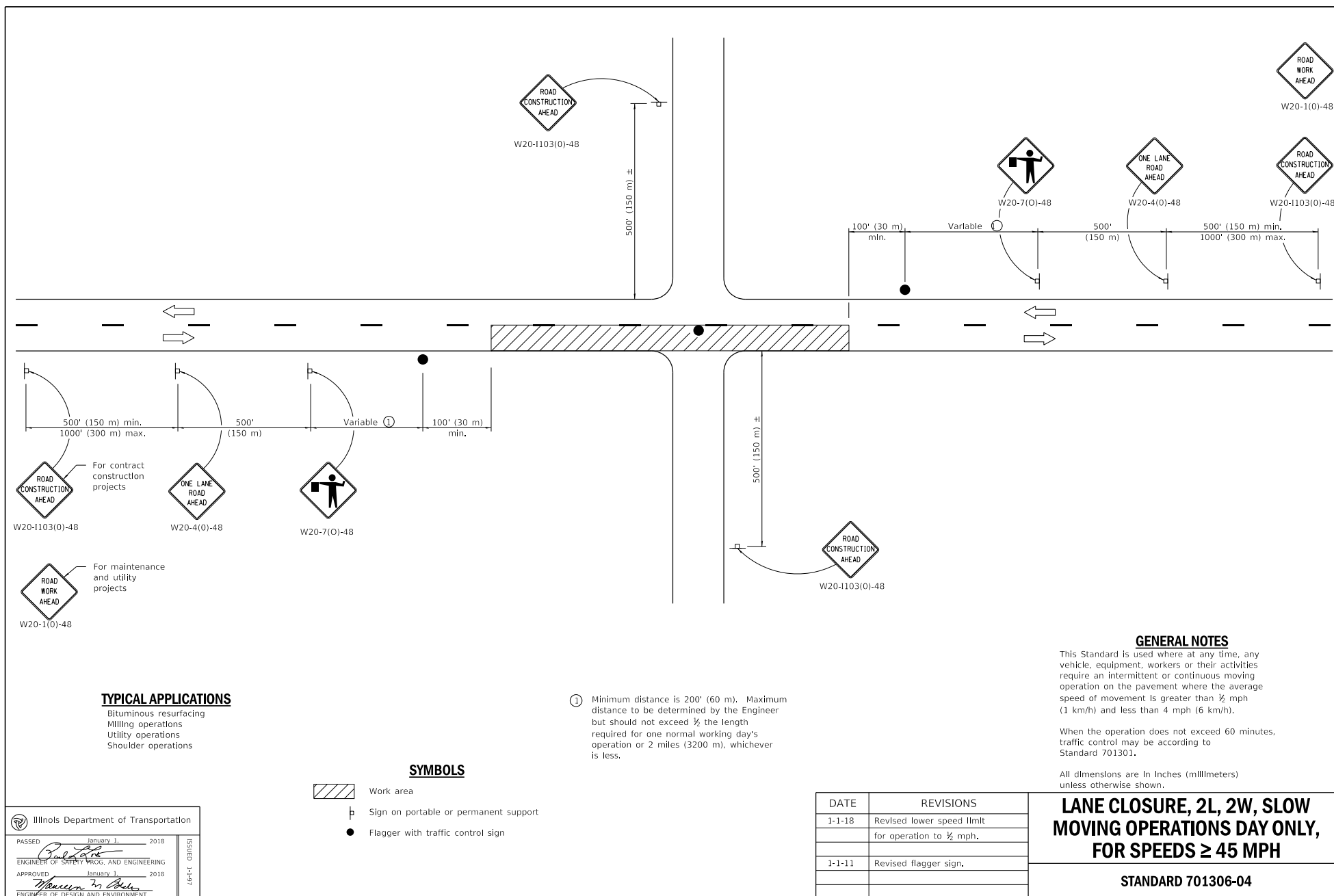
All dimensions are in inches (millimeters) unless otherwise shown.

PASSED January 1, 2011 ENGINEER OF SAFETY ENGINEERING APPROVED January 1, 2011 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-11

DATE	REVISIONS
1-1-11	Revised flagger sign.
1-1-09	Switched units to English (metric).

LANE CLOSURE, 2L, 2W, SHORT TIME OPERATIONS

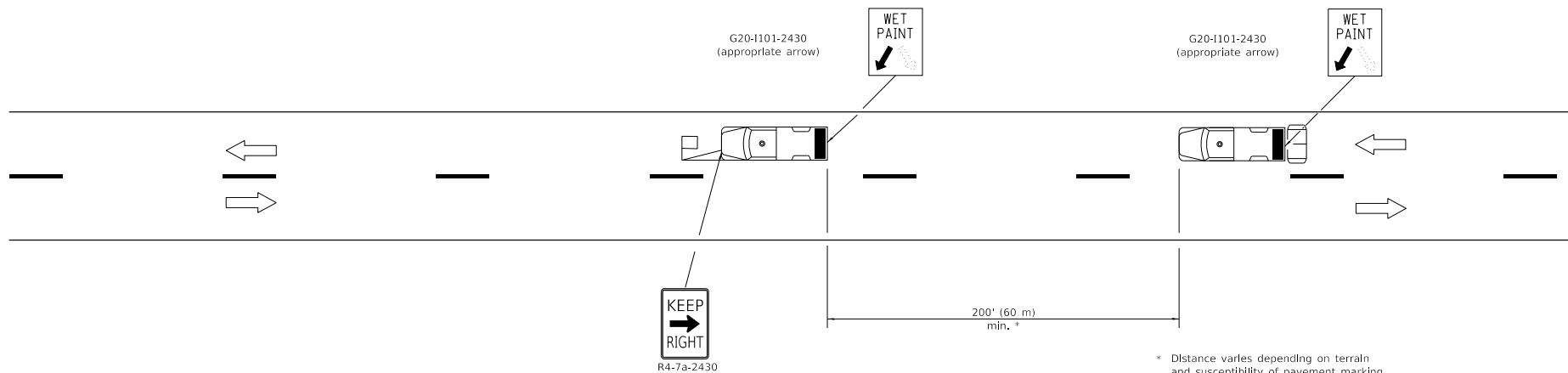
STANDARD 701301-04



Illinois Department of Transportation

PASSED January 1, 2018
 ENGINEER OF SAFETY, PROG. AND ENGINEERING
 APPROVED January 1, 2018
 ENGINEER OF DESIGN AND ENVIRONMENT





ISSUED 1-1-17



TYPICAL APPLICATIONS

Landscaping work
Utility work
Pavement marking
Weed spraying
Roadometer measurements
Debris cleanup
Crack pouring

SYMBOLS

-  Arrow board (Hazard Mode only)
-  Truck with headlights, emergency flashers and flashing amber light, (visible from all directions)
-  18x18 (450x450) min. orange flag (use when guide wheel is used)
-  Truck mounted attenuator

GENERAL NOTES

This Standard is used where any vehicle, equipment, workers or their activities will require a continuous moving operation where the average speed is greater than 3 mph (5 km/h).


For shoulder operations not encroaching on the pavement, use DETAIL A, Standard 701426.

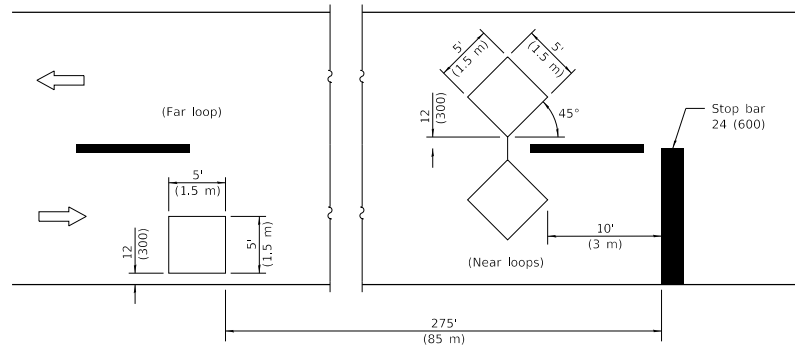
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to
	English (metric). Omitted
	Pass With Care sign.
1-1-00	Elim. speed restrictions
	In Standard title.

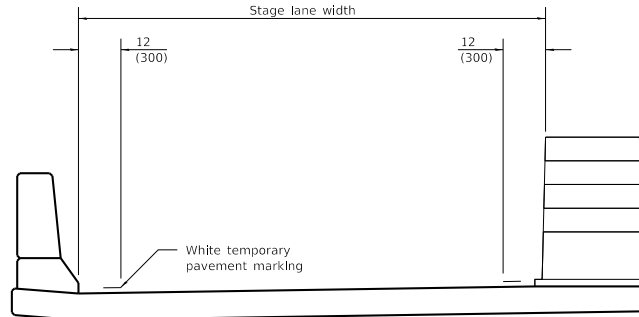
**LANE CLOSURE 2L, 2W
MOVING OPERATIONS-
DAY ONLY**

STANDARD 701311-03

 Illinois Department of Transportation	
PASSED <u>January 1, 2009</u> ENGINEER OF OPERATIONS	ISSUED 1-1-97
APPROVED <u>January 1, 2009</u> ENGINEER OF DESIGN AND ENVIRONMENT	



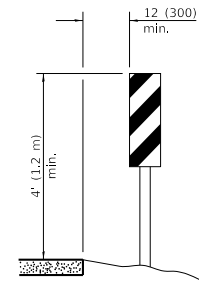
DETECTOR LOOPS



TEMPORARY PAVEMENT MARKING

TRAFFIC SIGNAL SEQUENCE						
PHASE	A			B		
INTERVAL	1	2	3	4	5	6
NORTHBOUND OR EASTBOUND	G	Y	R	R	R	R
SOUTHBOUND OR WESTBOUND	R	R	R	G	Y	R

ADVISORY SPEED LIMIT	
NORMAL POSTED SPEED	ADVISORY SPEED
55 - 45 mph	40 mph
40 mph	35 mph
35 - 30 mph	30 mph



VERTICAL PANELS

(Post mounted, one each side)

GENERAL NOTES

This Standard is used where, at any time any vehicle, equipment, workers or their activities will encroach on one lane of a bridge and traffic signals are required.

When traffic signals are not in operation, flaggers shall be used and traffic control devices shall conform to Standard 701201 or 701206.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

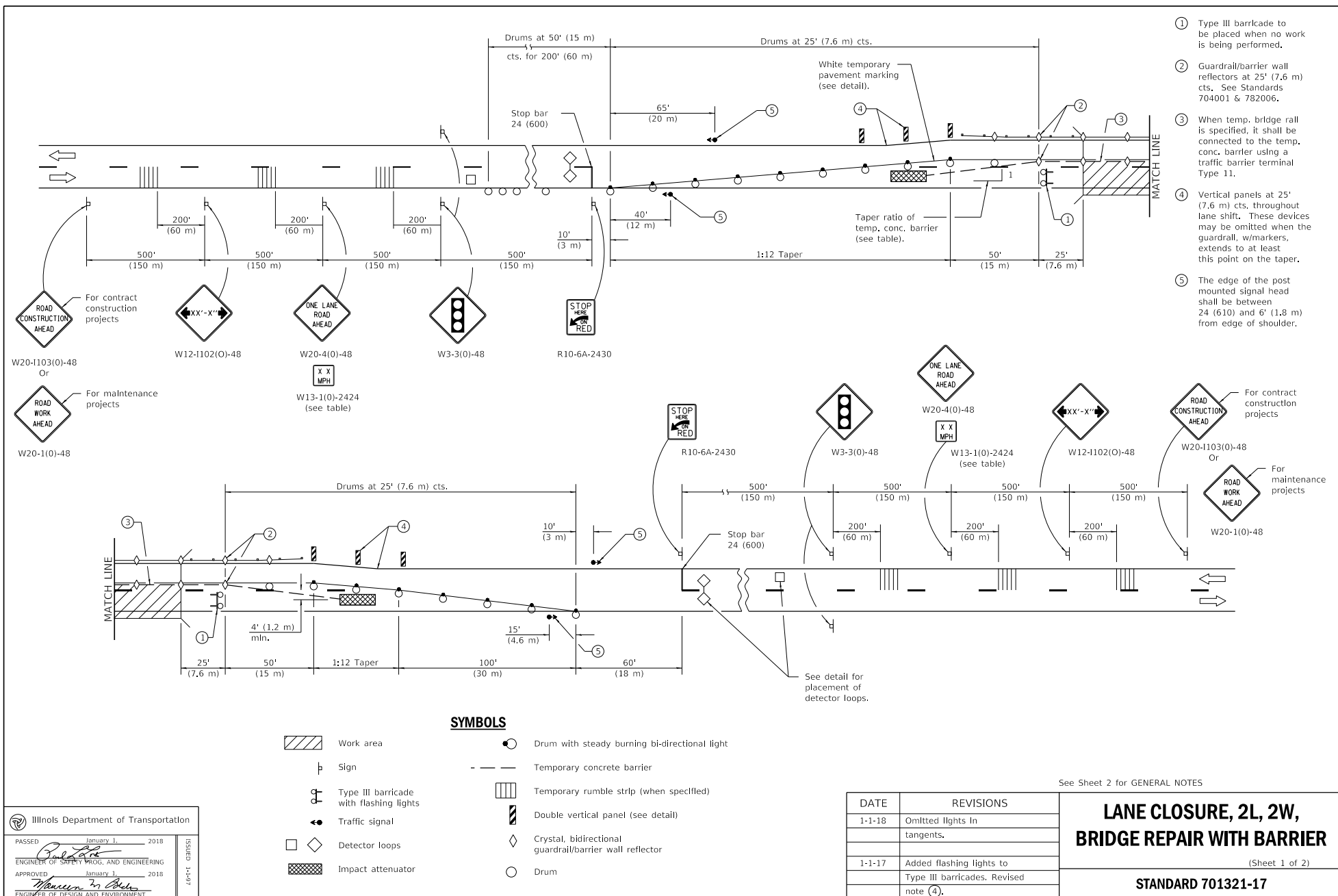
All dimensions are in inches (millimeters) unless otherwise shown.

**LANE CLOSURE, 2L, 2W,
BRIDGE REPAIR,
FOR SPEEDS ≥ 45 MPH**

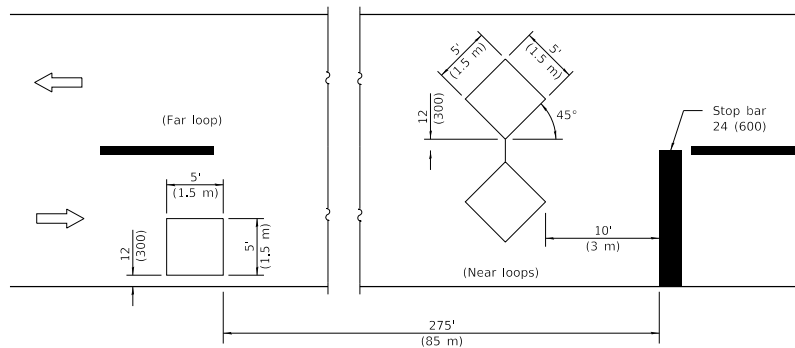
(Sheet 2 of 2)

STANDARD 701316-12

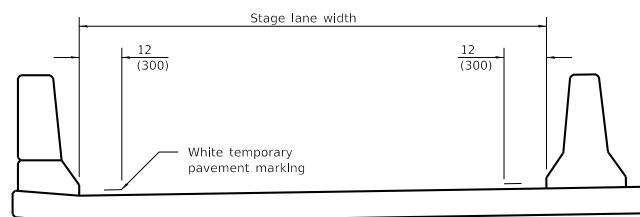
Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2018 ENGINEER OF SAFETY, PROG. AND ENGINEERING	ISSUED 1-1-97
APPROVED <i>[Signature]</i> January 1, 2018 ENGINEER OF DESIGN AND ENVIRONMENT	



- ① Type III barricade to be placed when no work is being performed.
- ② Guardrail/barrier wall reflectors at 25' (7.6 m) cts. See Standards 704001 & 782006.
- ③ When temp. bridge rail is specified, it shall be connected to the temp. conc. barrier using a traffic barrier terminal Type 11.
- ④ Vertical panels at 25' (7.6 m) cts. throughout lane shift. These devices may be omitted when the guardrail, w/markers, extends to at least this point on the taper.
- ⑤ The edge of the post mounted signal head shall be between 24 (610) and 6' (1.8 m) from edge of shoulder.



DETECTOR LOOPS

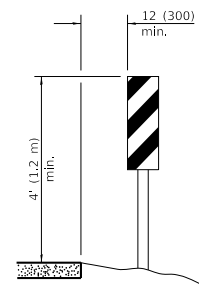


TEMPORARY PAVEMENT MARKING

TRAFFIC SIGNAL SEQUENCE						
PHASE	A			B		
INTERVAL	1	2	3	4	5	6
NORTHBOUND OR EASTBOUND	G	Y	R	R	R	R
SOUTHBOUND OR WESTBOUND	R	R	R	G	Y	R

TEMPORARY CONCRETE BARRIER	
NORMAL POSTED SPEED	TAPER RATIO
40 mph AND ABOVE	12:1
BELOW 40 mph	8:1

ADVISORY SPEED LIMIT	
NORMAL POSTED SPEED	ADVISORY SPEED
55 - 45 mph	40 mph
40 mph	35 mph
35 - 30 mph	30 mph



VERTICAL PANELS

(Post mounted, one each side)

GENERAL NOTES

This Standard is used where, at any time, any vehicle, equipment, workers, or their activities will encroach on one lane of a bridge. Traffic signals and a positive barrier are required.

Traffic signals shall be operational only when all traffic controls are in place. When traffic signals are not in operation, flaggers shall be used and traffic control shall conform to Standard 701201 or 701206.

Temporary concrete barrier shall be according to Standard 704001.

Existing or temporary pavement markings shall be on both sides of open lane from stop bar to stop bar.

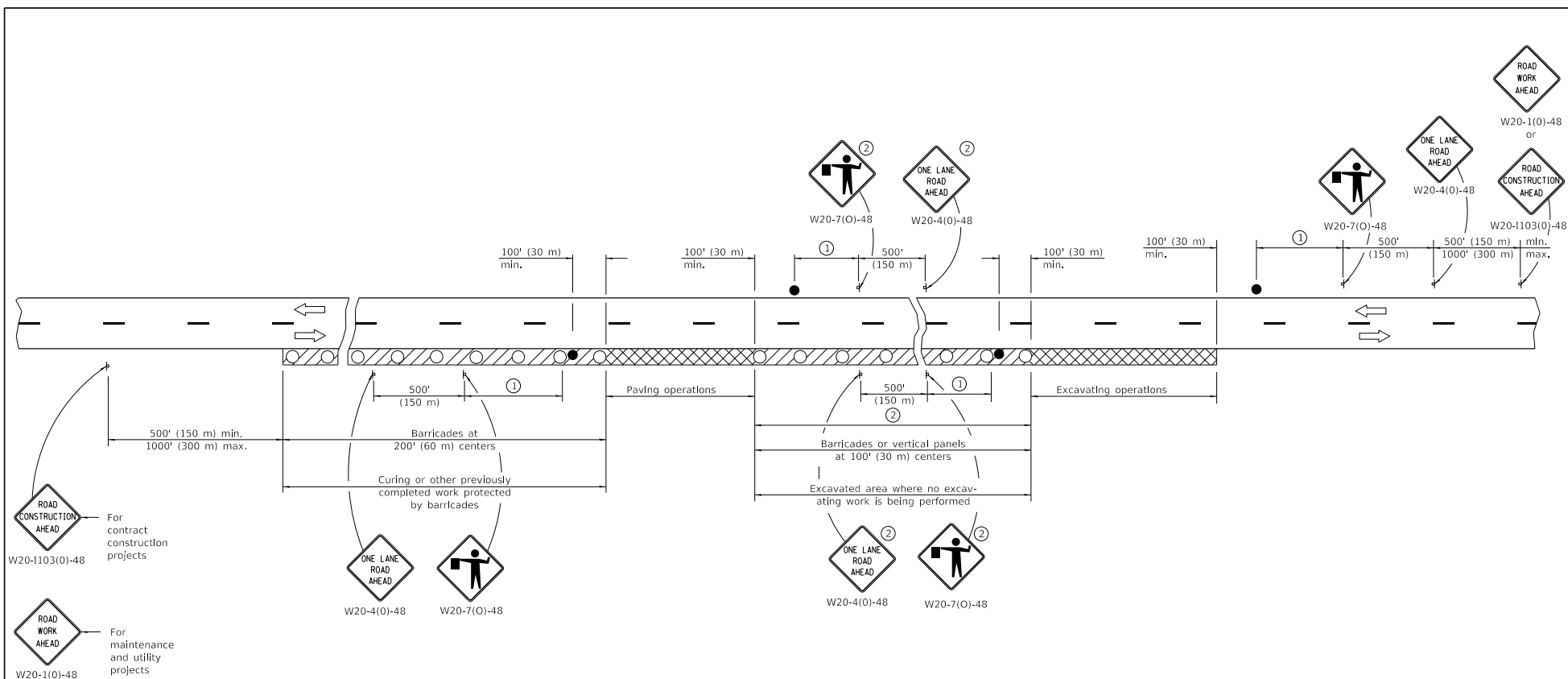
All dimensions are in inches (millimeters) unless otherwise shown.

LANE CLOSURE, 2L, 2W, BRIDGE REPAIR WITH BARRIER

(Sheet 2 of 2)

STANDARD 701321-17

Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2018 ENGINEER OF SAFETY PROG. AND ENGINEERING	ISSUED 1-1-17
APPROVED <i>[Signature]</i> January 1, 2018 ENGINEER OF DESIGN AND ENVIRONMENT	



SYMBOLS

- Work area
- Active Work area
- Sign
- Barricade, drum, or vertical panels
- Flagger with traffic control sign

- ① Minimum distance is 200' (60 m). Maximum distance to be determined by the Engineer but in no case to exceed the length of ½ day's normal operation or 2 miles (3200 m) whichever is less.
- ② Signs are not required if distance between work operations is less than 2000' (600 m) unless restricted sight distance exists.

GENERAL NOTES

This Standard is used where at any time, any vehicle, equipment, workers or their activities will encroach on the pavement during widening operations.

Two flaggers are required for each separate operation.

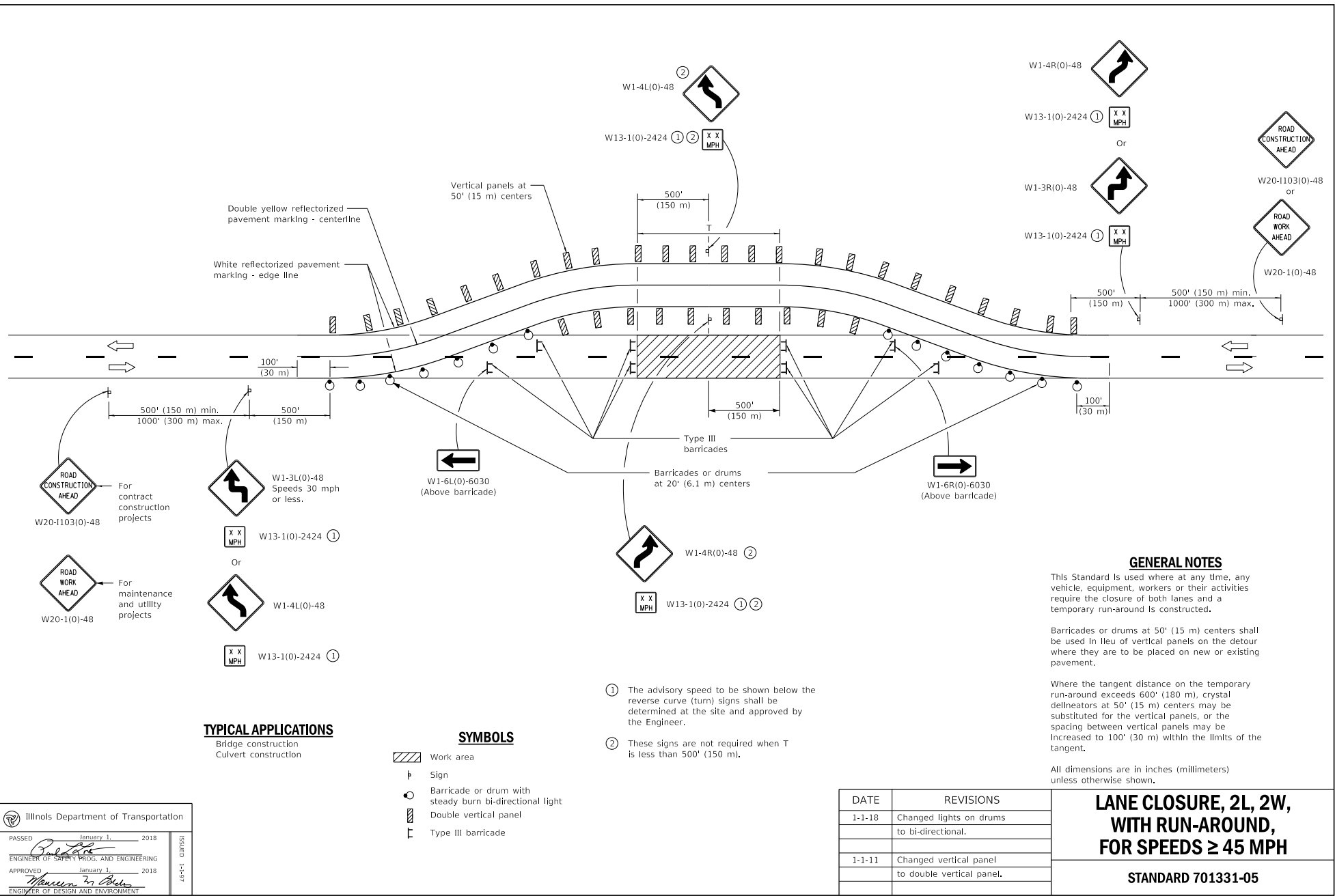
All dimensions are in inches (millimeters) unless otherwise shown.

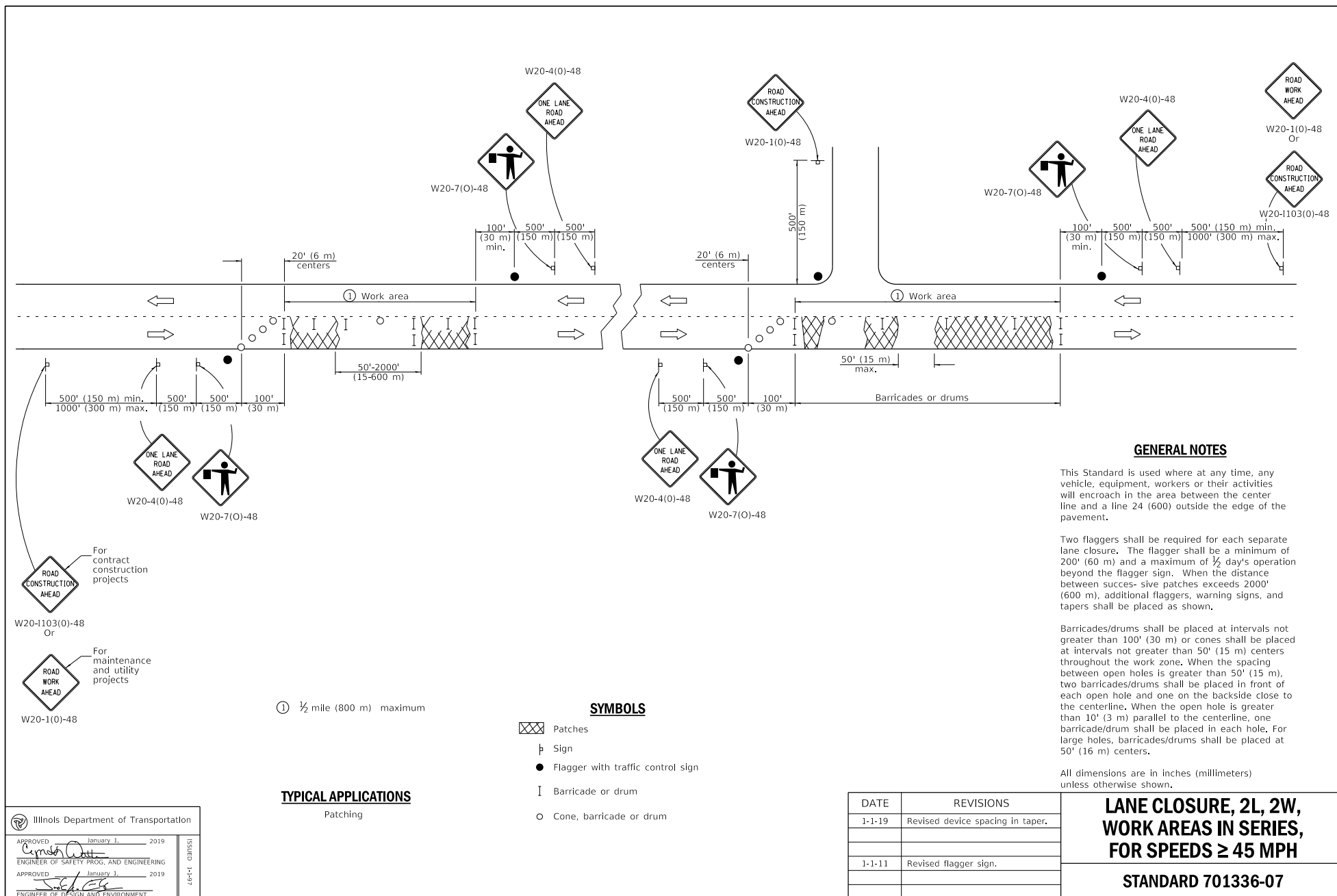
Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2011 ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <i>[Signature]</i> January 1, 2011 ENGINEER OF DESIGN AND ENVIRONMENT	

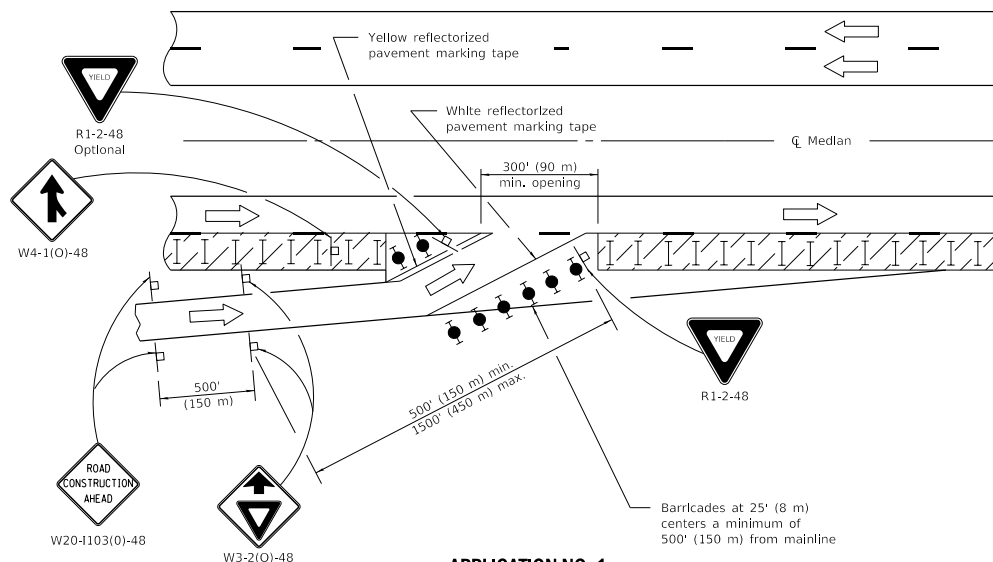
DATE	REVISIONS
1-1-11	Revised flagger sign.
1-1-09	Switched units to English (metric).
	Corrected sign No.'s.

**LANE CLOSURE, 2L, 2W,
PAVEMENT WIDENING,
FOR SPEEDS ≥ 45 MPH**

STANDARD 701326-04

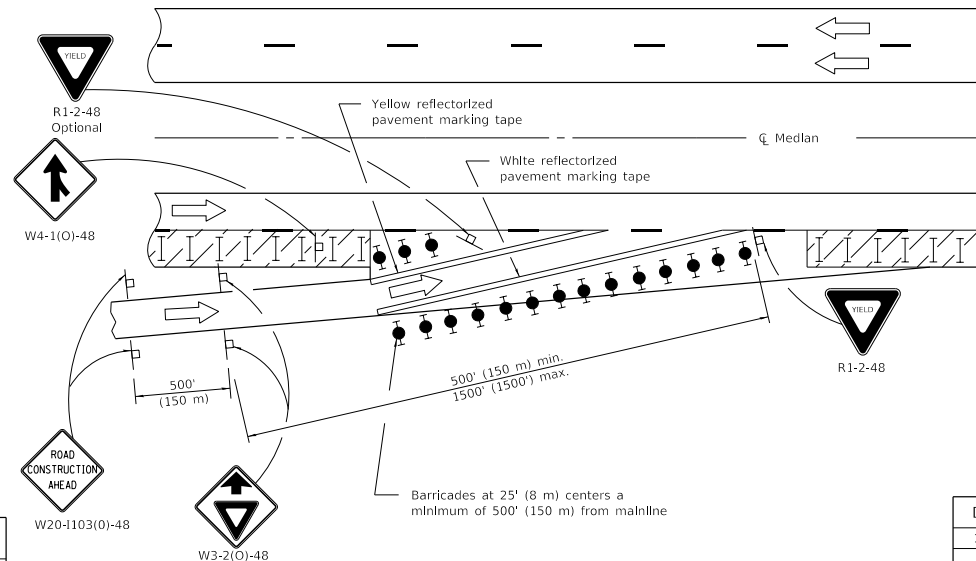






APPLICATION NO. 1

Application No. 1 depicts a modified entrance ramp. This method shall be utilized whenever existing entrance tapers cannot be retained due to the close proximity of the work zone. The entrance location may be shifted, with the approval of the Engineer, to perform work in the entrance area. Application No. 2 shall be put into effect as soon as possible.



APPLICATION NO. 2

Application No. 2 depicts a shortening of the normal entrance ramp. This method shall be used whenever the existing geometrics can be retained. Consideration should be given to the entering motorists' line of sight, through, between, or over the delineation devices.

SYMBOLS

- Work area
- Sign
- Type II barricades or drums with steady burning monodirectional light
- Type II barricades or drums
- Drums with steady burning monodirectional light

GENERAL NOTES

This Standard is used where, at any time any vehicle, equipment, workers or their activities require a lane closure in close proximity of an exit or entrance ramp and supplements other traffic control Standards for lane closures.

These applications also apply when work is being performed in the left lanes and the ramps enter and exit on the left. Under these conditions, the Exit sign arrow and the Side road symbol sign shall be changed.

Cones may be utilized during daylight operations, at one half the spacing of drums/barricades.

Use of these APPLICATION NO. 1 and APPLICATION NO. 3 shall be limited to five days per location.

When work does not exceed five days, pavement marking tape may be omitted.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-15	Revised gen. notes to limit
	App's 1 and 3 to five days.
	omit pvt. tape for ≤ 5 days.
1-1-12	Revised merge sign to agree
	with MUTCD, Dimensioned EXIT
	OPEN AHEAD sign.

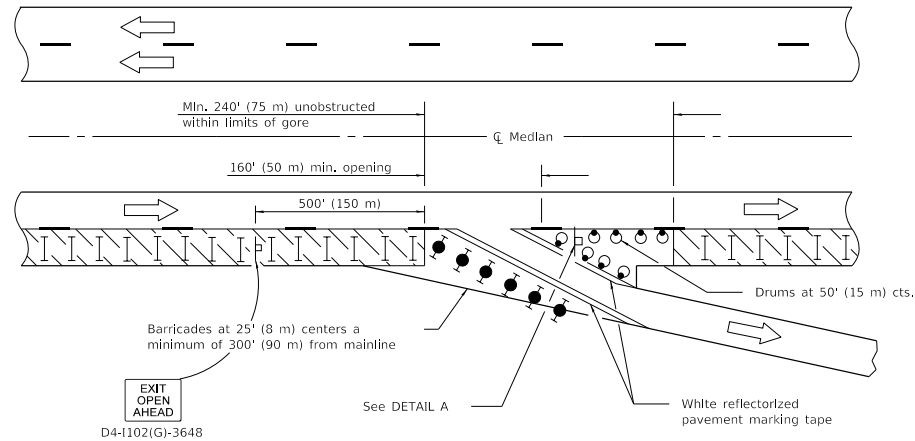
LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS ≥ 45 MPH

(Sheet 1 of 2)

STANDARD 701411-09

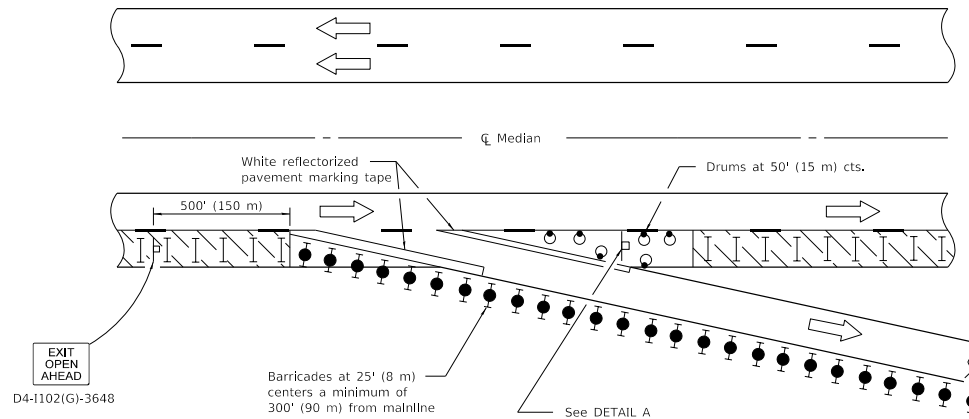
Illinois Department of Transportation	
PASSED	January 1, 2015
ENGINEER OF SAFETY ENGINEERING	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-17



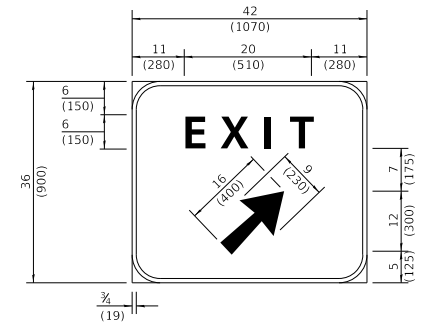
APPLICATION NO. 3

Application No. 3 depicts a modified exit ramp. The channelizing devices shall provide a clearly defined path for the exiting motorists. The minimum dimensions shown shall be increased as soon as the progress of the work will permit. The open portion of the ramp may be shifted, with the approval of the Engineer, to perform work in stages on the area adjacent to the ramp exit. Application No. 4 shall be put into effect as soon as possible.



APPLICATION NO. 4

Application No. 4 depicts an extension of the normal exit ramp. This method shall be used whenever existing geometrics can be retained. Consideration should be given to the exiting motorist's line of sight through, between or over the delineation devices.



Background - Green
Border and legend - White
"D" size letters

EXIT SIGN - SPECIAL

DETAIL A

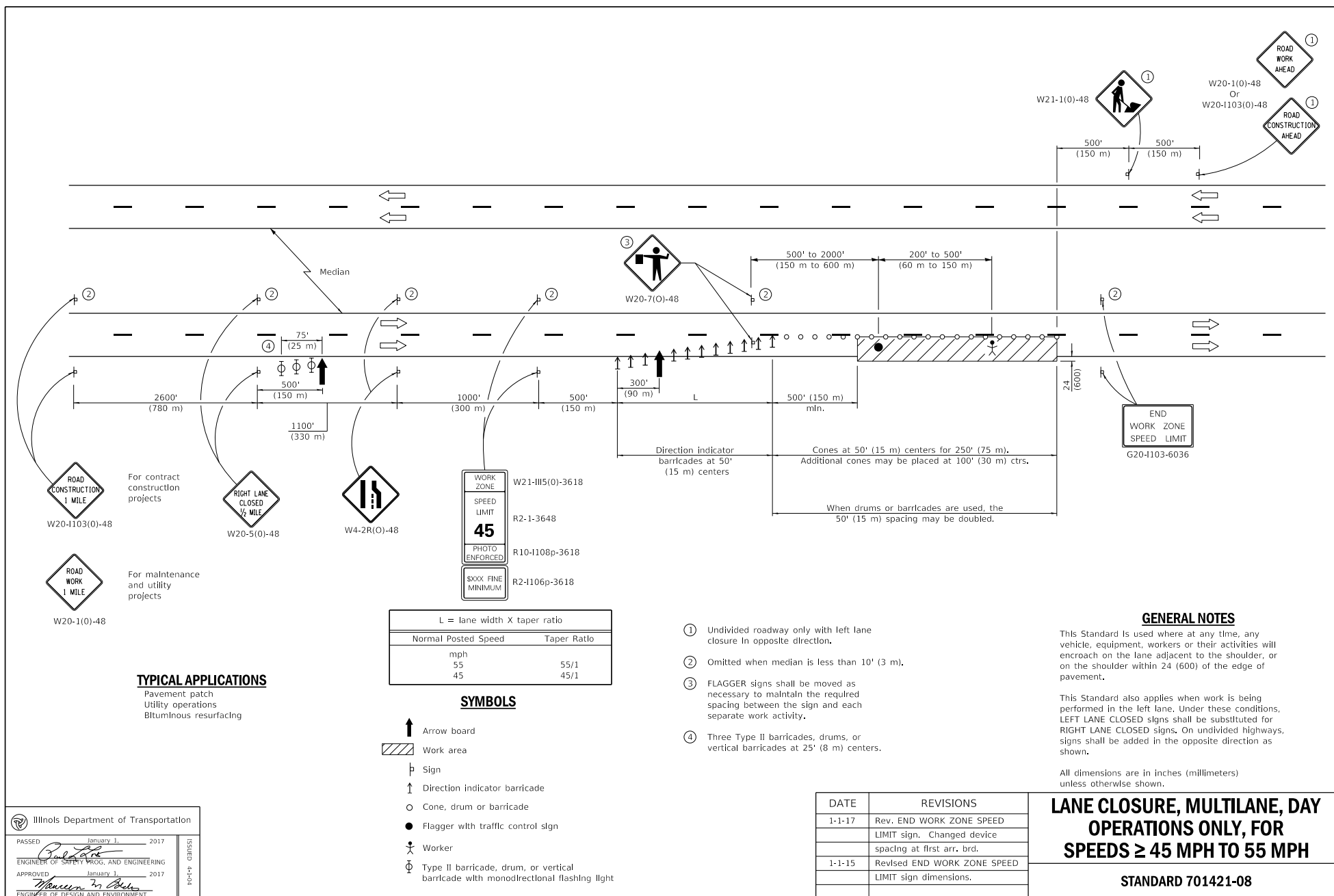
(To be utilized where distance between the two rows of channelizing devices is 6' (1.8 m) in width.)

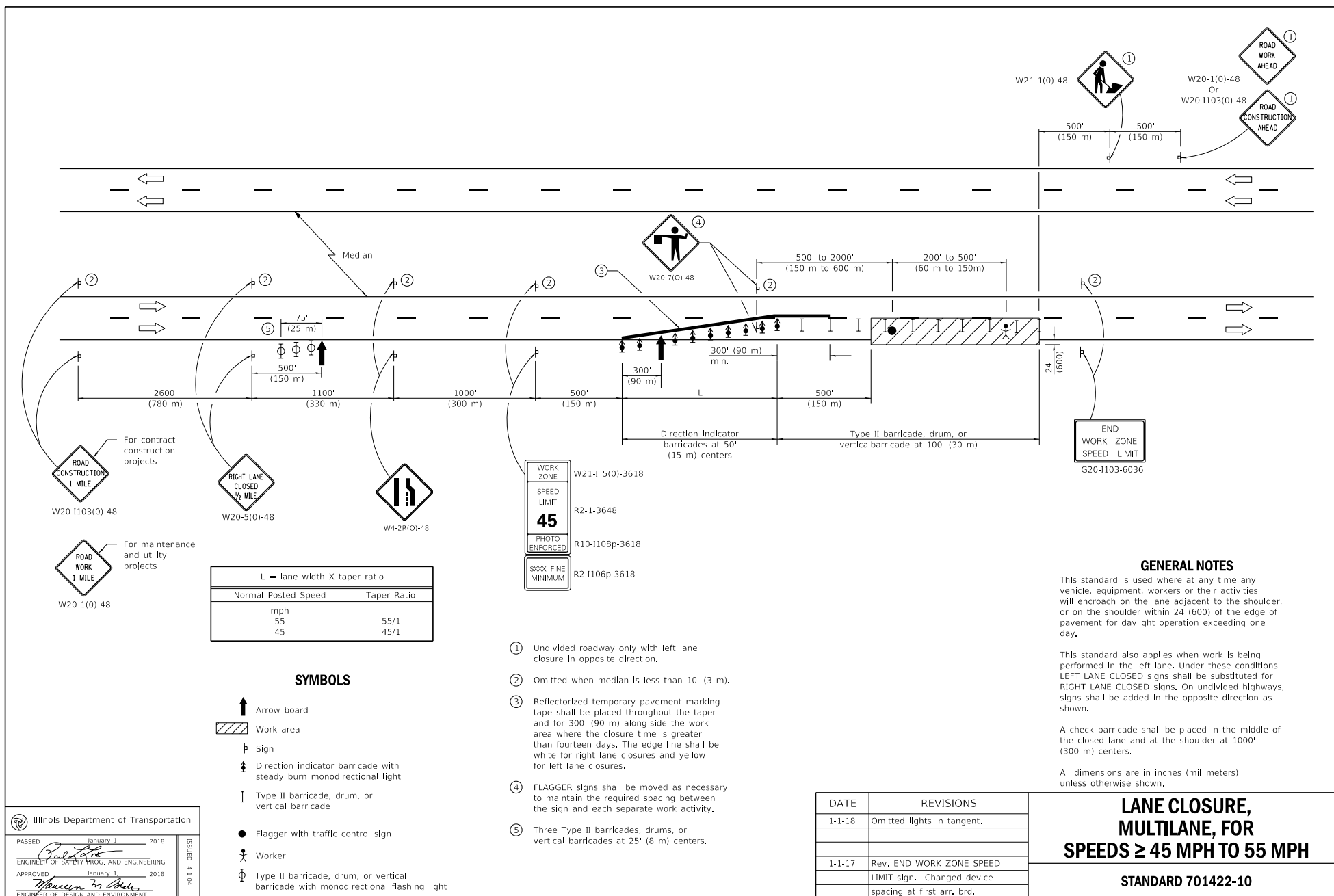
Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2015 ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <i>[Signature]</i> January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	

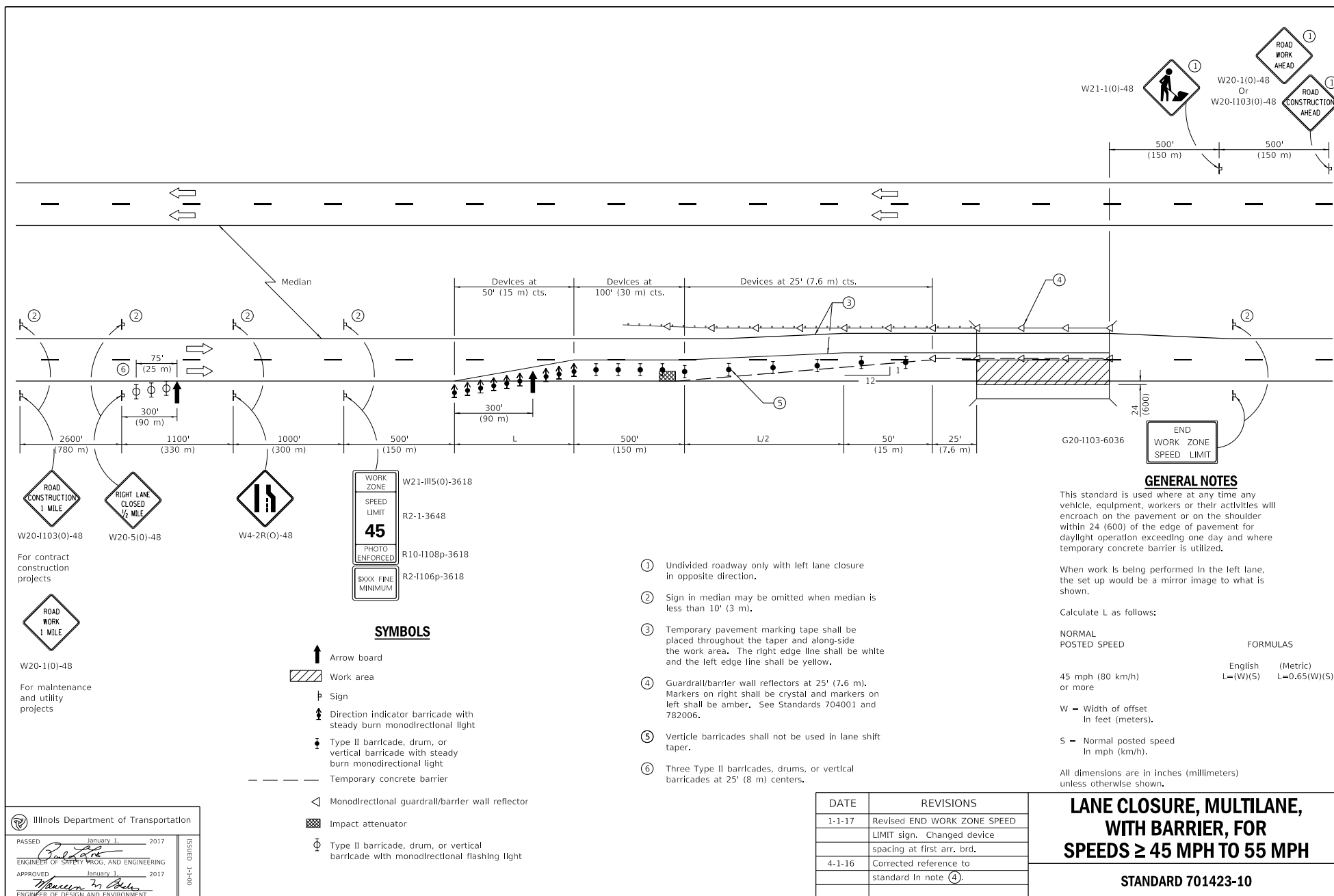
**LANE CLOSURE, MULTILANE,
AT ENTRANCE OR EXIT RAMP,
FOR SPEEDS \geq 45 MPH**

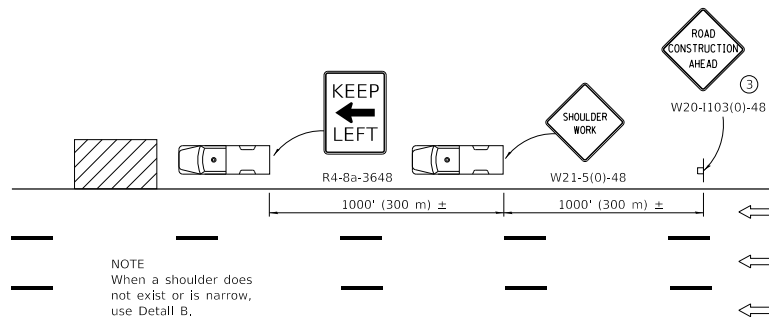
(Sheet 2 of 2)

STANDARD 701411-09

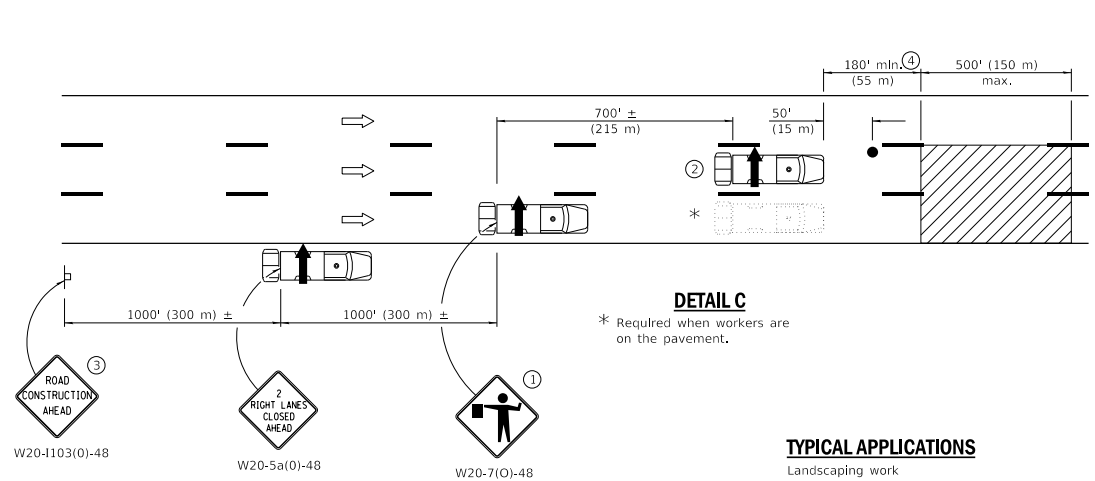








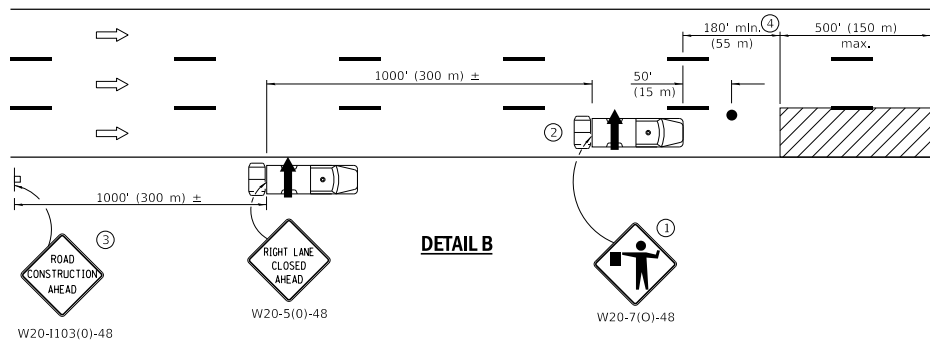
DETAIL A



DETAIL C

TYPICAL APPLICATIONS

Landscaping work
Utility work
Pavement marking
Weed spraying
Roadometer measurements
Debris cleanup
Crack pouring



DETAIL B

- ① Flaggers are required when workers are on the pavement.
- ② For striping operations only. See sign arrow detail on this standard.
- ③ For stationary operations which are on the roadway or shoulder, greater than 15 minutes and up to 1 hour.
- ④ The distance between the work and the lead truck may vary according to terrain or paint/crack sealing drying time.



G20-1101-2430
(appropriate arrow)
② (when striping only)

GENERAL NOTES

This Standard is used where any vehicle, equipment, workers or their activities will require:
1) stationary operations up to 1 hour, or 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP LEFT signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeter) unless otherwise shown.

SYMBOLS

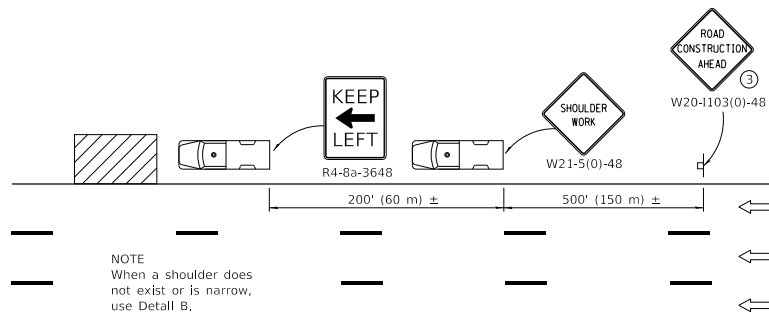
- ↑ Arrow board
- ▨ Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- ⊥ Sign

Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2017 ENGINEER OF SAFETY PROG. AND ENGINEERING	ISSUED 1-1-17
APPROVED <i>[Signature]</i> January 1, 2017 ENGINEER OF DESIGN AND ENVIRONMENT	

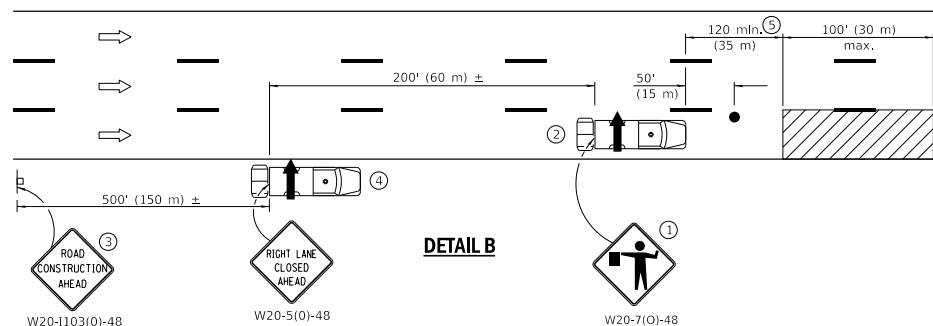
DATE	REVISIONS
1-1-17	Revised 'NOTE' on DETAIL A to use DETAIL B in lieu of DETAIL C.
4-1-16	Added trailer option for attenuator symbol. Added note④. Revised gen. notes.

LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≥ 45 MPH

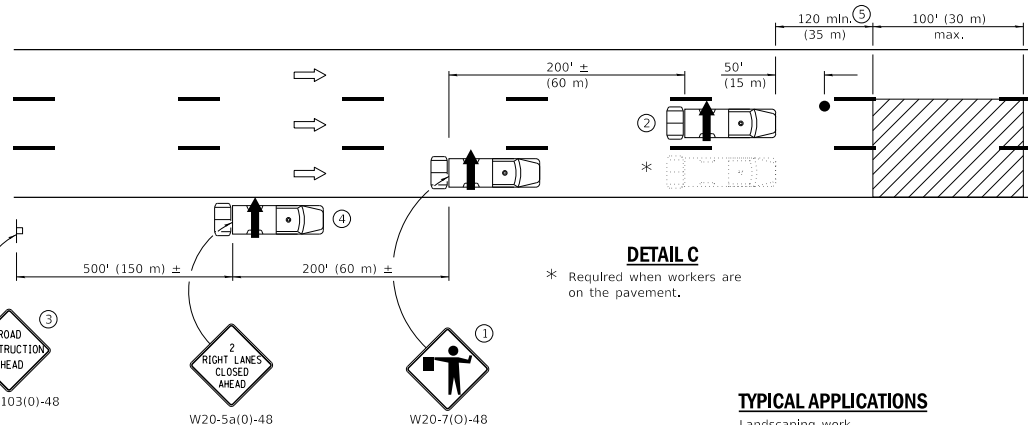
STANDARD 701426-09



DETAIL A



DETAIL B



DETAIL C

* Required when workers are on the pavement.

TYPICAL APPLICATIONS

Landscaping work
Utility work
Pavement marking
Weed spraying
Roadometer measurements
Debris cleanup
Crack pouring

- ① Flaggers are required when workers are on the pavement.
- ② For striping operations only. See sign arrow detail on this standard.
- ③ For stationary operations which are on the roadway or shoulder, greater than 15 minutes and up to 1 hour.
- ④ Omit truck, attenuator and arrow board when no shoulder exists due to curb and gutter.
- ⑤ The distance between the work and the lead truck may vary according to terrain or paint/crack sealing time.



G20-1101-2430
(appropriate arrow)
② (when striping only)

GENERAL NOTES

This Standard is used where any vehicle, equipment, workers or their activities will require:
1) stationary operations up to 1 hour, or 2) a continuous or intermittent moving operation where the average speed of movement is greater than 1 mph (2 km/h).

This Standard is also applicable when work is being performed in the left lane(s) or on the median shoulder. Under these conditions, KEEP RIGHT signs shall be substituted for KEEP LEFT signs and arrow board indications shall be directed to the right.

All dimensions are in inches (millimeter) unless otherwise shown.

SYMBOLS

- ↑ Arrow board
- ▨ Work area
- Truck with flashing amber light
- Truck/Trailer mounted attenuator
- Flagger with traffic control sign
- ⊥ Sign

Illinois Department of Transportation

PASSED January 1, 2017
ENGINEER OF SAFETY, PROG. AND ENGINEERING

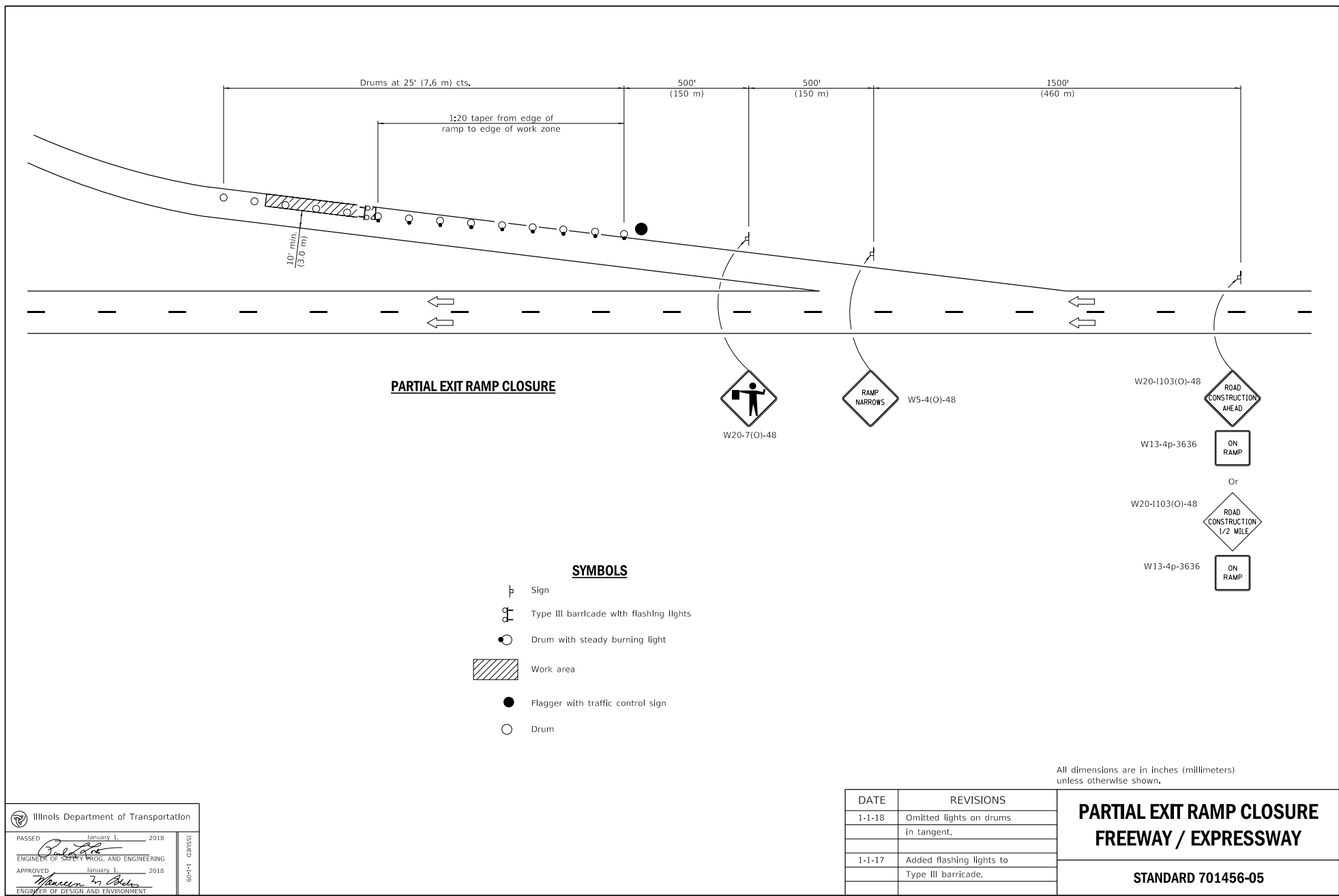
APPROVED January 1, 2017
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-11

DATE	REVISIONS
1-1-17	Revised 'NOTE' on DETAIL A to use DETAIL B in lieu of DETAIL C.
4-1-16	Rev. gen. notes, Added note ⑤. Rev. dist. between work and lead truck.

LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS ≤ 40 MPH

STANDARD 701427-05



Illinois Department of Transportation

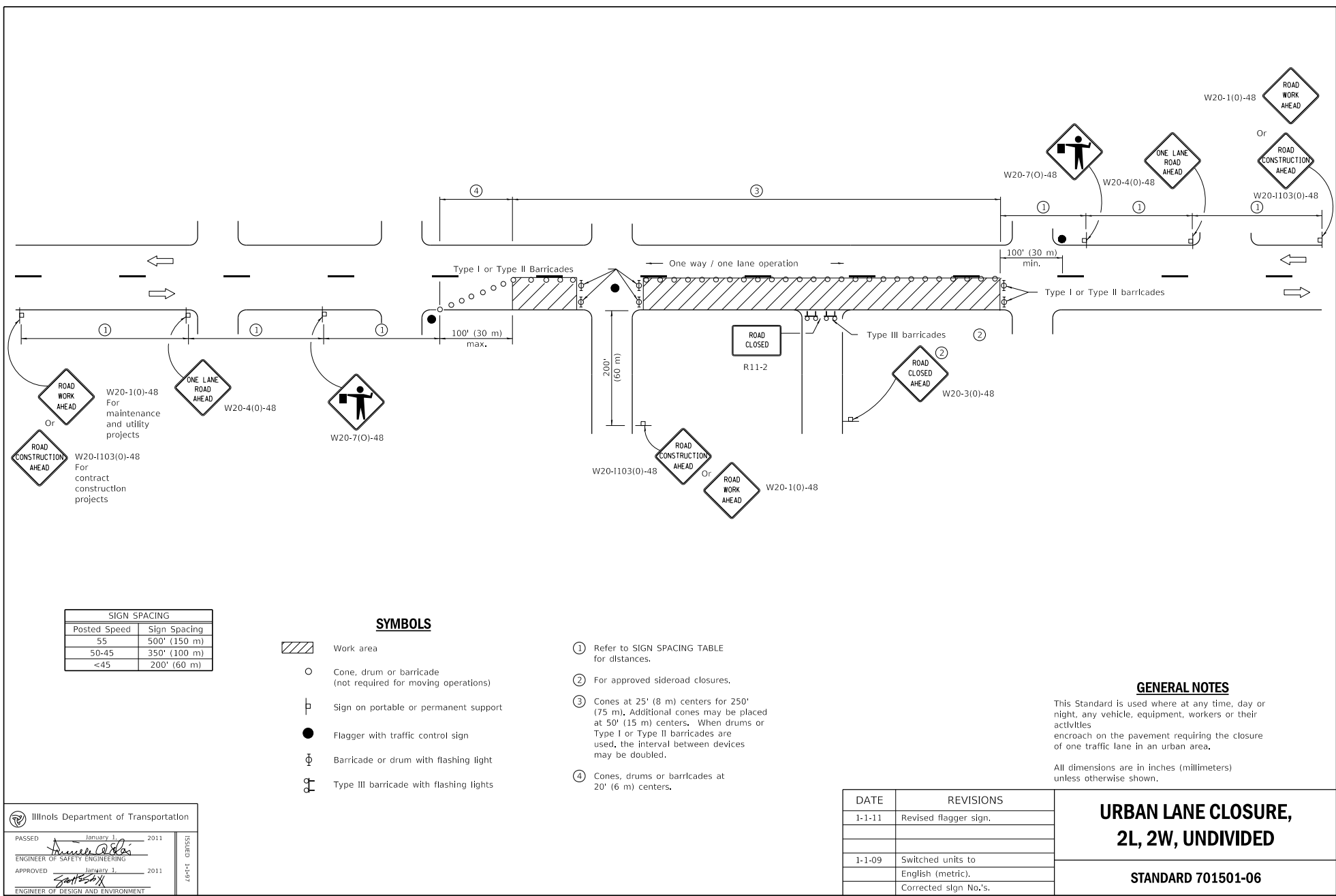
PASSED January 1, 2018

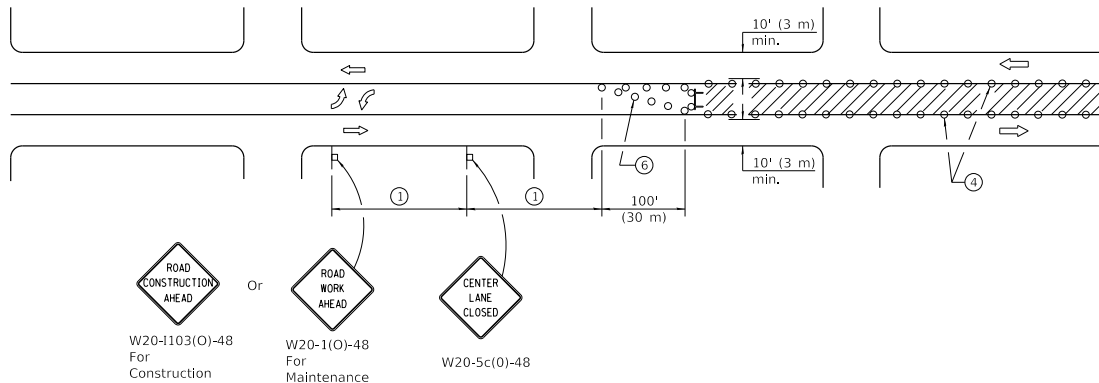
ENGINEER OF SAFETY, PROG. AND ENGINEERING

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

All dimensions are in inches (millimeters) unless otherwise shown.





CASE I

(Signs required for both directions)

SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Work area
- Barricade or drum with flashing light
- Flagger with traffic control sign
- Cone, drum or barricade
- Sign on portable or permanent support
- Type III barricade with flashing lights

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 mph (70 km/h).
- ③ Required if work exceeds 500' (164 m) or 1 block.
- ④ Cones at 25' (8 m) centers for 250' (75 m) on approach. Additional cones may be placed at 50' (15 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
- ⑤ For approved sideroad closures.
- ⑥ Cones, drums or barricades at 20' (6 m) centers in taper.
- ⑦ Use flagger sign only when flagger is present.

GENERAL NOTES

This Standard is used to close one lane of an urban, two lane, two way roadway with a bidirectional turn lane.

Case I applies when no workers are present. When workers are present, two lanes shall be closed and traffic control shall be according to Standard 701501.

Calculate L as follows:

SPEED LIMIT	FORMULAS	
	English	(Metric)
40 mph (70 km/h) or less:	$L = \frac{WS^2}{60}$	$L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$	$L = 0.65(W)(S)$

W = Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

All dimensions are in inches (millimeters) unless otherwise shown.

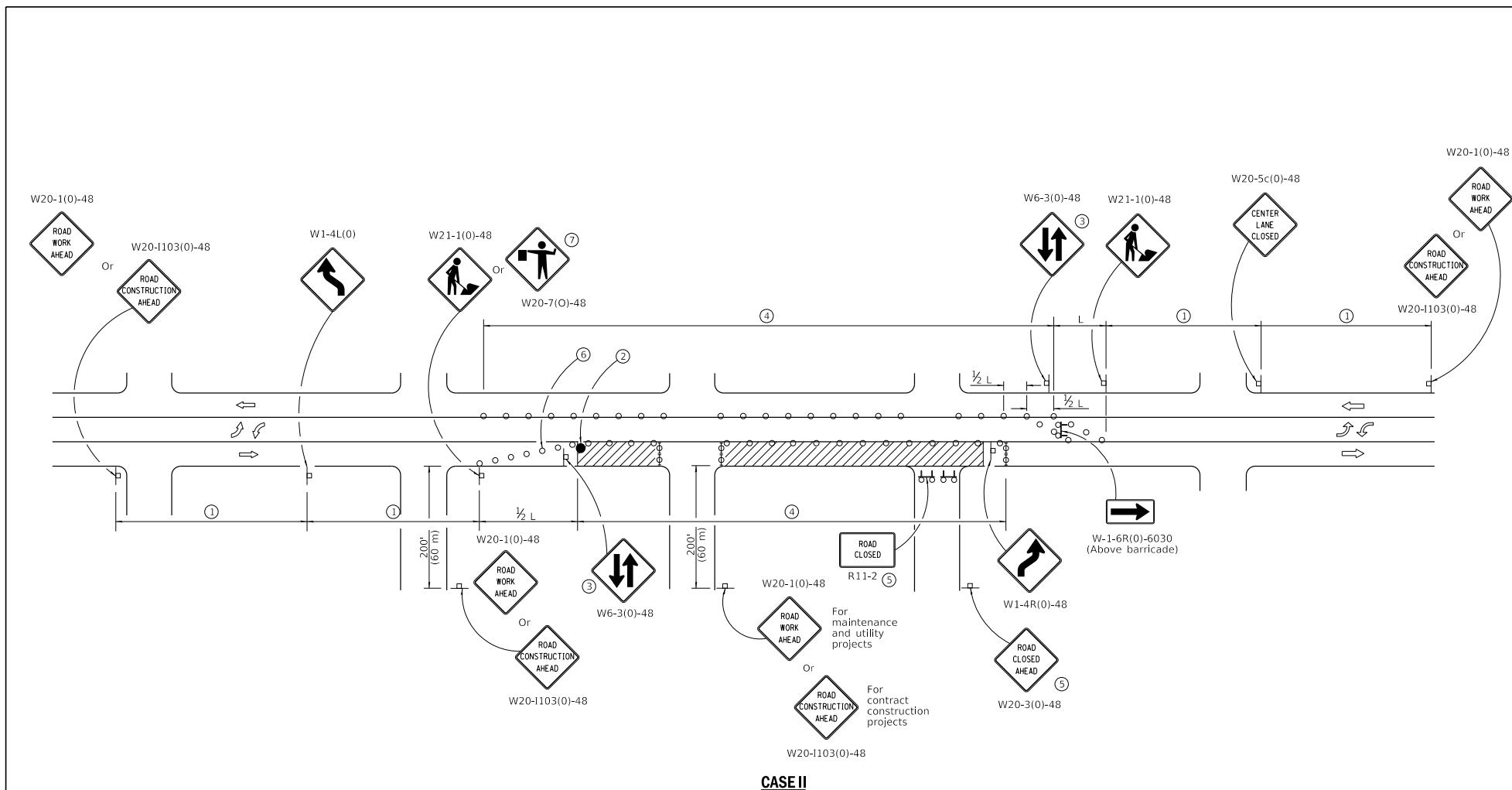
Illinois Department of Transportation	
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF SAFETY PROG. AND ENGINEERING	ISSUED: 1-1-20
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-19	Revised to allow cones at night.
1-1-18	Corrected sign number for TWO WAY TRAFFIC sign for CASE II.

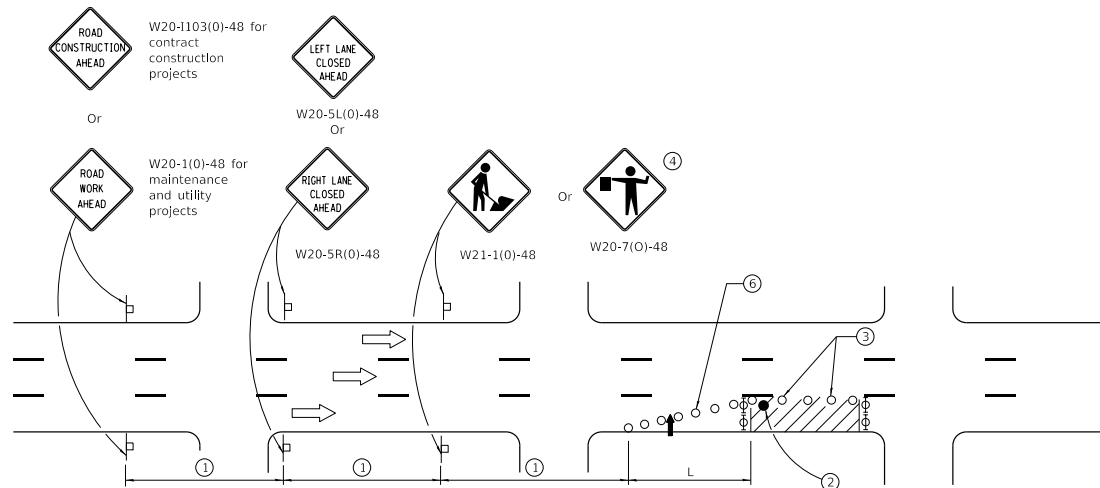
URBAN LANE CLOSURE, 2L, 2W, WITH BIDIRECTIONAL LEFT TURN LANE

(Sheet 1 of 2)

STANDARD 701502-09



CASE II



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Type III barricade with flashing lights
- Flagger with traffic control sign.

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 MPH
- ③ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ④ Use flagger sign only when flagger is present.
- ⑤ For approved sideroad closures.
- ⑥ Cones, drums or barricades at 20' (6 m) in taper.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in urban areas.

Calculate L as follows:

SPEED LIMIT	FORMULAS	
	English	(Metric)
40 mph (70 km/h) or less:	$L = \frac{WS^2}{60}$	$L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$	$L = 0.65(W)(S)$
W = Width of offset In feet (meters).		
S = Normal posted speed mph (km/h).		

All dimensions are in inches (millimeters) unless otherwise shown.

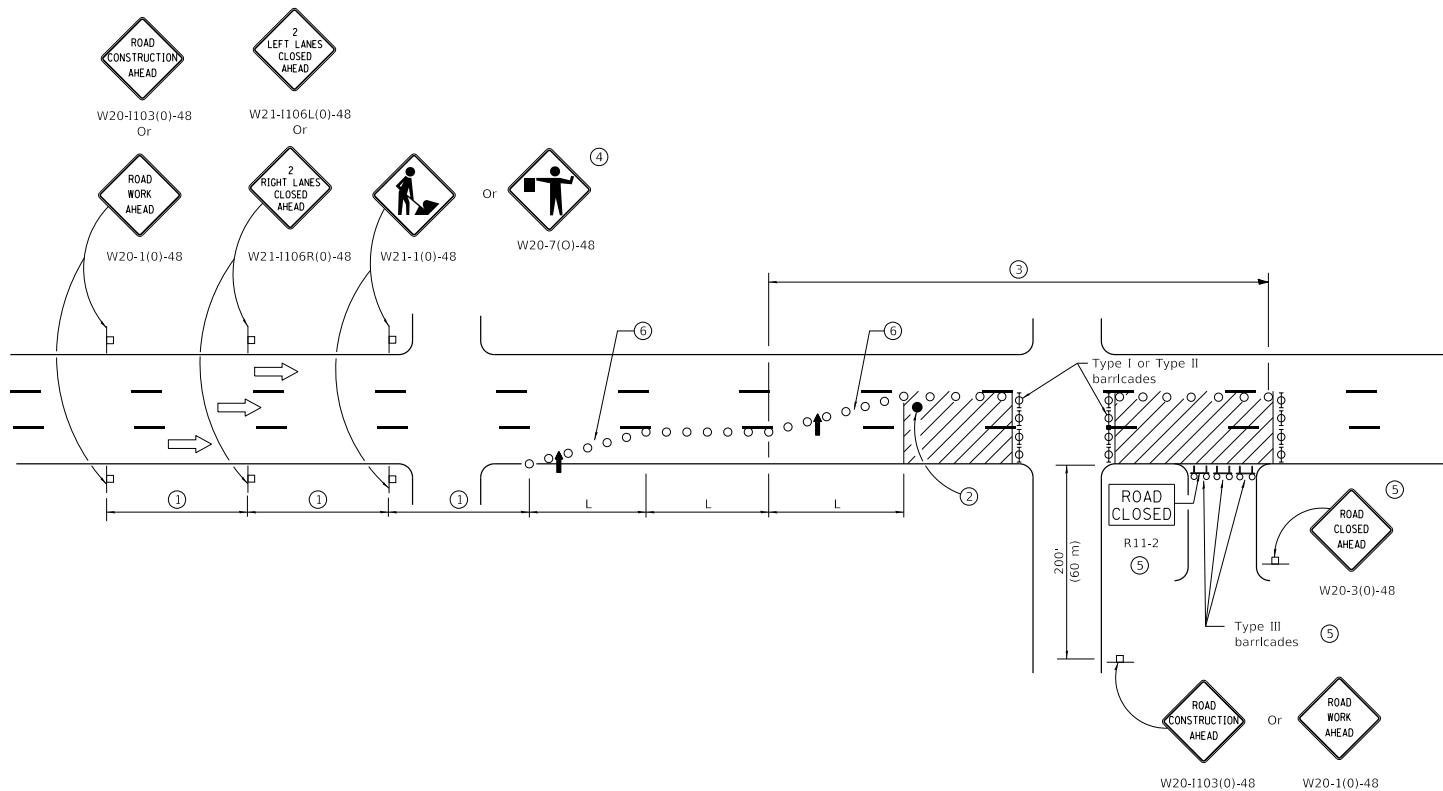
Illinois Department of Transportation	
PASSED <u>January 1, 2014</u> ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <u>January 1, 2014</u> ENGINEER OF DESIGN AND ENVIRONMENT	

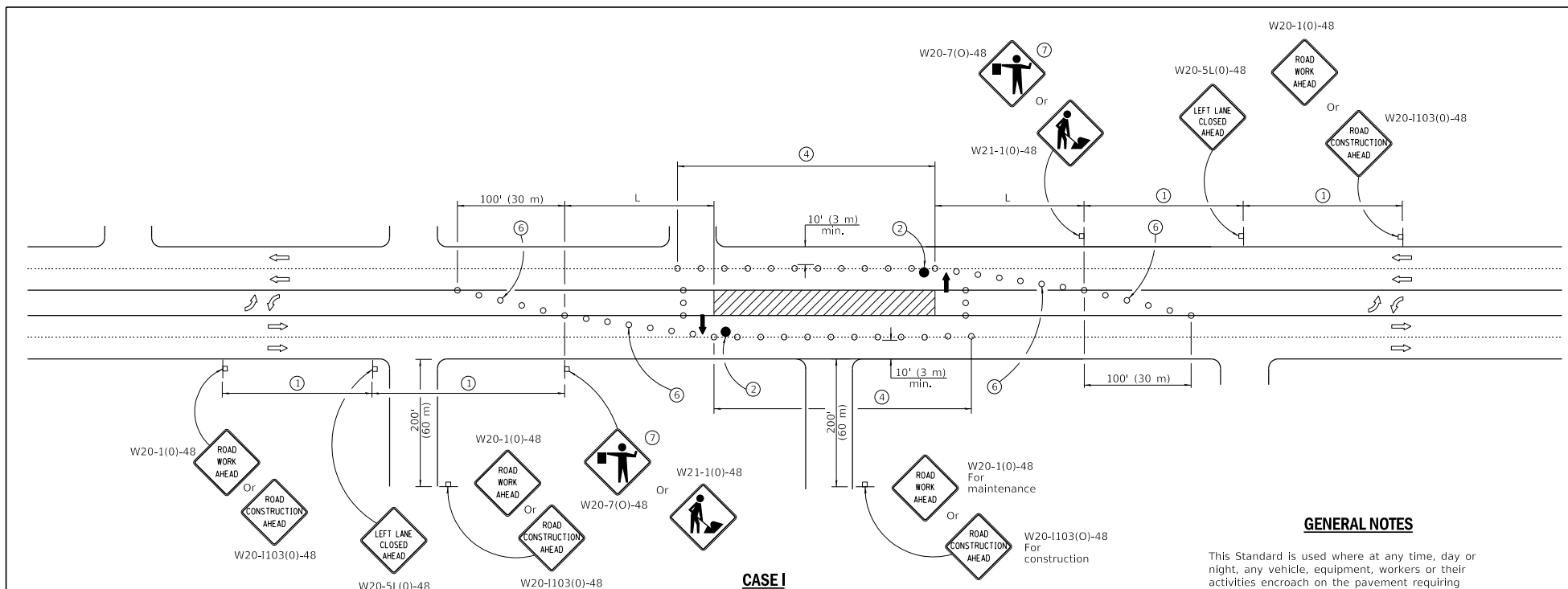
DATE	REVISIONS
1-1-14	Revised workers sign
	number to agree with
	current MUTCD.
1-1-13	Omitted text 'WORKERS' sign.

URBAN LANE CLOSURE, MULTILANE, 1W OR 2W WITH NONTRAVERSABLE MEDIAN

(Sheet 1 of 2)

STANDARD 701601-09





SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Arrow board
- Work area
- Barricade or drum with steady burning monidirectional light
- Flagger with traffic control sign
- Cone, drum or barricade
- Sign on portable or permanent support
- Type III barricade with flashing lights

CASE I

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 mph (70 km/h).
- ③ Required if work exceeds 500' (164 m) or 1 block, repeat every 1 mile (1.6 km).
- ④ Cones at 25' (8 m) centers for 250' (75 m) on approach. Additional cones may be placed at 50' (15 m) centers. When drums or type I or II barricades are used, the interval between devices may be doubled.
- ⑤ For approved sideroad closures.
- ⑥ Cones, drums or barricades at 20' (6 m) centers in taper.
- ⑦ Use flagger sign only when flagger is present.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an Urban area.

If the work operation is performed between 9:00 a.m. and 3:00 p.m. and does not exceed 15 min. Traffic protection shall be as shown for Standard 701426.

Calculate L as follows:

SPEED LIMIT

40 mph (70 km/h) or less:

45 mph (80 km/h) or greater:

W = Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

FORMULAS

English (Metric)

$$L = \frac{WS^2}{60} \quad L = \frac{WS^2}{150}$$

$$L = (W)(S) \quad L = 0.65(W)(S)$$

All dimensions are in inches (millimeters) unless otherwise shown.

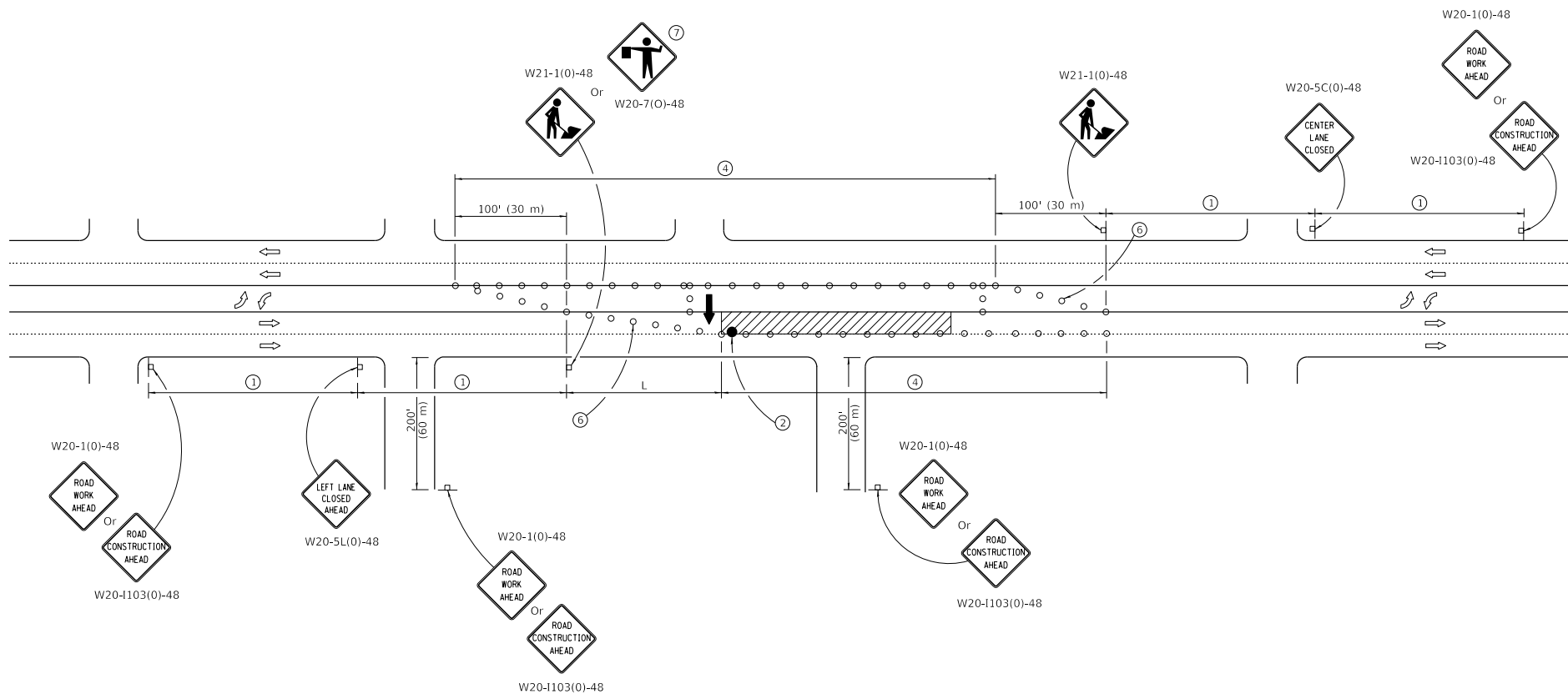
Illinois Department of Transportation	
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF SAFETY PROG. AND ENGINEERING	ISSUED: 1-1-13
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-19	Revised to allow cones at night.
1-1-18	Moved arrow boards into closed lanes for CASE I.

URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDIRECTIONAL LEFT TURN LANE

(Sheet 1 of 4)

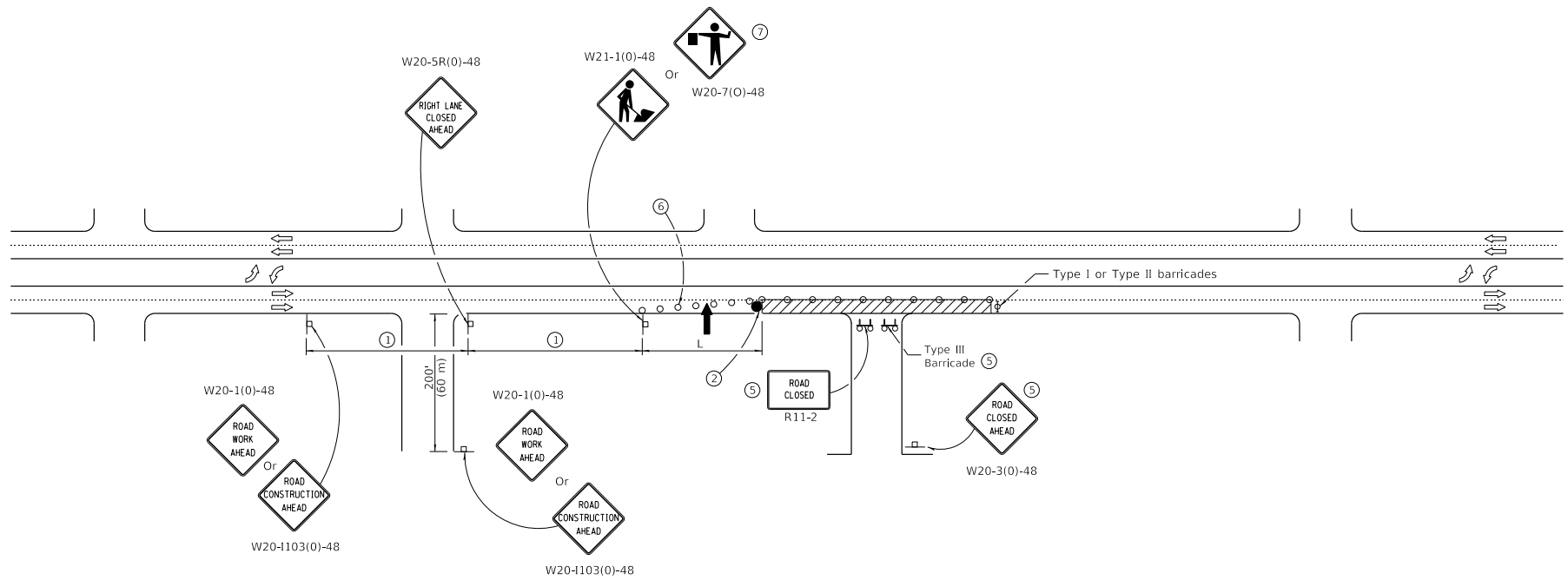
STANDARD 701602-10



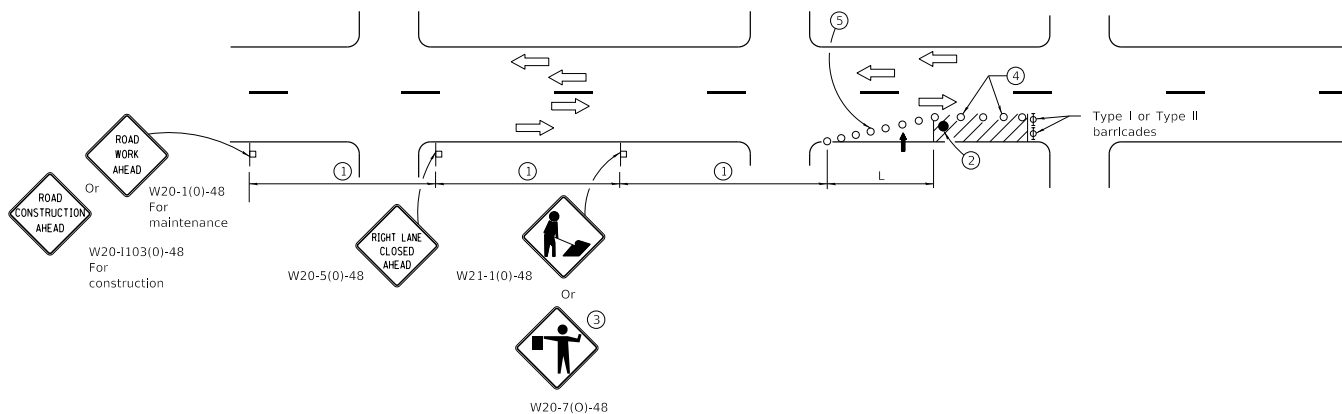
CASE III

Illinois Department of Transportation	
APPROVED: <i>[Signature]</i> ENGINEER OF SAFETY PROG. AND ENGINEERING January 1, 2019	ISSUED: 1-1-13
APPROVED: <i>[Signature]</i> ENGINEER OF DESIGN AND ENVIRONMENT January 1, 2019	

**URBAN LANE CLOSURE,
MULTILANE, 2W WITH
BIDIRECTIONAL LEFT TURN LANE**
 (Sheet 3 of 4)
STANDARD 701602-10



CASE IV



SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SYMBOLS

- Arrow board
- Cone, drum or barricade
- Sign on portable or permanent support
- Work area
- Barricade or drum with flashing light
- Flagger with traffic control sign.

- ① Refer to SIGN SPACING TABLE for distances.
- ② Required for speeds > 40 mph.
- ③ Use flagger sign only when flagger is present.
- ④ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ⑤ Cones, drums or barricades at 20' (6 m) centers in taper.

GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement requiring the closure of one traffic lane in an Urban area.

Calculate L as follows:

SPEED LIMIT	FORMULAS	
	English	(Metric)
40 mph (70 km/h) or less:	$L = \frac{WS^2}{60}$	$L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$	$L = 0.65(W)(S)$

W = Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

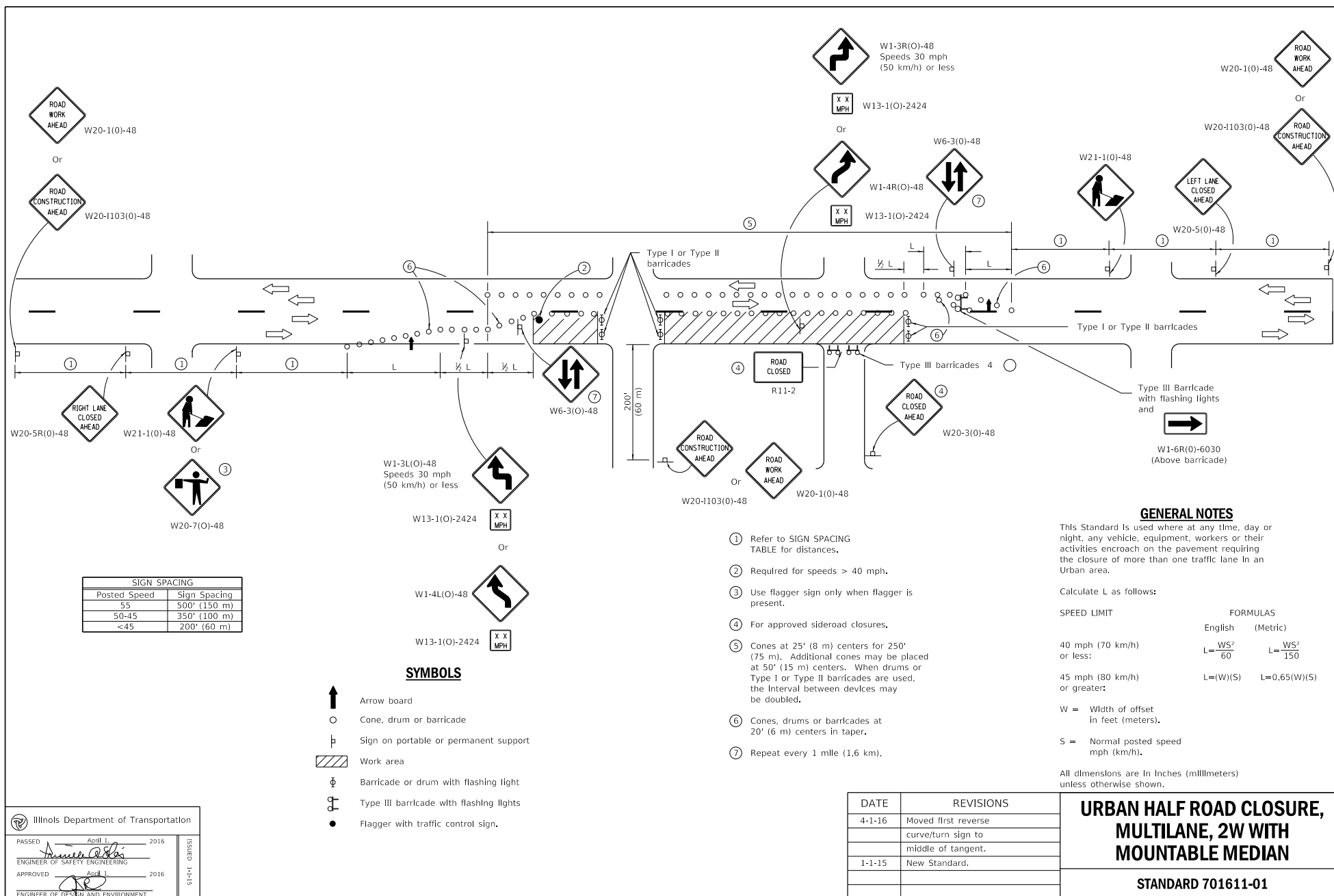
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED <i>[Signature]</i> January 1, 2015 ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <i>[Signature]</i> January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	

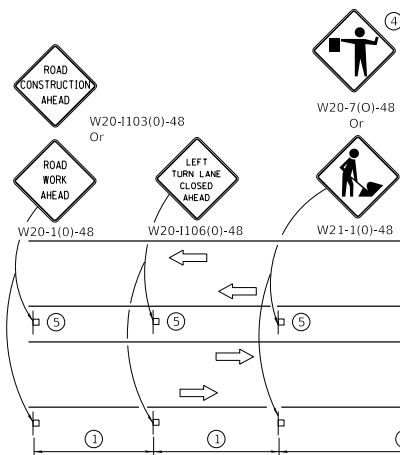
DATE	REVISIONS
1-1-15	Renamed standard. Moved case on Sheet 2 to new Highway Standard.
1-1-14	Revised workers sign number to agree with current MUTCD.

URBAN SINGLE LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN

STANDARD 701606-10



DATE	REVISIONS
4-1-16	Moved first reverse
	curve/turn sign to
	middle of tangent.
1-1-15	New Standard.



LEFT TURN LANE OR CENTER MEDIAN OPERATIONS

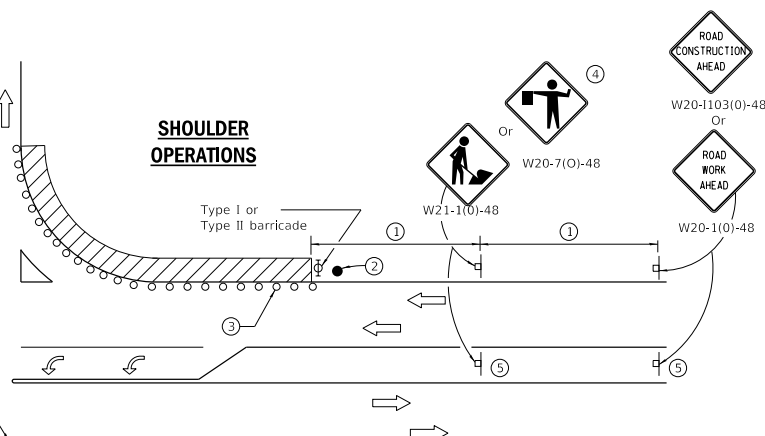
- ① Refer to SIGN SPACING TABLE for distance.
- ② Required for speed > 40 mph.
- ③ Cones at 25' (8 m) centers for 250' (75 m). Additional cones may be placed at 50' (15 m) centers. When drums or Type I or Type II barricades are used, the interval between devices may be doubled.
- ④ Use flagger sign only when flagger is present.
- ⑤ Omit this sign when median is less than 10' (3 m) or for bi-directional turn lanes.
- ⑥ Cones, drums or barricades at 20' (6 m) centers in taper.
- ⑦ Advanced arrow board required for speeds > 45 mph.
- ⑧ Three Type II barricades, drums or vertical barricades at 50' (15 m) centers.

SYMBOLS

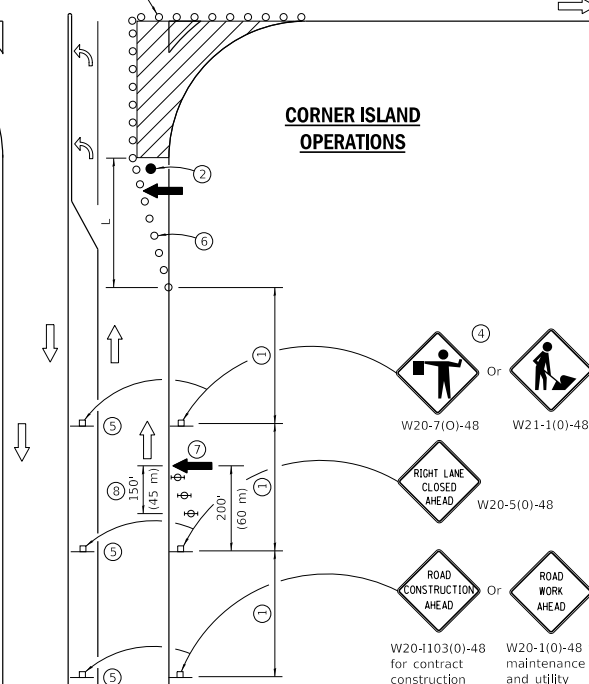
- Work area
- Cone, drum or barricade
- Sign on portable or permanent support
- Arrow board
- Barricade or drum with flashing light
- Flagger with traffic control sign

SIGN SPACING	
Posted Speed	Sign Spacing
55	500' (150 m)
50-45	350' (100 m)
<45	200' (60 m)

SHOULDER OPERATIONS



CORNER ISLAND OPERATIONS



GENERAL NOTES

This Standard is used where at any time, day or night, any vehicle, equipment, workers or their activities encroach on the pavement during shoulder operations or where construction requires lane closures in an urban area.

Calculate L as follows:

SPEED LIMIT	FORMULAS	
	English	(Metric)
40 mph (70 km/h) or less:	$L = \frac{WS^2}{60}$	$L = \frac{WS^2}{150}$
45 mph (80 km/h) or greater:	$L = (W)(S)$	$L = 0.65(W)(S)$

W = Width of offset in feet (meters).

S = Normal posted speed mph (km/h).

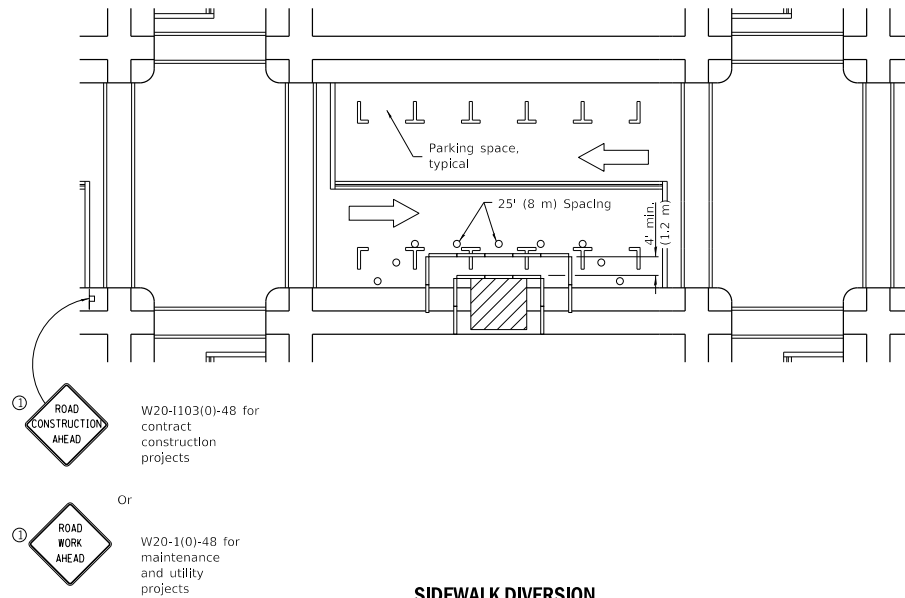
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED <u>April 1, 2016</u> ENGINEER OF SAFETY ENGINEERING	ISSUED 1-1-17
APPROVED <u>April 1, 2016</u> ENGINEER OF DESIGN AND ENVIRONMENT	

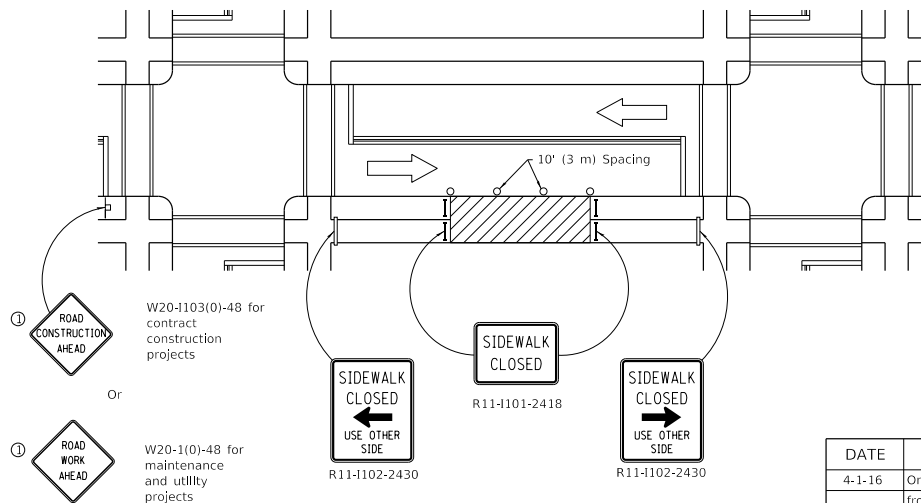
DATE	REVISIONS
4-1-16	Corrected sign number for LEFT TURN LANE CLOSED AHEAD.
1-1-14	Added devices at arrow board upstream from taper.
	Rev. workers sign number.

URBAN LANE CLOSURE, MULTILANE INTERSECTION

STANDARD 701701-10



SIDEWALK DIVERSION



SIDEWALK CLOSURE

SYMBOLS

- Work area
- Sign on portable or permanent support
- Barricade or drum
- Cone, drum or barricade
- Type III barricade
- Detectable pedestrian channelizing barricade

① Omit whenever duplicated by road work traffic control.

GENERAL NOTES

This Standard is used where, at any time, pedestrian traffic must be rerouted due to work being performed.

This Standard must be used in conjunction with other Traffic Control & Protection Standards when roadway traffic is affected.

Temporary facilities shall be detectable and accessible.

The temporary pedestrian facilities shall be provided on the same side of the closed facilities whenever possible.

The SIDEWALK CLOSED / USE OTHER SIDE sign shall be placed at the nearest crosswalk or intersection to each end of the closure. Where the closure occurs at a corner, the signs shall be erected on the corners across the street from the closure. The SIDEWALK CLOSED signs shall be used at the ends of the actual closures.

Type III barricades and R11-2-4830 signs shall be positioned as shown in "ROAD CLOSED TO ALL TRAFFIC" detail on Standard 701901.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
4-1-16	Omitted orange safety fence
	from standard as this is
	covered in the std. spec.
1-1-12	Added SIDEWALK DIVERSION.
	Modified appearance of
	plan views. Renamed Std.

SIDEWALK, CORNER OR CROSSWALK CLOSURE

(Sheet 1 of 2)

STANDARD 701801-06

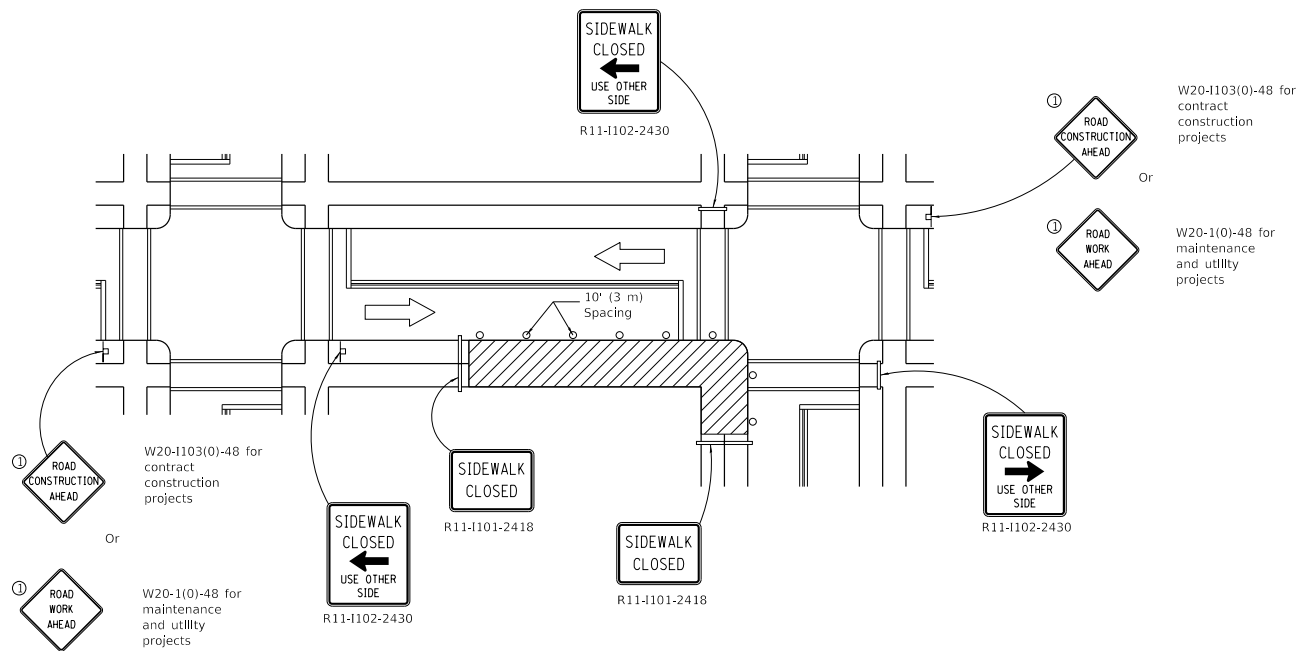
Illinois Department of Transportation

PASSED April 1, 2016 ISSUED 1-1-17

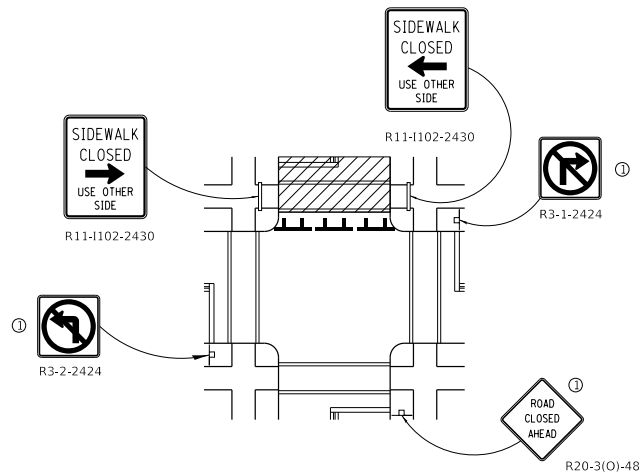
ENGINEER OF SAFETY ENGINEERING

APPROVED April 1, 2016

ENGINEER OF DESIGN AND ENVIRONMENT



CORNER CLOSURE

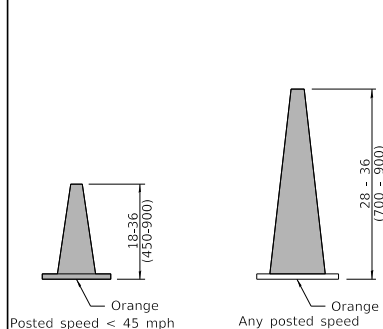


CROSSWALK CLOSURE

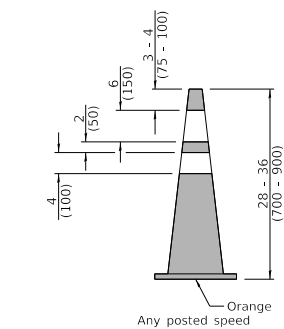
SIDEWALK, CORNER OR CROSSWALK CLOSURE

(Sheet 2 of 2)

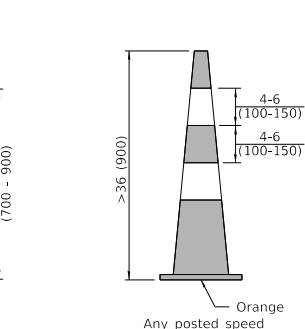
STANDARD 701801-06



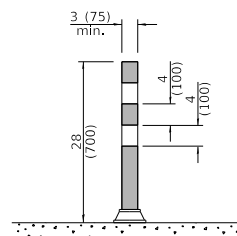
DAYTIME USE



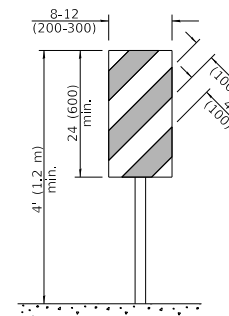
CONES



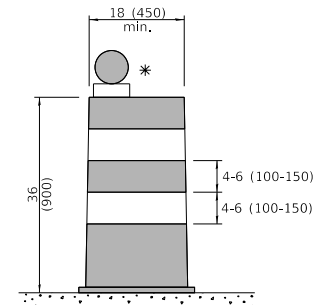
DAY OR NIGHTTIME USE



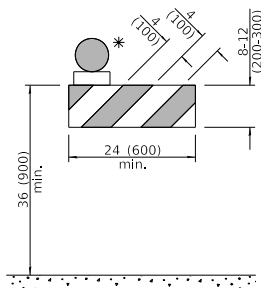
TUBULAR MARKER



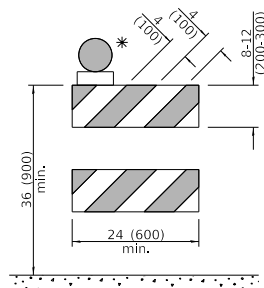
**VERTICAL PANEL
POST MOUNTED**



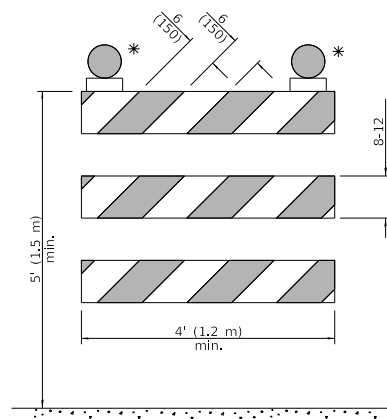
DRUM



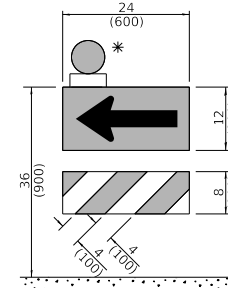
TYPE I BARRICADE



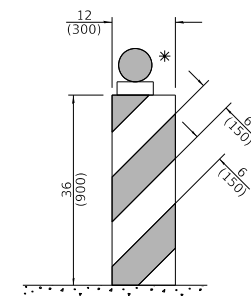
TYPE II BARRICADE



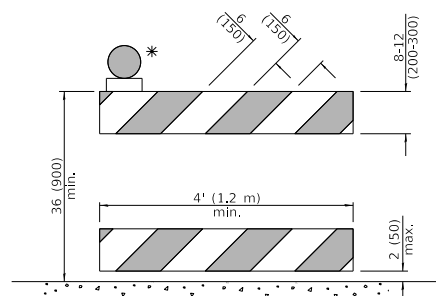
TYPE III BARRICADE



**DIRECTION INDICATOR
BARRICADE**



VERTICAL BARRICADE



**DETECTABLE PEDESTRIAN
CHANNELIZING BARRICADE**

* Warning lights (if required)

GENERAL NOTES

All heights shown shall be measured above the pavement surface.

All dimensions are in inches (millimeters) unless otherwise shown.

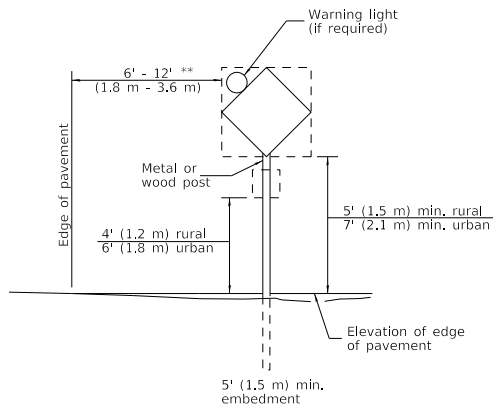
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF SAFETY PROG. AND ENGINEERING	ISSUED: 1-1-19
APPROVED: <i>[Signature]</i> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-19	Revised cone usage and added cones >36" (900 mm) height.
1-1-18	Revised END WORK ZONE SPEED LIMIT sign from orange to white background.

TRAFFIC CONTROL DEVICES

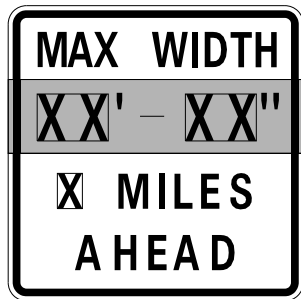
(Sheet 1 of 3)

STANDARD 701901-08



POST MOUNTED SIGNS

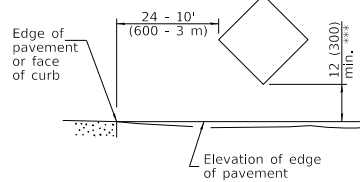
** When curb or paved shoulder are present this dimension shall be 24 (600) to the face of curb or 6' (1.8 m) to the outside edge of the paved shoulder.



W12-I103-4848

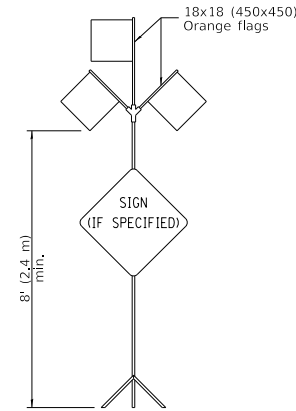
WIDTH RESTRICTION SIGN

XX'-XX" width and X miles are variable.

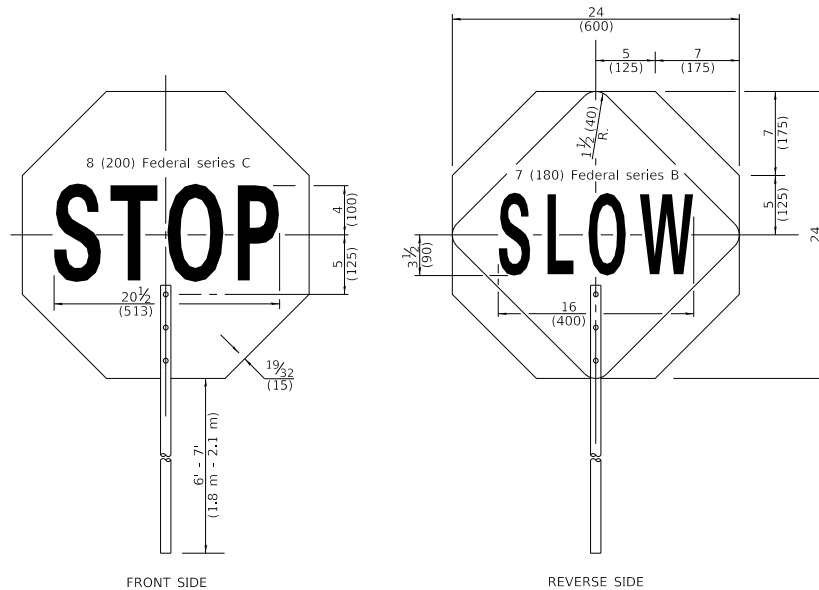


SIGNS ON TEMPORARY SUPPORTS

*** When work operations exceed four days, this dimension shall be 5' (1.5 m) min. If located behind other devices, the height shall be sufficient to be seen completely above the devices.



HIGH LEVEL WARNING DEVICE



FLAGGER TRAFFIC CONTROL SIGN

ROAD CONSTRUCTION NEXT X MILES	END CONSTRUCTION
G20-I104(0)-6036	G20-I105(0)-6024

This signing is required for all projects 2 miles (3200 m) or more in length.

ROAD CONSTRUCTION NEXT X MILES sign shall be placed 500' (150 m) in advance of project limits.

END CONSTRUCTION sign shall be erected at the end of the job unless another job is within 2 miles (3200 m).

Dual sign displays shall be utilized on multi-lane highways.

WORK LIMIT SIGNING

WORK ZONE	W21-I115(0)-3618
SPEED LIMIT XX	R2-1-3648
PHOTO ENFORCED	R10-I108p-3618 ****
\$\$\$ FINE MINIMUM	R2-I106p-3618

Sign assembly as shown on Standards or as allowed by District Operations.

END WORK ZONE SPEED LIMIT	G20-I103-6036
---------------------------------	---------------

This sign shall be used when the above sign assembly is used.

HIGHWAY CONSTRUCTION SPEED ZONE SIGNS

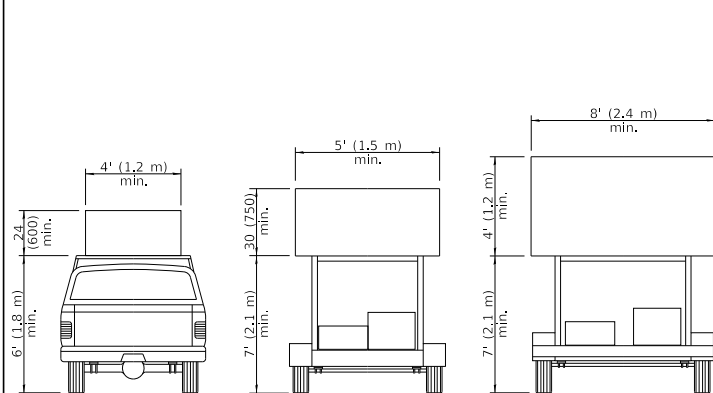
**** R10-I108p shall only be used along roadways under the jurisdiction of the State.

TRAFFIC CONTROL DEVICES

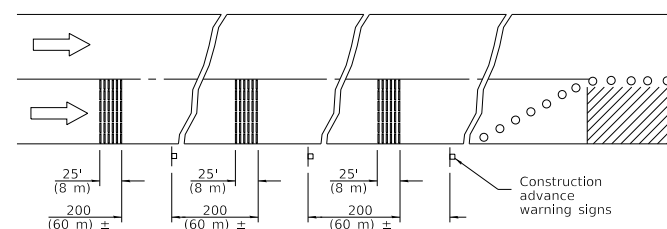
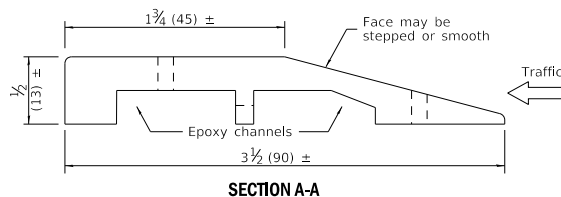
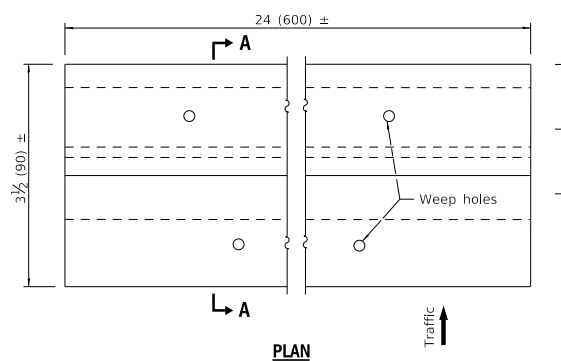
(Sheet 2 of 3)

STANDARD 701901-08

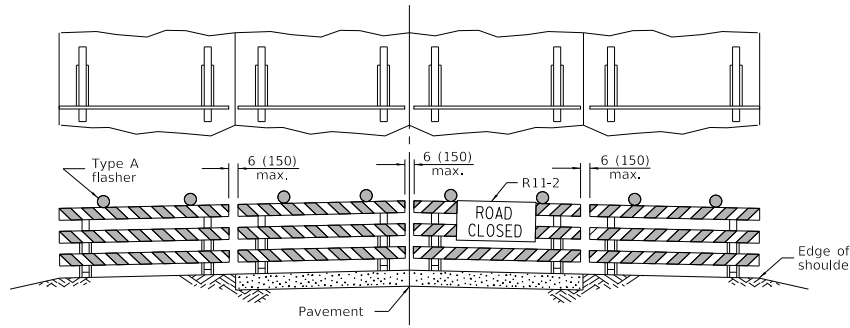
Illinois Department of Transportation	
APPROVED January 1, 2019 ENGINEER OF SAFETY, PROGRAM, AND ENGINEERING APPROVED January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-13



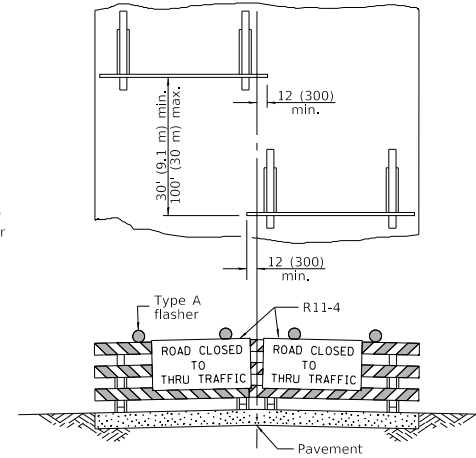
ARROW BOARDS



TEMPORARY RUMBLE STRIPS



Reflectorized striping may be omitted on the back side of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the sign may be mounted on an NCHRP 350 temporary sign support directly in front of the barricade.



ROAD CLOSED TO THRU TRAFFIC

Reflectorized striping shall appear on both sides of the barricades. If a Type III barricade with an attached sign panel which meets NCHRP 350 is not available, the signs may be mounted on NCHRP 350 temporary sign supports directly in front of the barricade.

**TRAFFIC CONTROL
DEVICES**

(Sheet 3 of 3)

STANDARD 701901-08

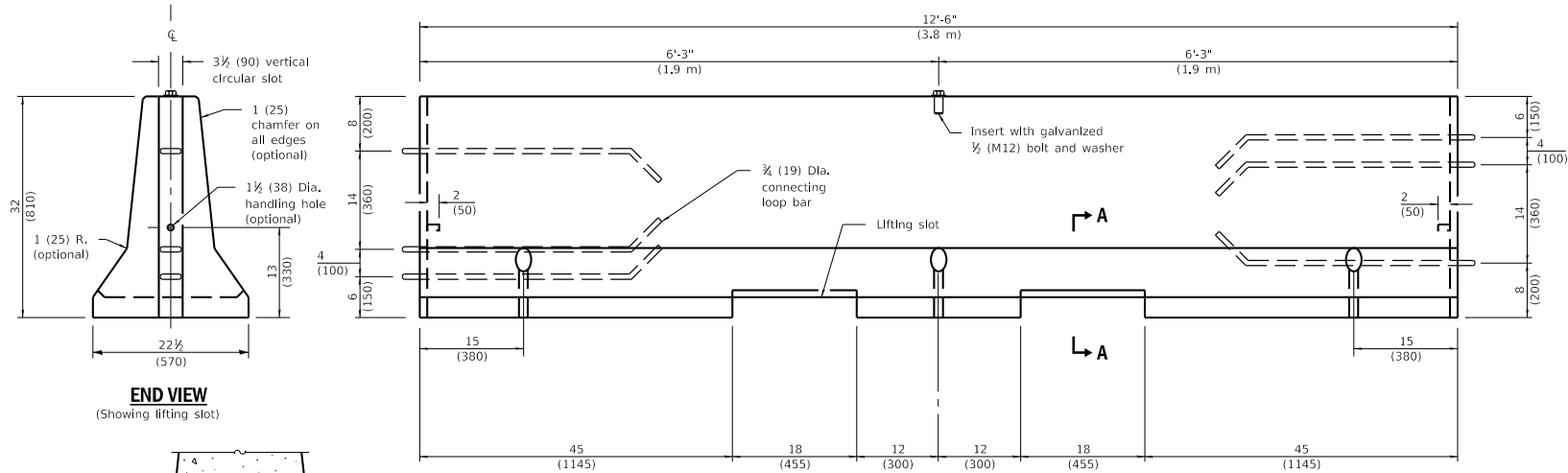
Illinois Department of Transportation

APPROVED January 1, 2019
ENGINEER OF SAFETY PROG. AND ENGINEERING

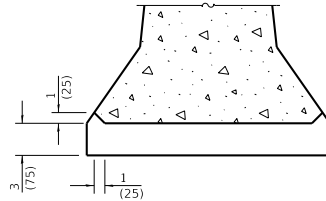
APPROVED January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-13

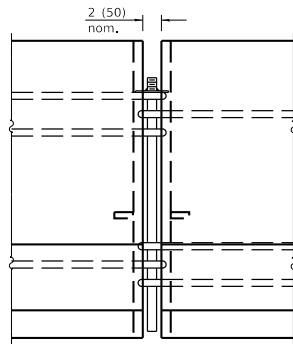
**TYPICAL APPLICATIONS OF
TYPE III BARRICADES CLOSING A ROAD**



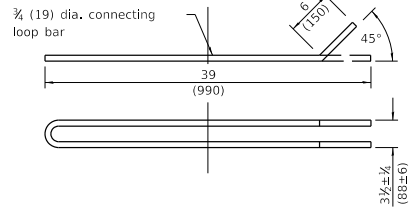
END VIEW
(Showing lifting slot)



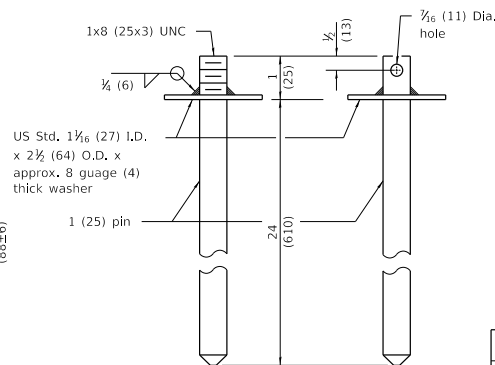
**SECTION A-A
LIFTING SLOT**



CONNECTING DETAIL



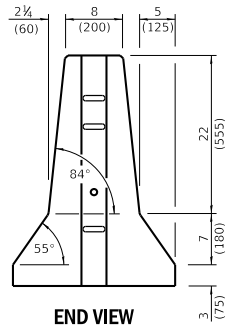
CONNECTING LOOP BAR



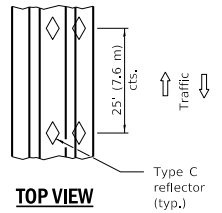
**CONNECTING AND
ANCHOR PINS**

(End may be beveled 1/4 (6) max.)

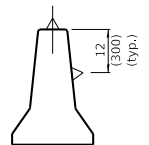
F SHAPE DESIGN



END VIEW



TOP VIEW



BARRIER WALL REFLECTORS

GENERAL NOTES

Each F shape barrier shall be clearly marked with "ILLINOIS F SHAPE", the Producer's mark and the date of manufacture. The markings shall be indented on the barrier or painted thereon with waterproof paint/Ink.

The Insert for the 1/2 (M12) bolt shall be capable of 3,000 lb (13 kN) pull-out strength.

When barrier separates opposing flows of traffic markers shall be on both sides of barrier.

See Standard 782006 for dimensions of Type C reflector.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
4-1-16	Rev. opt. chamfer on all edges to 1 (25). Reference to Std. 635011 now 782006.
1-1-12	Omitted 'ALTERNATE' from connecting and anchoring pins detail.

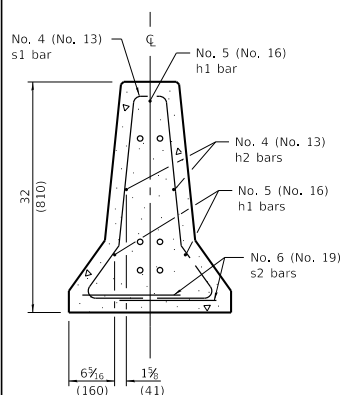
TEMPORARY CONCRETE BARRIER

(Sheet 1 of 2)

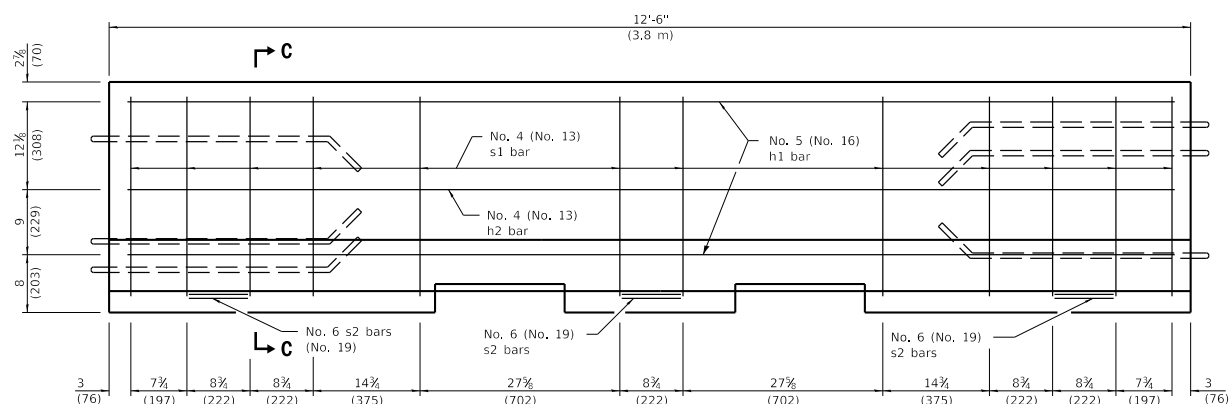
STANDARD 704001-08

Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF POLICY AND PROCEDURES <i>Michael Brand</i>	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT <i>[Signature]</i>	
DESIGNED	10-1-02

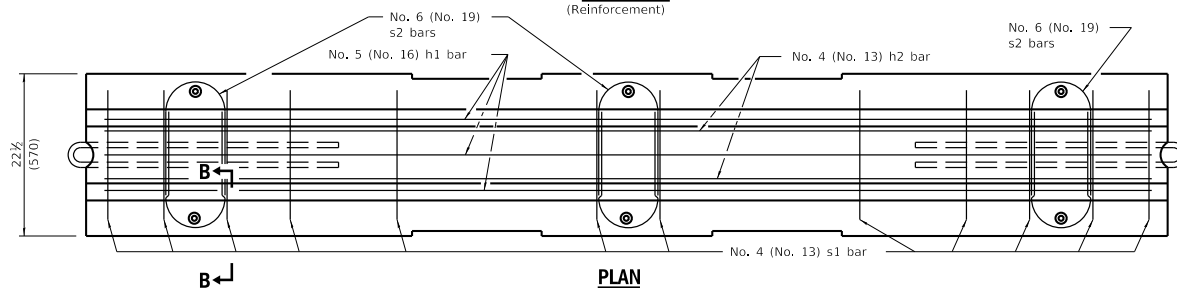
F SHAPE DESIGN



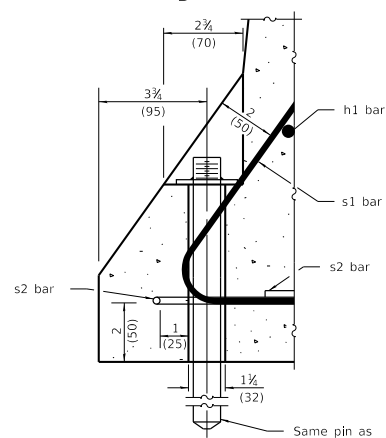
SECTION C-C



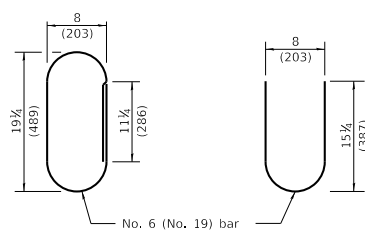
ELEVATION
(Reinforcement)



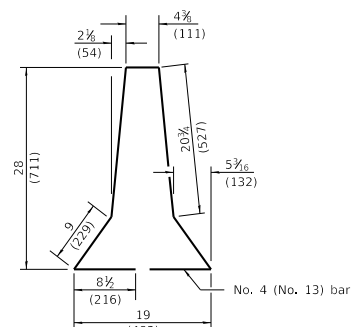
PLAN



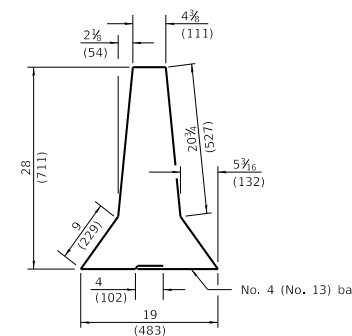
SECTION B-B
ANCHORING DETAIL



ALTERNATE s2 BARS



s1 BAR



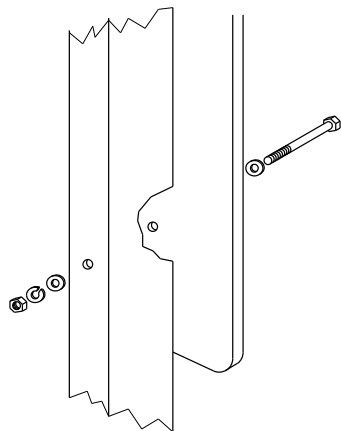
ALTERNATE s1 BAR

Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

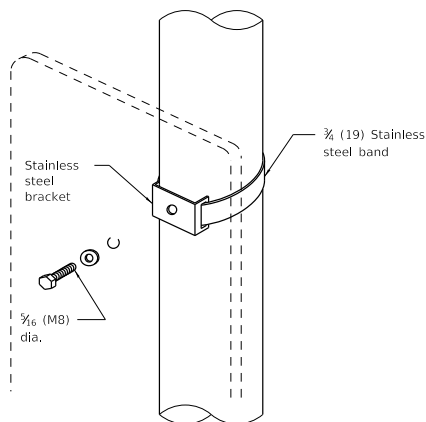
**TEMPORARY CONCRETE
BARRIER**

(Sheet 2 of 2)

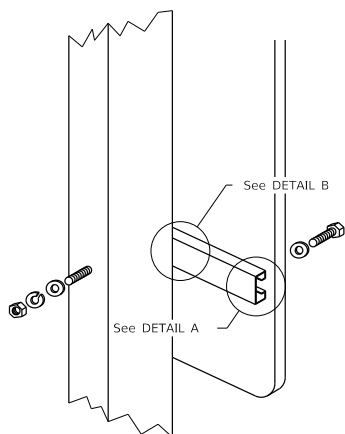
STANDARD 704001-08



Sign panel 36 (900) wide or less

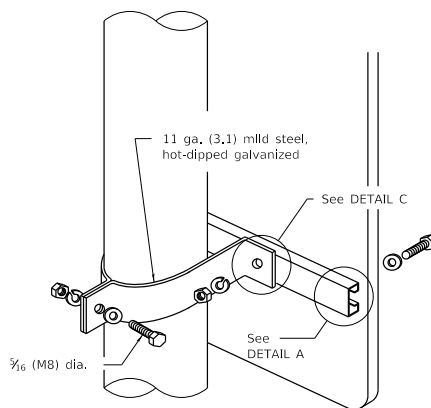


Sign panel 36 (900) wide or less



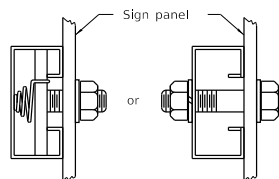
Sign panel over 36 (900) wide

WOOD OR TELESCOPING STEEL POSTS

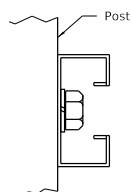


Sign panel over 36 (900) wide

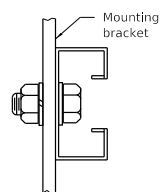
LIGHT OR SIGNAL STANDARDS



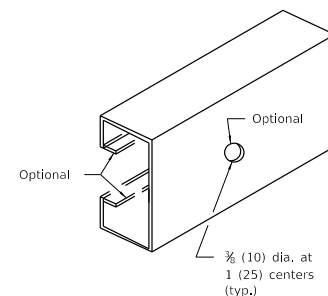
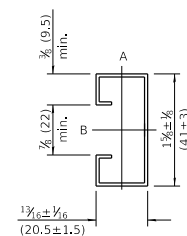
DETAIL A



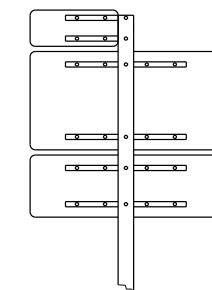
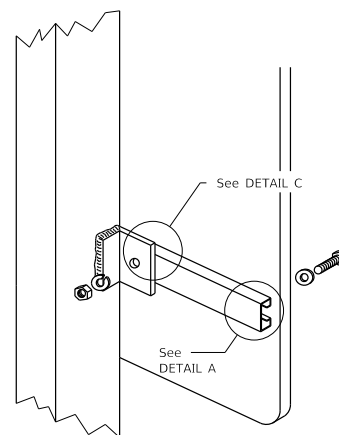
DETAIL B



DETAIL C



SUPPORTING CHANNEL DETAILS



ROUTE MARKER ASSEMBLY

BREAKAWAY STEEL TUBING POSTS

(All sign panel sizes)

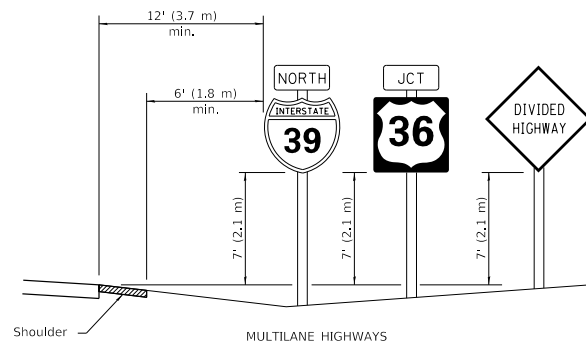
All dimensions are in inches (millimeters)
unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-97	Renum. Standard 2319-6.

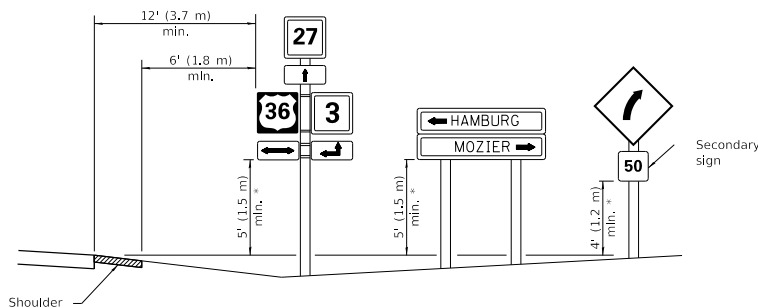
SIGN PANEL MOUNTING DETAILS

STANDARD 720001-01

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED 1-1-97	

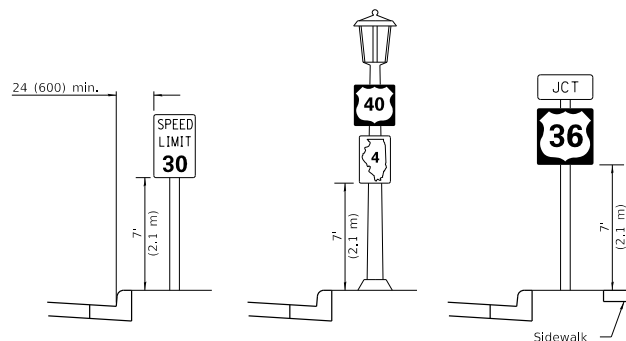


MULTILANE HIGHWAYS



* In any area where parking is likely to occur or where there are obstructions to view or where signs are located over sidewalks, the height shall be at least 7' (2.1 m).

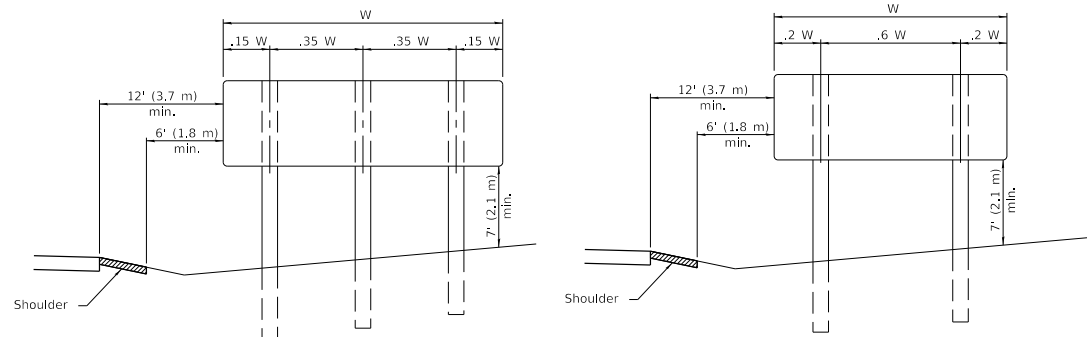
TWO LANE RURAL HIGHWAYS



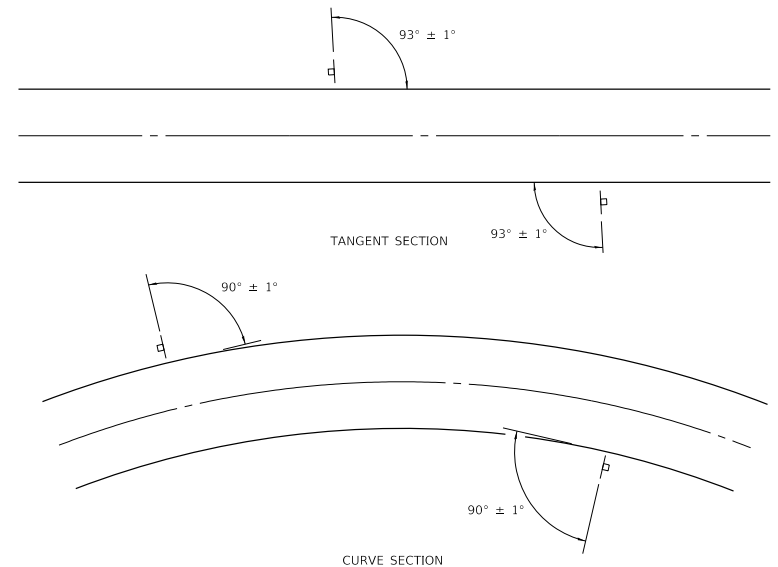
URBAN LOCATIONS

TYPICAL INSTALLATIONS

Signs in any area shall be erected to a uniform height above the edge of the pavement.



POST SPACING FOR NON-FREEWAY SIGN PANELS



GROUND MOUNT SIGN POSITIONING

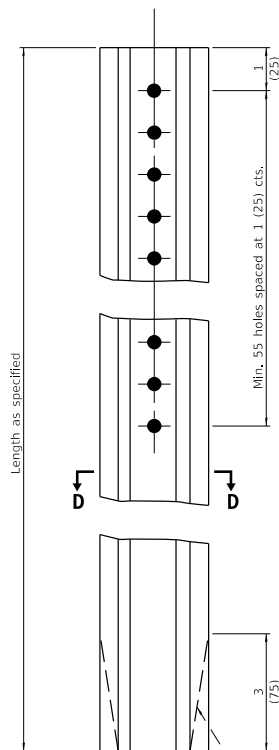
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2014
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2014
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-14	Added shoulders and slopes.
	Changed sign distances
	from roadway and shoulder.
1-1-12	Rev. sign elev. for multilane
	hwy's. Revlsd sign elev. and
	dist. to curb for rural loc.

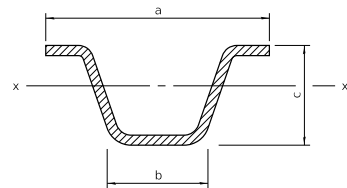
SIGN PANEL ERECTION DETAILS

STANDARD 720006-04

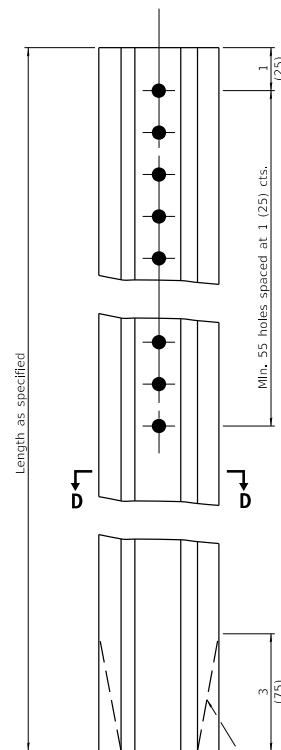


TYPE A

Taper optional

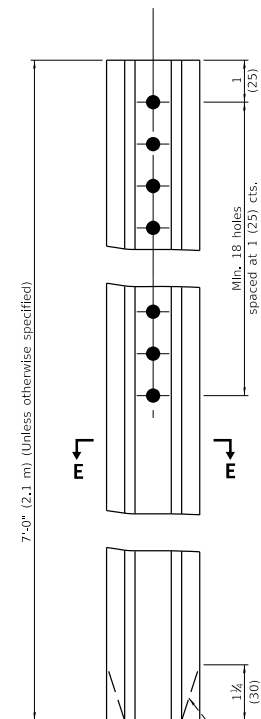


SECTION D-D

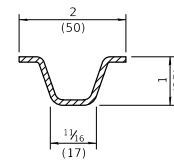


TYPE B

Taper optional



TYPE C



SECTION E-E

Steel - 1.12 lbs./ft. (1.67 kg/m)

Taper optional

		a	b	c	Sx-x in. ³ (mm ³)	lbs./ft. (kg/m)
TYPE A	Steel	3/8 (78)	1/8 (32)	1/8 (37)	0.223 (3.654)	2.00 (2.98)
	Aluminum	3/8 (89)	1/8 (41)	1/8 (48)	0.435 (7.128)	0.90 (1.34)
TYPE B	Steel	3/8 (81)	1/8 (32)	1/8 (38)	0.341 (5.588)	3.00 (4.46)
	Aluminum	4/8 (118)	2/8 (57)	2/8 (60)	0.888 (14.552)	1.30 (1.93)

GENERAL NOTES

Dimensions shown for cross sections are minimum.

All holes are 3/8 (10).

Sx-x is the minimum section modulus about the x-x axis of the post as shown. For posts in which holes are punched or drilled for more than half their length, Sx-x shall be computed for the net section.

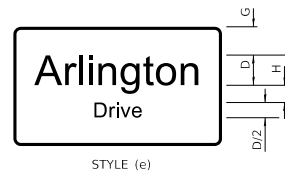
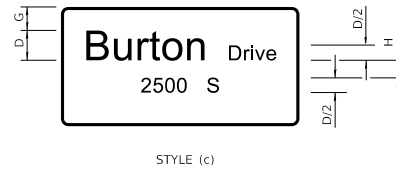
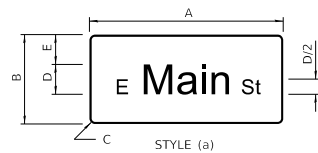
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to
	English (metric).
1-1-97	Renum. Standard 2350-4.

**METAL POSTS FOR SIGNS,
MARKERS & DELINEATORS**

STANDARD 720011-01

Illinois Department of Transportation	
PASSED January 1, 2009 ENGINEER OF POLICY AND PROCEDURES APPROVED January 1, 2009 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-97

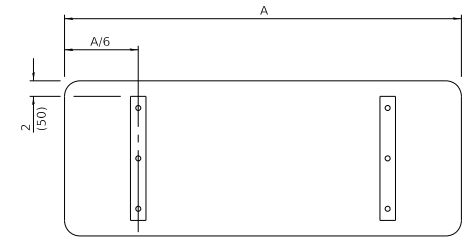


When road classification only is on the second line, it should not be abbreviated.

TYPICAL SIGN STYLES

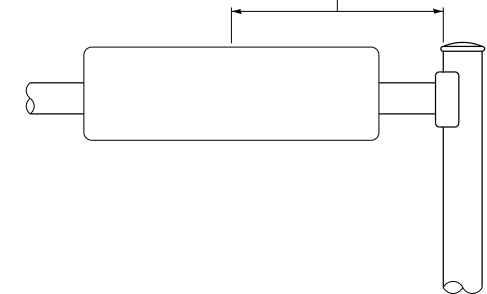
SIGN STYLE	DIMENSIONS								LETTER SIZE UC/LC PRIMARY			BORDER
	A	B	C	D	E	F	G	H	1	2	*	
a,b,d	Var.	12 (300)	1½ (40)	6 (150)	3 (75)	-	-	-	6/4½ (150/115)	-	-	¾ (10)
	Var.	18 (450)	1½ (40)	8 (200)	5 (125)	-	-	-	8/6 (200/150)	-	-	¾ (15)
	Var.	24 (600)	1½ (40)	10 (250)	7 (175)	-	-	-	10/7½ (250/190)	-	-	¾ (15)
	Var.	30 (750)	1½ (45)	12 (300)	9 (225)	-	-	-	12/9 (400/300)	-	-	¾ (20)
c,e	Var.	24 (600)	1½ (40)	6 (150)	-	-	5½ (140)	4 (100)	6/4½ (150/115)	-	3 (75)	¾ (15)
	Var.	30 (750)	1½ (45)	8 (200)	-	-	7 (175)	4½ (115)	8/6 (200/150)	-	4 (100)	¾ (20)
	Var.	36 (900)	2½ (60)	10 (250)	-	-	7½ (190)	6 (150)	10/7½ (250/190)	-	5 (125)	¾ (20)
	Var.	42 (1050)	3 (75)	12 (300)	-	-	8½ (215)	7 (175)	12/9 (400/300)	-	6 (150)	1 (25)
f	Var.	24 (600)	1½ (40)	6 (150)	4 (100)	4 (100)	-	-	6/4½ (150/115)	6/4½ (150/115)	-	¾ (15)
	Var.	30 (750)	1½ (45)	8 (200)	4½ (115)	5 (125)	-	-	8/6 (200/150)	8/6 (200/150)	-	¾ (20)
	Var.	42 (1050)	3 (75)	10 (250)	7½ (190)	7 (175)	-	-	10/7½ (250/190)	10/7½ (250/190)	-	1 (25)
	Var.	48 (1200)	3 (75)	12 (300)	7½ (190)	8 (200)	-	-	12/9 (400/300)	12/9 (400/300)	-	1 (25)

* Supplemental Messages



SUPPORTING CHANNELS

8' (2.4 m) max. for mastarms 16' (4.9 m) through 55' (16.8 m), 18' (5.5 m) max. for mastarms 56' (17.1 m) through 75' (22.9 m) to mid-point of sign panel or blankout sign.



MOUNTING LOCATION

GENERAL NOTES

All signs shall have a white reflectorized legend and border on a green reflectorized background.

The sign panels shall be mounted as shown on Standard 720001 or as specified in the plans.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	MAST ARM MOUNTED STREET NAME SIGNS
1-1-18	Revised MOUNTING LOCATION detail.	
1-1-12	Revised table and lettering to upper/lower case per current MUTCD.	STANDARD 720016-04

Illinois Department of Transportation

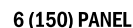
PASSED January 1, 2018

ENGINEER OF OPERATIONS

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-17



(Color shall match sign facematerial. To be riveted to sign panel at 24 (600) O.C.)

DATE	REVISIONS
1-1-09	Added aluminum clip.
	Switched units to
	English (metric).
1-1-03	Revised stainless steel
	clip design, and
	minor changes.

SIGN PANELS

EXTRUDED ALUMINUM TYPE

(Sheet 1 of 2)

STANDARD 720021-02

SIGN PANEL ATTACHMENT TO WOOD POST

ELEVATION VIEW

PLAN VIEW

STAINLESS STEEL CLIP

SECTION D-D

PLAN VIEW

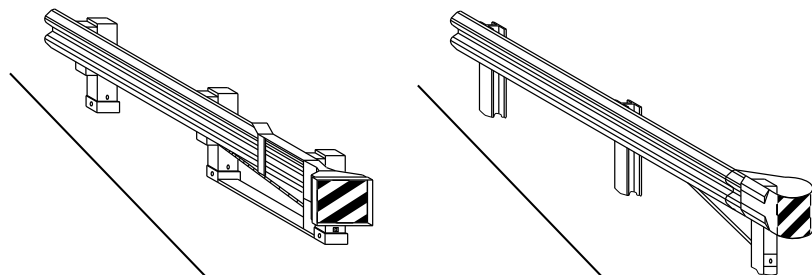
ELEVATION VIEW

ALUMINUM CLIP

STAINLESS STEEL CLIP
NUT, BOLT AND WASHER ASSEMBLY

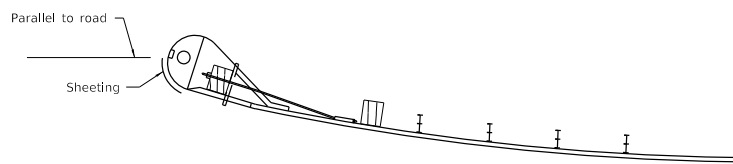
END VIEW

DETAIL B
(Enlarged detail
of serrations)

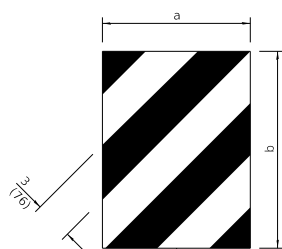


CASE I

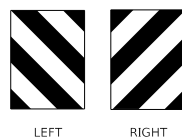
CASE II



SHEETING POSITION: CASE II



Alternating black and yellow stripes.



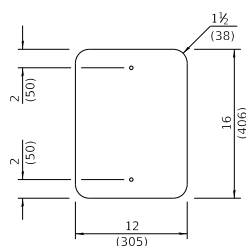
DIMENSION	CASE I	CASE II
a	*	18 (450)
b	*	16 (406)

DIRECT APPLIED

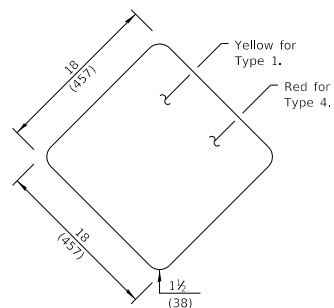
TERMINAL MARKER DETAILS

Color: Black / Yellow reflectorized

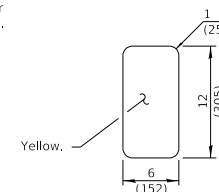
* The width and height (a, b) of the terminal marker shall be within approximately 1 (25) of the outer edge of the terminal end.



POST MOUNTED

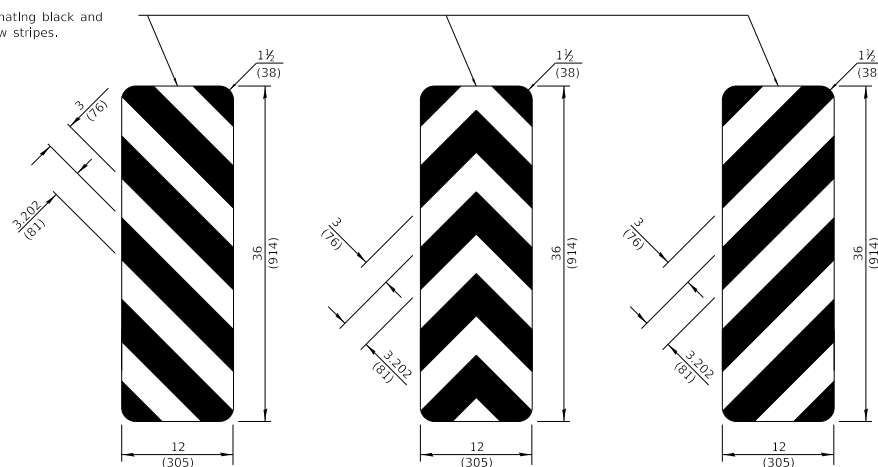


TYPE 1 OR TYPE 4



TYPE 2

Alternating black and yellow stripes.



TYPE 3

OBJECT MARKER DETAILS

GENERAL NOTES

See detail on Standard 729001 for mounting markers to posts.

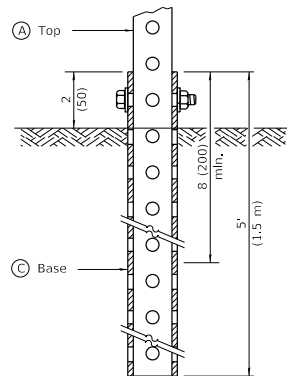
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-17	Omitted minimum reflective area requirement for terminal marker.
4-1-16	Renumbered standard from 635006.

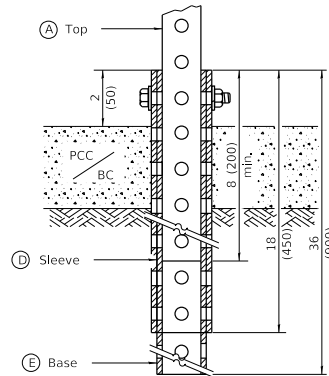
**OBJECT AND
TERMINAL MARKERS**

STANDARD 725001-01

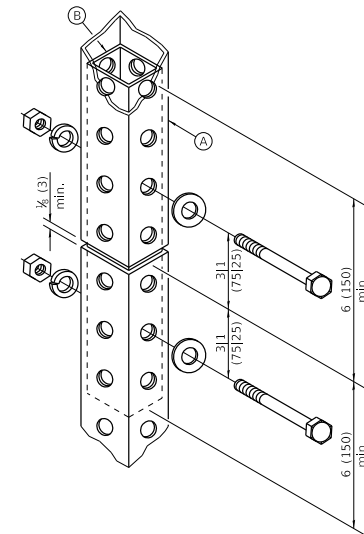
Illinois Department of Transportation	
PASSED	January 1, 2017
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2017
ENGINEER OF DESIGN AND ENVIRONMENT	



GROUND MOUNT DETAIL



PAVEMENT MOUNT DETAIL



SPLICE DETAIL

(A)	2 x 2 x var. (51 x 51 var.)
(B)	1 1/4 x 1 1/4 x 12 (44 x 44 x 300)
(C)	2 1/4 x 2 1/4 x 60 (57 x 57 x 1500)
(D)	2 1/2 x 2 1/2 x 18 (64 x 64 x 450)
(E)	2 1/2 x 2 1/2 x 36 (57 x 57 x 900)

GENERAL NOTES

All bolts 3/8" (M10) hex head zinc or cadmium plated.

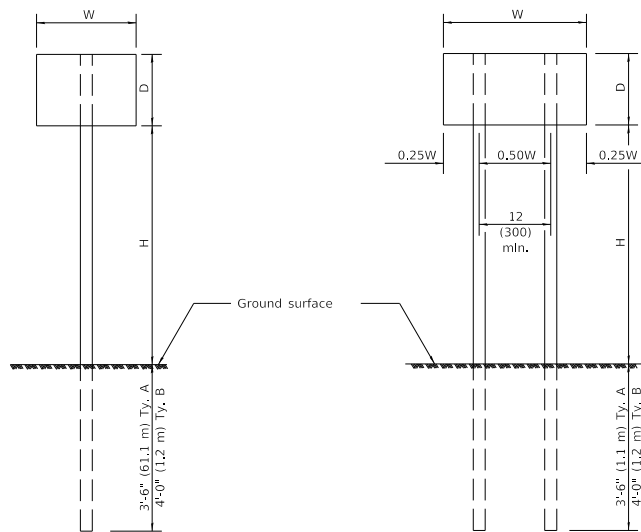
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-07	New Standard. Used to be part of Standard 720006.

TELESCOPING STEEL SIGN SUPPORT

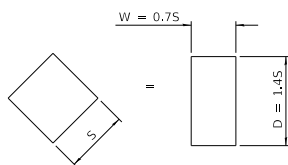
STANDARD 728001-01

Illinois Department of Transportation	
PASSED <u>January 1, 2009</u> ENGINEER OF OPERATIONS	ISSUED 1-1-07
APPROVED <u>January 1, 2009</u> ENGINEER OF DESIGN AND ENVIRONMENT	



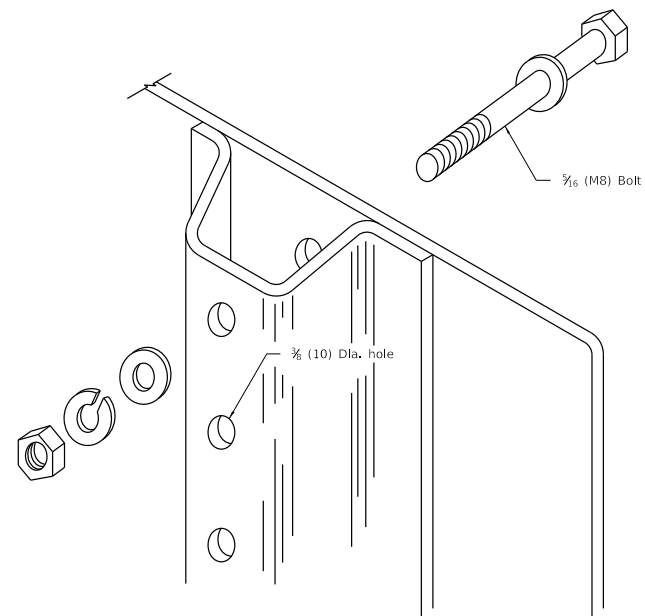
ONE POST INSTALLATION

TWO POST INSTALLATION



For diamond shaped sign with side S as shown, use required post size for a sign with $W = 0.75$ and $D = 1.45$.

SIGN DEPTH (D)	H	NO. AND TYPE OF POST FOR SIGN WIDTH (W)				
		12 (300)	18 (450)	24 (600)	30 (750)	36 (900)
18 (450)	5'-0" (1.5 m)	A	A	A	A	A
	5'-6" (1.7 m)	A	A	A	A	A
	6'-0" (1.8 m)	A	A	A	A	B
	6'-6" (2.0 m)	A	A	A	A	B
	7'-0" (2.1 m)	A	A	A	A	B
	7'-6" (2.3 m)	A	A	A	A	B
	8'-0" (2.4 m)	A	A	A	A	B
	8'-6" (2.6 m)	A	A	A	B	B
24 (600)	5'-0" (1.5 m)	A	A	A	A	B
	5'-6" (1.7 m)	A	A	A	A	B
	6'-0" (1.8 m)	A	A	A	B	B
	6'-6" (2.0 m)	A	A	A	B	B
	7'-0" (2.1 m)	A	A	A	B	B
	7'-6" (2.3 m)	A	A	A	B	B
	8'-0" (2.4 m)	A	A	A	B	2A
	8'-6" (2.6 m)	A	A	B	B	2A
30 (750)	5'-0" (1.5 m)	A	A	A	B	B
	5'-6" (1.7 m)	A	A	A	B	2A
	6'-0" (1.8 m)	A	A	A	B	2A
	6'-6" (2.0 m)	A	A	A	B	2A
	7'-0" (2.1 m)	A	A	B	B	2A
	7'-6" (2.3 m)	A	A	B	B	2A
	8'-0" (2.4 m)	A	A	B	B	2A
	8'-6" (2.6 m)	A	A	B	2A	2A
36 (900)	5'-0" (1.5 m)	A	A	B	B	2A
	5'-6" (1.7 m)	A	A	B	B	2A
	6'-0" (1.8 m)	A	A	B	B	2A
	6'-6" (2.0 m)	A	A	B	2A	2A
	7'-0" (2.1 m)	A	A	B	2A	2A
	7'-6" (2.3 m)	A	A	B	2A	2A
	8'-0" (2.4 m)	A	B	B	2A	2A
	8'-6" (2.6 m)	A	B	B	2A	2B
4'-0" (1.2 m)	5'-0" (1.5 m)	A	A	B	2A	2A
	5'-6" (1.7 m)	A	B	B	2A	2A
	6'-0" (1.8 m)	A	B	B	2A	2A
	6'-6" (2.0 m)	A	B	2A	2A	2B
	7'-0" (2.1 m)	A	B	2A	2A	2B
	7'-6" (2.3 m)	A	B	2A	2B	2B
	8'-0" (2.4 m)	A	B	2A	2B	2B
	8'-6" (2.6 m)	B	B	2B	2B	2B
9'-0" (2.7 m)	5'-0" (1.5 m)	A	A	B	2A	2A
	5'-6" (1.7 m)	A	A	B	2A	2A
	6'-0" (1.8 m)	A	A	B	2A	2A
	6'-6" (2.0 m)	A	A	B	2A	2A
	7'-0" (2.1 m)	A	A	B	2A	2A
	7'-6" (2.3 m)	A	A	B	2A	2A
	8'-0" (2.4 m)	A	A	B	2A	2A
	8'-6" (2.6 m)	A	A	B	2A	2A



DETAIL OF MOUNTING SIGN TO POST

NOTE: Minimum of 2 bolts per post required.

GENERAL NOTES

DESIGN: Current AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

LOADING: for 60 mph (95 km/h) wind velocity with 30% gust factor, normal to sign.

SOIL PRESSURE: Minimum allowable soil pressure 1.25 tsf (120 kPa).

See Standard 720011 for details of Types A and B posts.

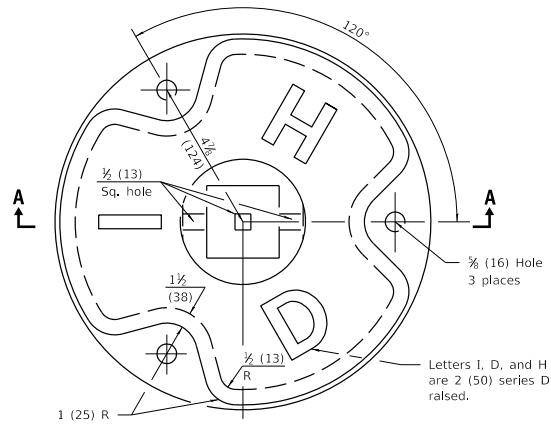
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-97	Renum. Standard 2363-2.

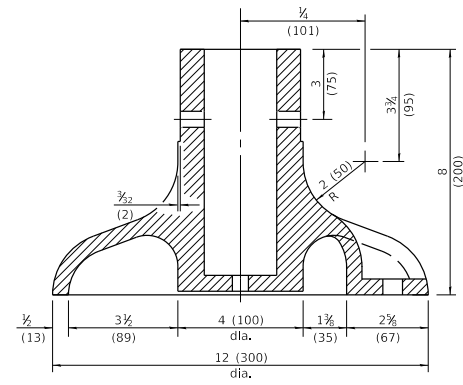
APPLICATIONS OF TYPES A & B METAL POSTS (FOR SIGNS & MARKERS)

STANDARD 729001-01

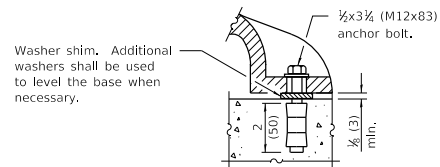
Illinois Department of Transportation	
PASSED January 1, 2009 ENGINEER OF POLICY AND PROCEDURES APPROVED January 1, 2009 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-97



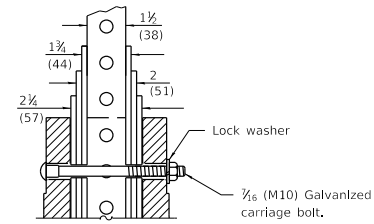
PLAN



SECTION A-A



ANCHOR BOLT DETAIL



POST ASSEMBLY DETAIL

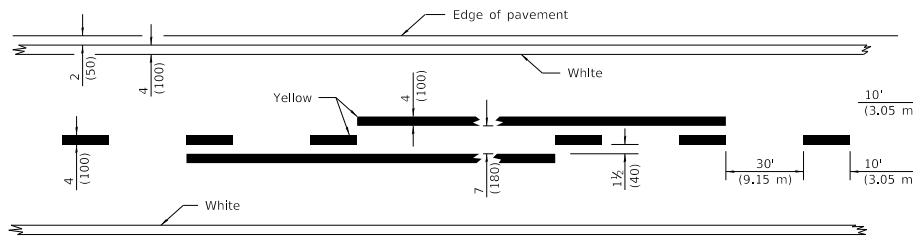
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

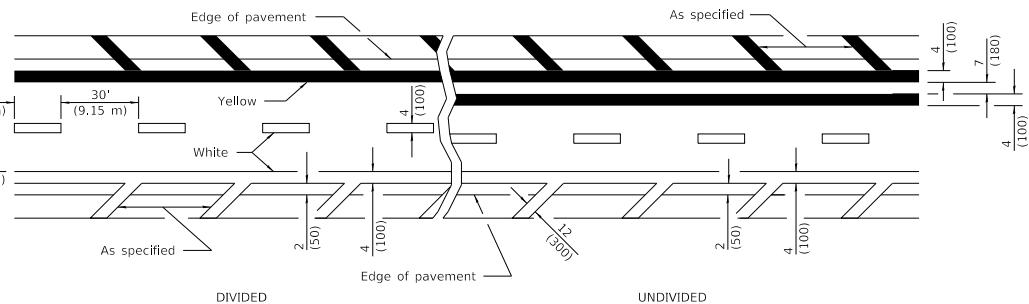
DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-07	New Standard, Used to be part of Standard 720006.

BASE FOR TELESCOPING STEEL SIGN SUPPORT

STANDARD 731001-01

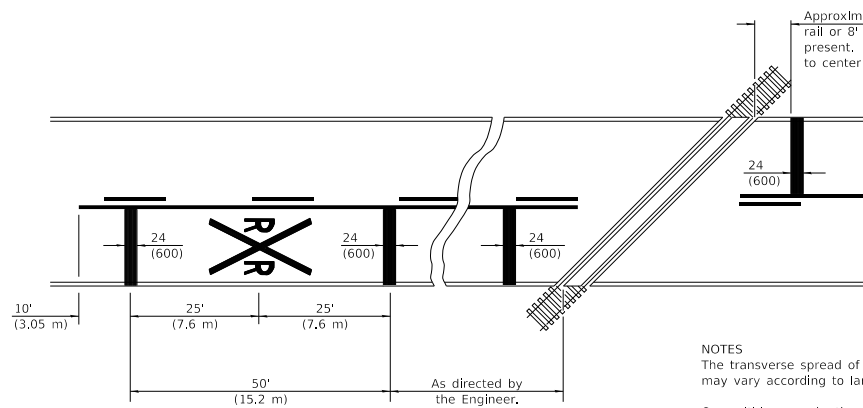


2 LANE



MULTI LANE

LANE AND EDGE LINES

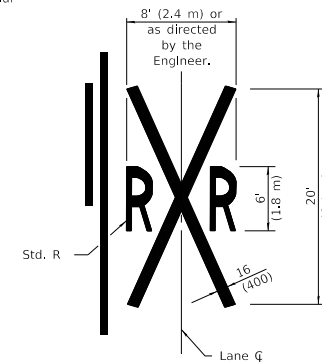


NOTES

The transverse spread of the "X" may vary according to lane width.

On multi-lane roads, the stop lines shall extend across all approach lanes and separate RXR symbols shall be placed adjacent to each other in each lane.

When the pavement marking symbol is used, a portion of the symbol should be located directly adjacent to the Advance Warning Sign (W10-1) as placed by Table 2C-4, Condition B of the MUTCD.



**PAVEMENT MARKINGS AT
RAILROAD-HIGHWAY GRADE CROSSING**

All dimensions are in inches (millimeters) unless otherwise shown.

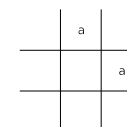
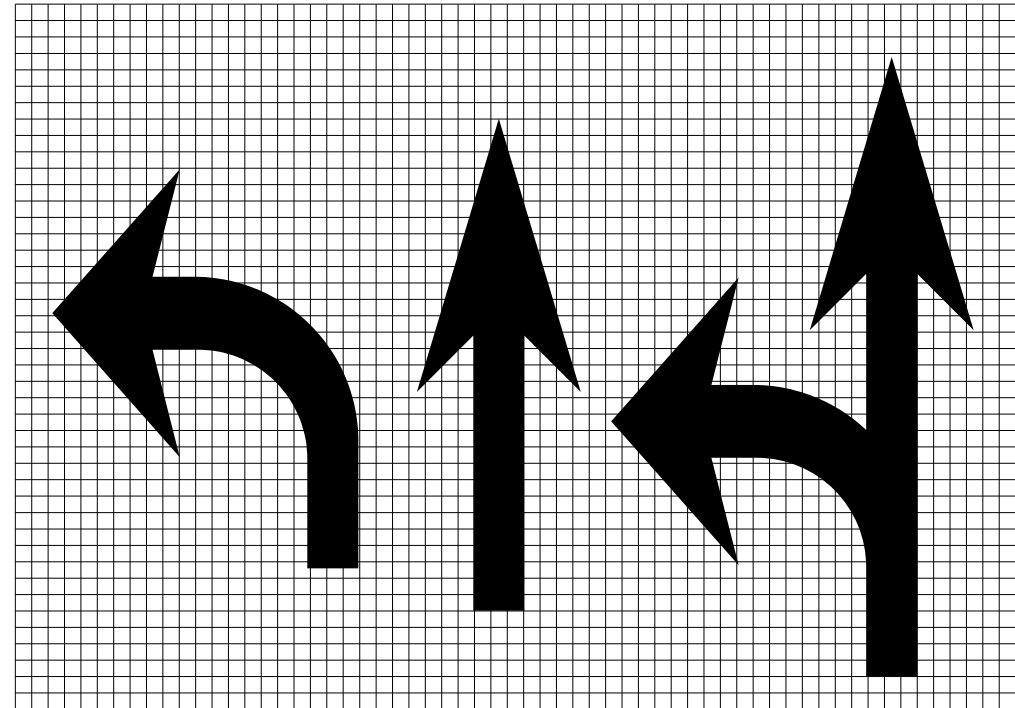
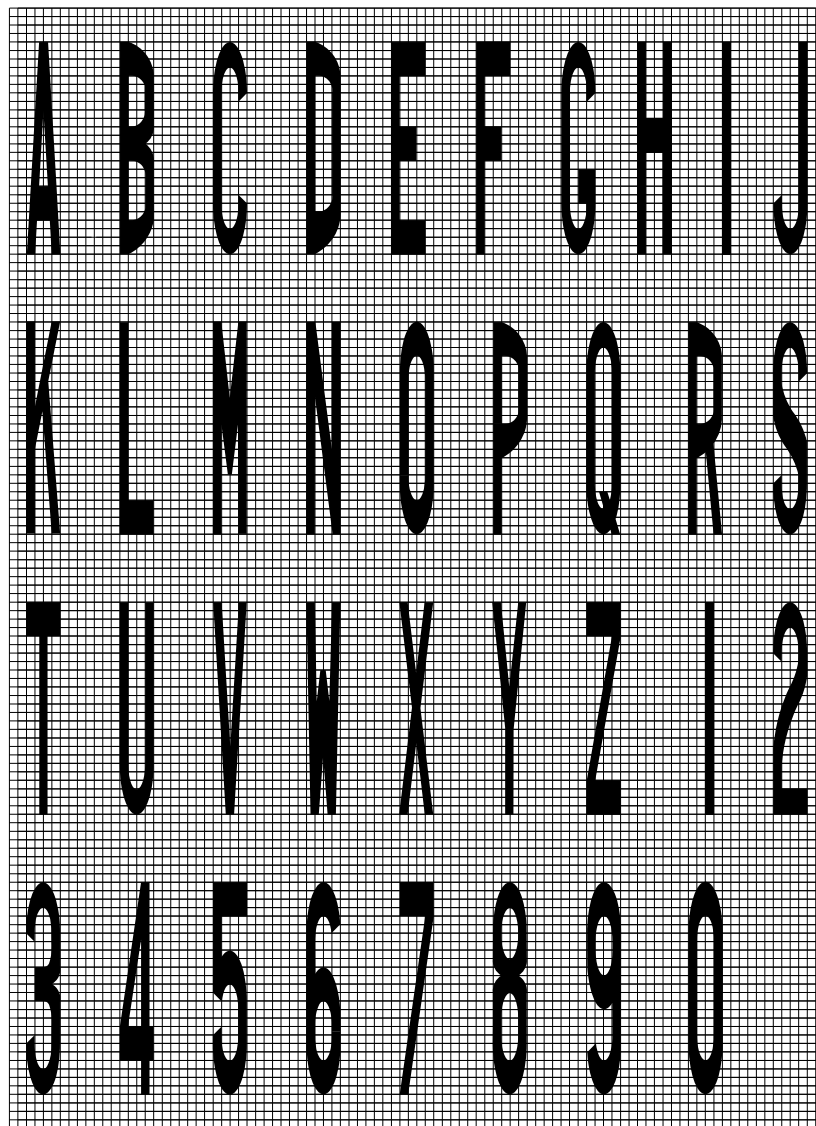
DATE	REVISIONS
1-1-15	Added symbols. Revised bike symbol. Revised note for stop line at RR crossing.
1-1-14	Added bike symbol. Renamed 'LANE DROP ARROW' detail to 'LANE-REDUCTION ARROW'.

**TYPICAL PAVEMENT
MARKINGS**

(Sheet 1 of 3)

STANDARD 780001-05

Illinois Department of Transportation	
PASSED January 1, 2015 ENGINEER OF OPERATIONS	ISSUED 1-1-17
APPROVED January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	



Legend Height	Arrow Size	a
6' (1.8 m)	Small	2.9 (74)
8' (2.4 m)	Large	3.8 (96)

The space between adjacent letters or numerals should be approximately 3 (75) for 6' (1.8 m) legend and 4 (100) for 8' (2.4 m) legend.

LETTER AND ARROW GRID SCALE

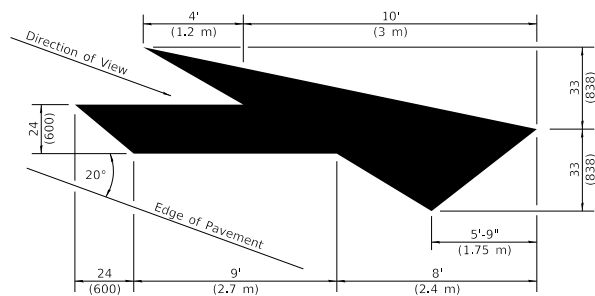
Illinois Department of Transportation	
PASSED	January 1, 2015
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-17

TYPICAL PAVEMENT MARKINGS

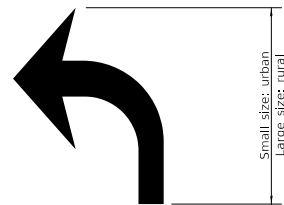
(Sheet 2 of 3)

STANDARD 780001-05



LANE-REDUCTION ARROW

Right lane-reduction arrow shown.
Use mirror image for left lane.

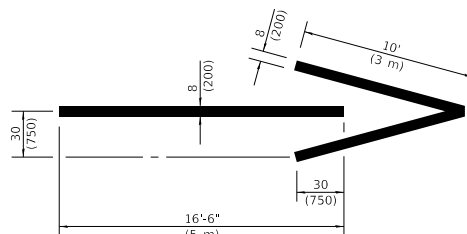


20' (6 m): urban
50' (15 m): rural
(Between arrow
and word or
between words)

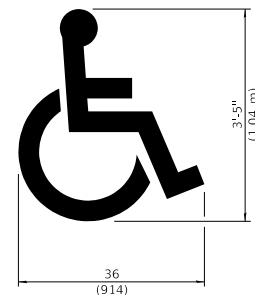
ONLY

6' (1.8 m): urban
8' (2.4 m): rural

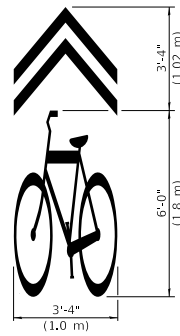
WORD AND ARROW LAYOUT



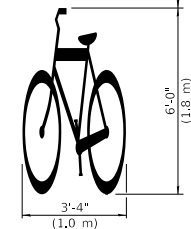
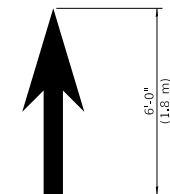
WRONG WAY ARROW



INTERNATIONAL SYMBOL OF ACCESSIBILITY



SHARED LANE SYMBOL



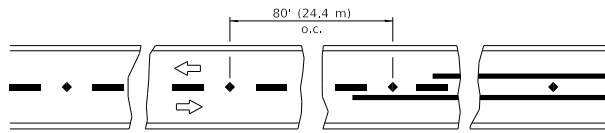
BIKE SYMBOL (Arrow is optional.)

TYPICAL PAVEMENT MARKINGS

(Sheet 3 of 3)

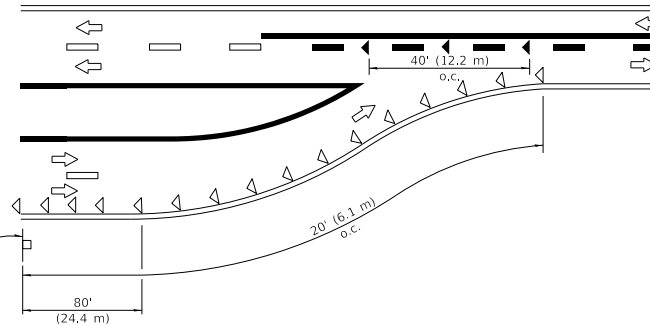
STANDARD 780001-05

Illinois Department of Transportation	
PASSED	January 1, 2015
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

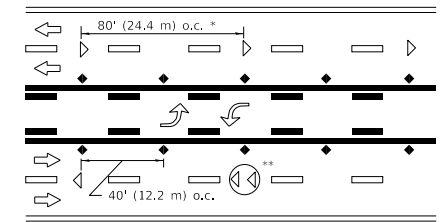


Reduce to 40' (12.2 m) o.c. on curves with posted or advisory speeds of 45 mph (70 km/h) or less.

TWO-LANE / TWO-WAY

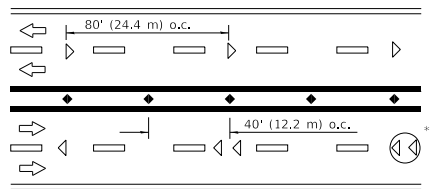


LANE REDUCTION TRANSITION



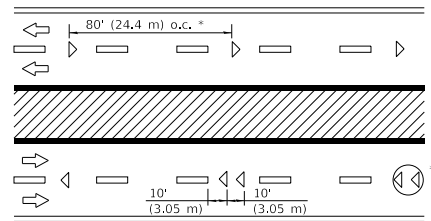
*,** See MULTI LANE DIVIDED detail for lane marker notes.

TWO-WAY LEFT TURN



*,** See MULTI LANE DIVIDED detail for lane marker notes.

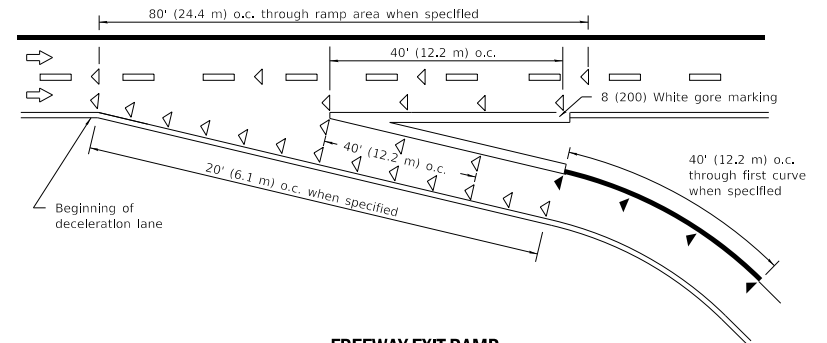
MULTI-LANE UNDIVIDED



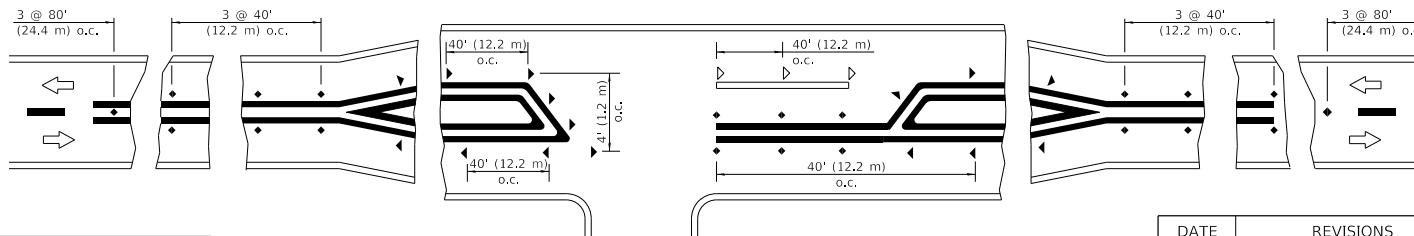
* Reduce to 40' (12.2 m) o.c. on curves where advisory speeds are 10 mph (15 km/h) lower than posted speeds.

** Where double lane line markers are specified, they shall be spaced as shown.

MULTI-LANE DIVIDED



FREEWAY EXIT RAMP



RURAL LEFT TURN

SYMBOLS

- Yellow stripe
- White stripe
- One-way amber marker
- One-way crystal marker
- Two-way amber marker

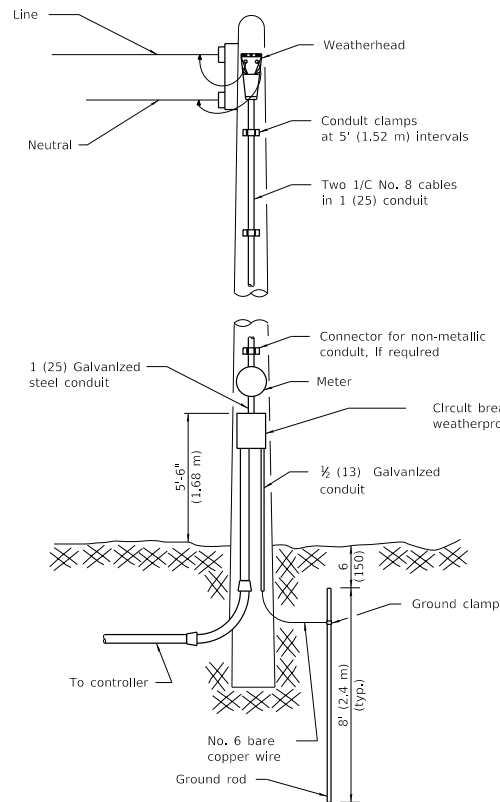
All dimensions are in inches (millimeters) unless otherwise shown.

TYPICAL APPLICATIONS RAISED REFLECTIVE PAVEMENT MARKERS

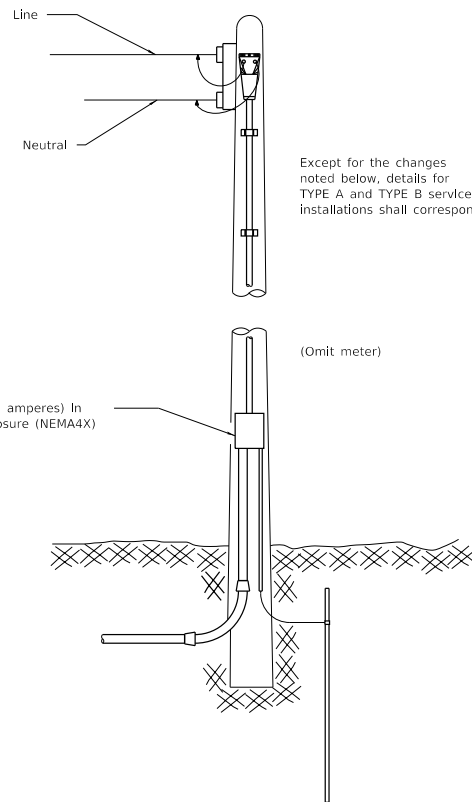
STANDARD 781001-04

Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF OPERATIONS	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

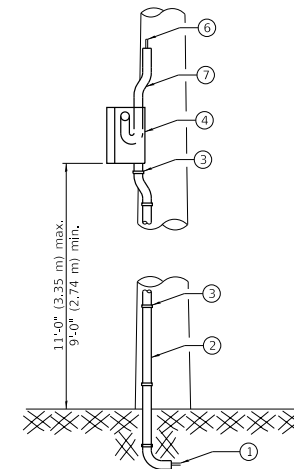
DATE	REVISIONS
4-1-16	Revised LANE ENDS sign
	W4-2 to agree with current MUTCD.
1-1-09	Switched units to English (metric).



TYPE A



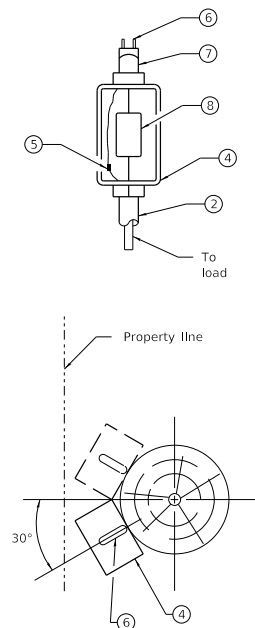
TYPE B



TYPE C

The following equipment is to be furnished and installed on the TYPE C Installation.

- ① Cable in conduit (electric cable, No. 6, 2/C except where otherwise specified)
- ② Galvanized steel conduit 1 1/4 (32) with bend
- ③ Galvanized conduit clamps
- ④ Aluminum weatherproof box with gasketed cover. Weatherproof box shall be installed facing the adjacent property line. (See diagram for alternate installation.)
- ⑤ Ground stud for neutral connection
- ⑥ Service cables
- ⑦ Offset weatherproof fitting
- ⑧ Circuit breaker



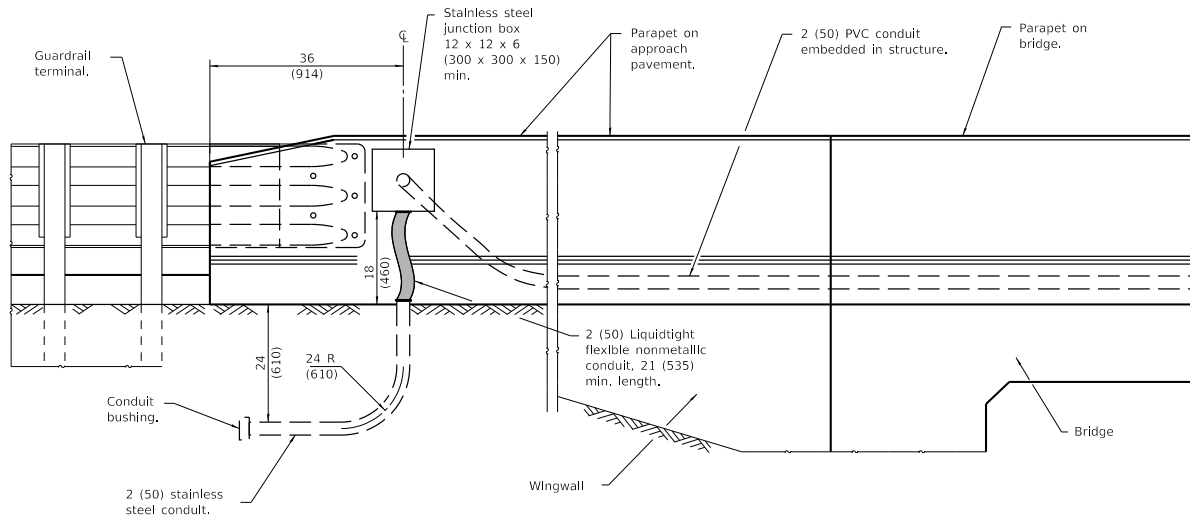
ALTERNATE INSTALLATION

(Installation when weatherproof box cannot be installed facing the adjacent property line.)

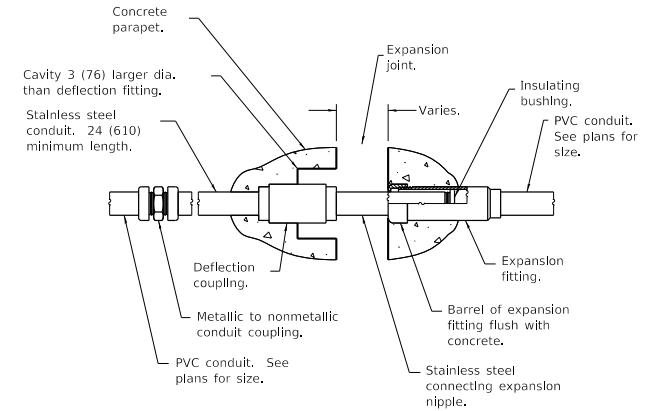
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

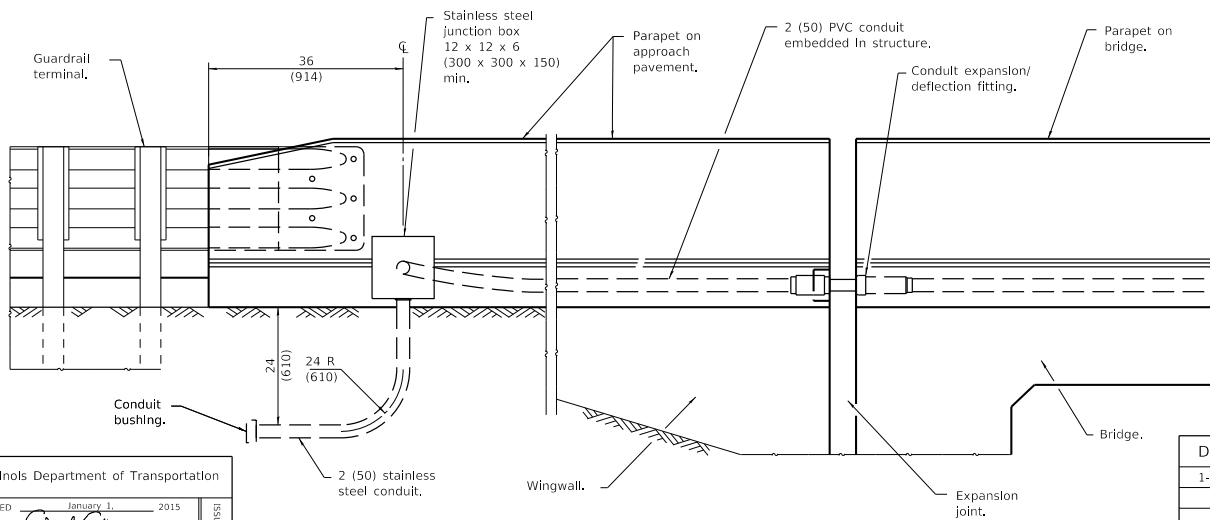
DATE	REVISIONS	ELECTRICAL SERVICE INSTALLATION DETAILS
1-1-09	Switched units to English (metric).	
1-1-02	Renum. Standard 2373-1.	
		STANDARD 805001-01



**INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH
PARAPET ON APPROACH PAVEMENT**



COMBINATION EXPANSION/ DEFLECTION FITTING



**JOINTED ABUTMENT WITH
PARAPET ON APPROACH PAVEMENT**

GENERAL NOTES

The barrel in the expansion fitting shall be fully embedded in the concrete on one side of the expansion joint. One half the length of the deflection fitting shall be embedded in the concrete on the other side of the expansion joint.

The Contractor shall install combination expansion deflection fittings at all bridge expansion joints.

With the approval of the Engineer, the Contractor may substitute two 12 x 12 x 6 (300 x 300 x 150) min. stainless steel junction boxes attached to back of wall and connected with liquidtight flexible nonmetallic conduit for all expansion joints.

All dimensions are in inches (millimeters) unless otherwise shown.

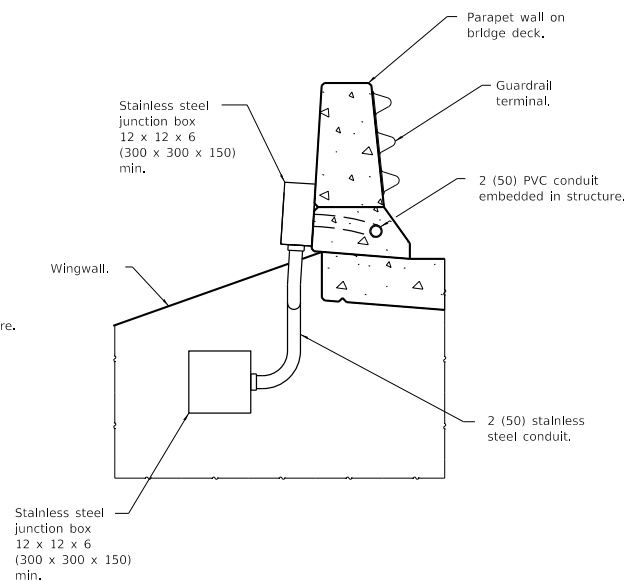
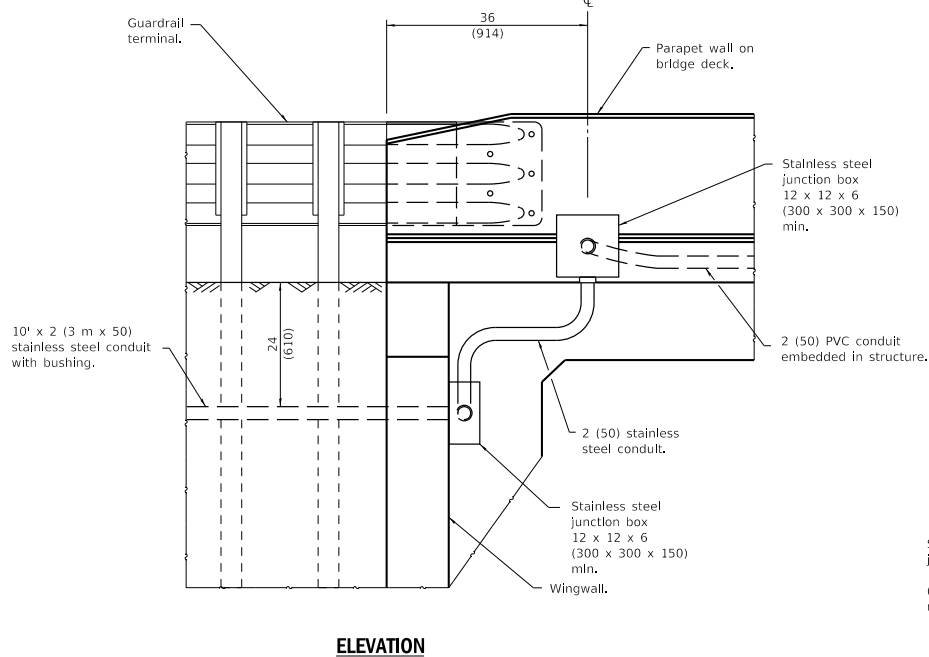
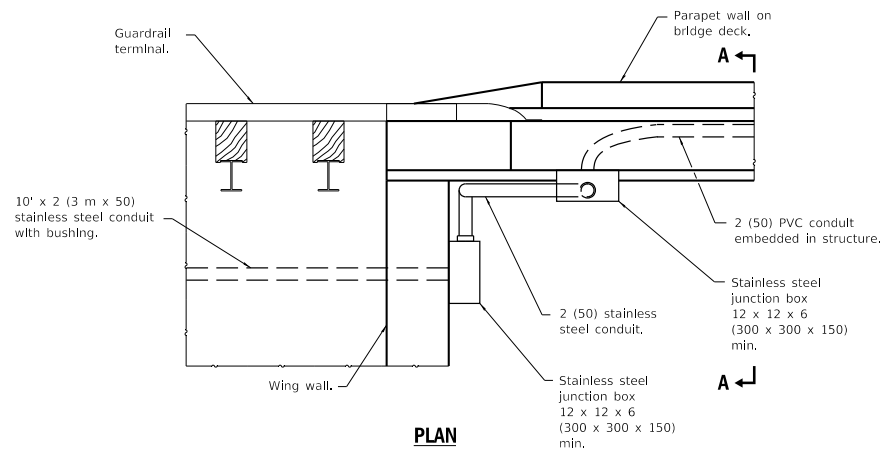
DATE	REVISIONS
1-1-15	New standard.

**RACEWAY EMBEDDED
IN STRUCTURE**

(Sheet 1 of 3)

STANDARD 812001

Illinois Department of Transportation	
APPROVED: <i>Charles G. Miller</i> ENGINEER OF POLICY AND PROCEDURES APPROVED: <i>Charles G. Miller</i> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED: 1-1-15



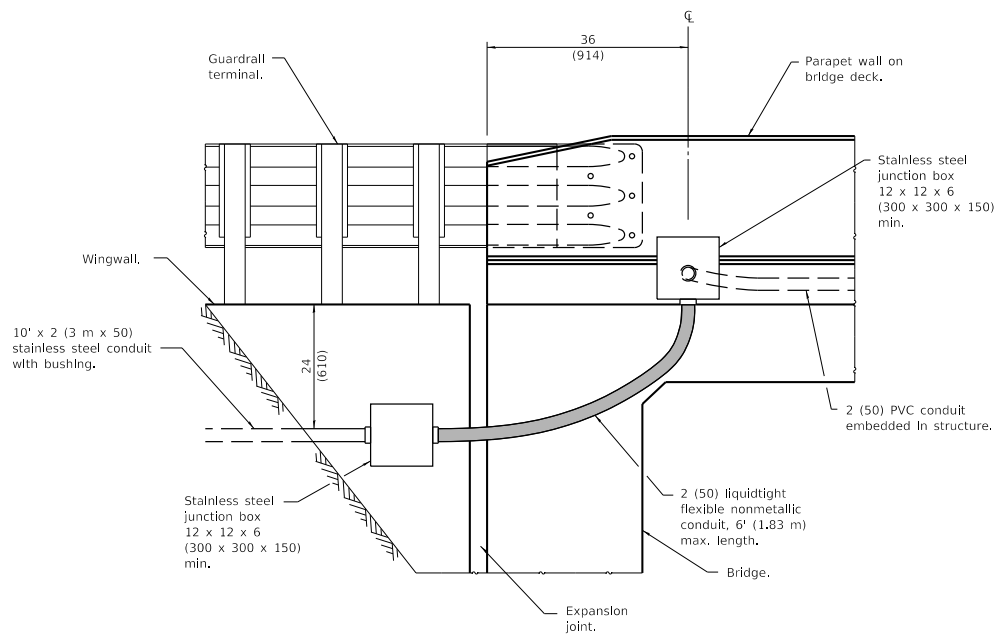
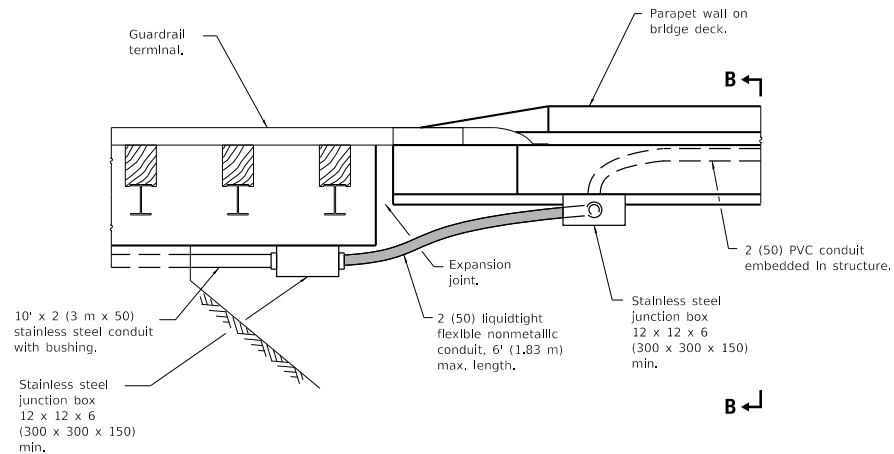
**INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH
PARAPET ENDING ON BRIDGE DECK**

**RACEWAY EMBEDDED
IN STRUCTURE**

(Sheet 2 of 3)

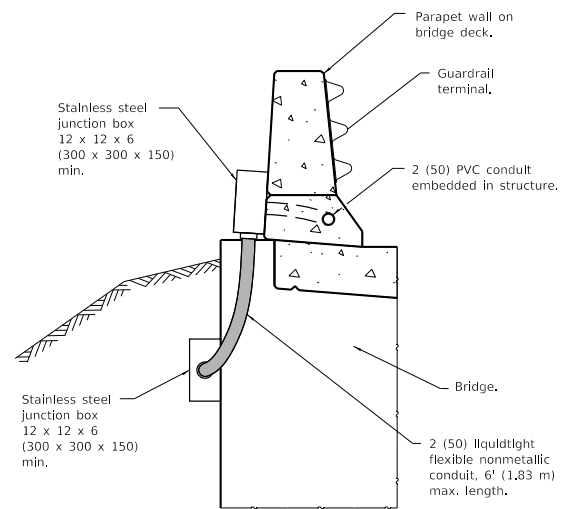
STANDARD 812001

Illinois Department of Transportation	
APPROVED: <i>Charles G. [Signature]</i> January 1, 2015 ENGINEER OF POLICY AND PROCEDURES APPROVED: <i>[Signature]</i> January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED: 11-1-11



ELEVATION

**JOINTED ABUTMENT WITH
PARAPET ENDING ON BRIDGE DECK**



VIEW B-B

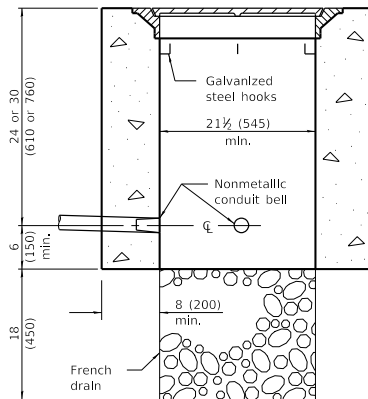
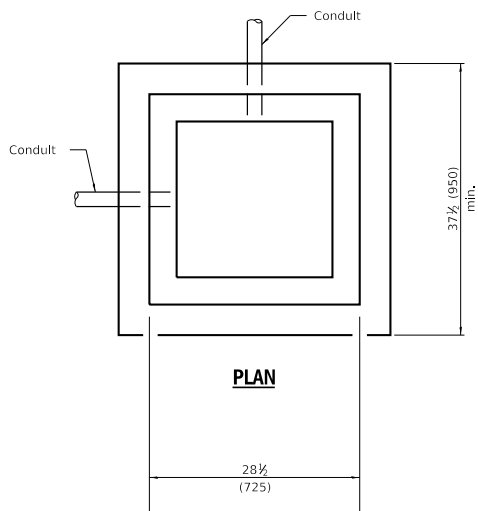
**RACEWAY EMBEDDED
IN STRUCTURE**

(Sheet 3 of 3)

STANDARD 812001

Illinois Department of Transportation	
APPROVED	January 1, 2015
ENGINEER OF POLICY AND PROCEDURES	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

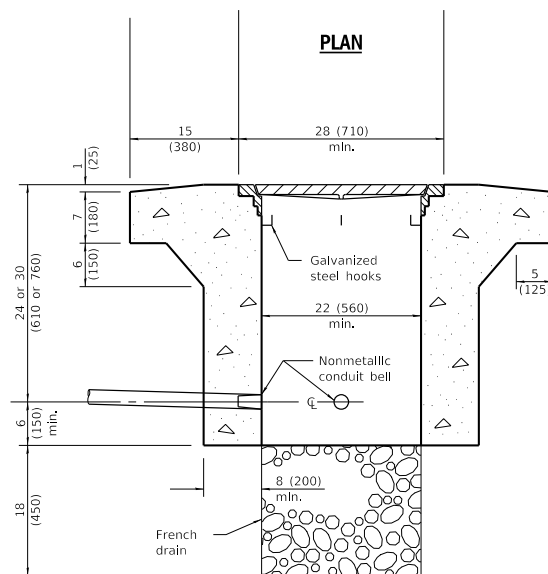
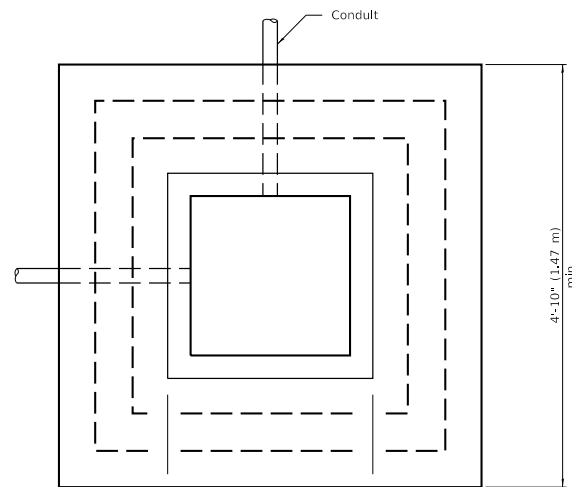
ISSUED 1-1-15



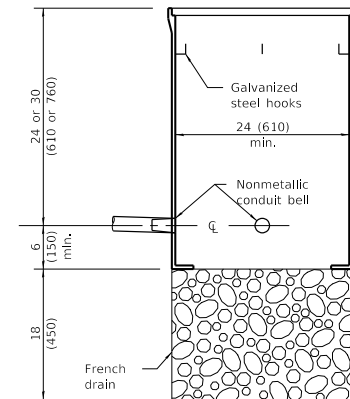
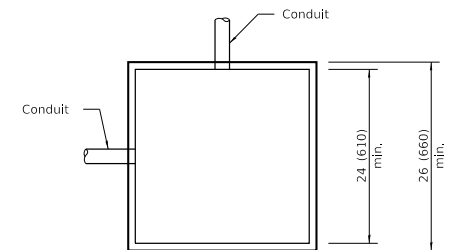
PORTLAND CEMENT CONCRETE

QUANTITIES

Depth	Concrete yd ³ (m ³)	
	Handhole	Heavy Duty Handhole
30 (762)	0.61 (0.47)	0.98 (0.75)
36 (914)	0.73 (0.56)	1.10 (0.84)



**PORTLAND CEMENT CONCRETE
HEAVY DUTY**

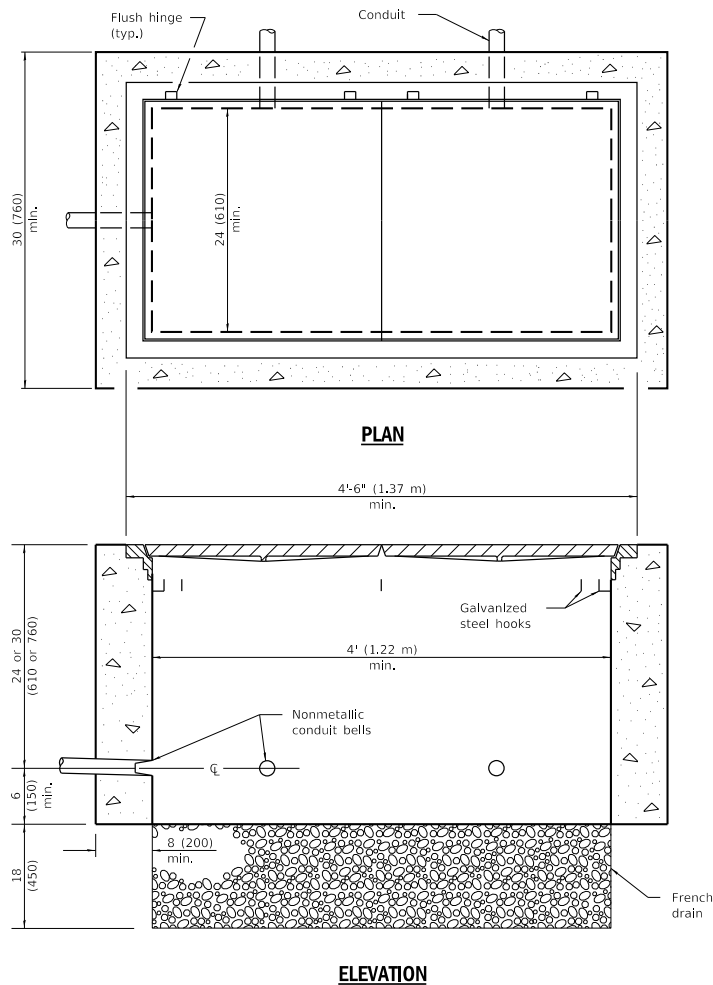


COMPOSITE CONCRETE

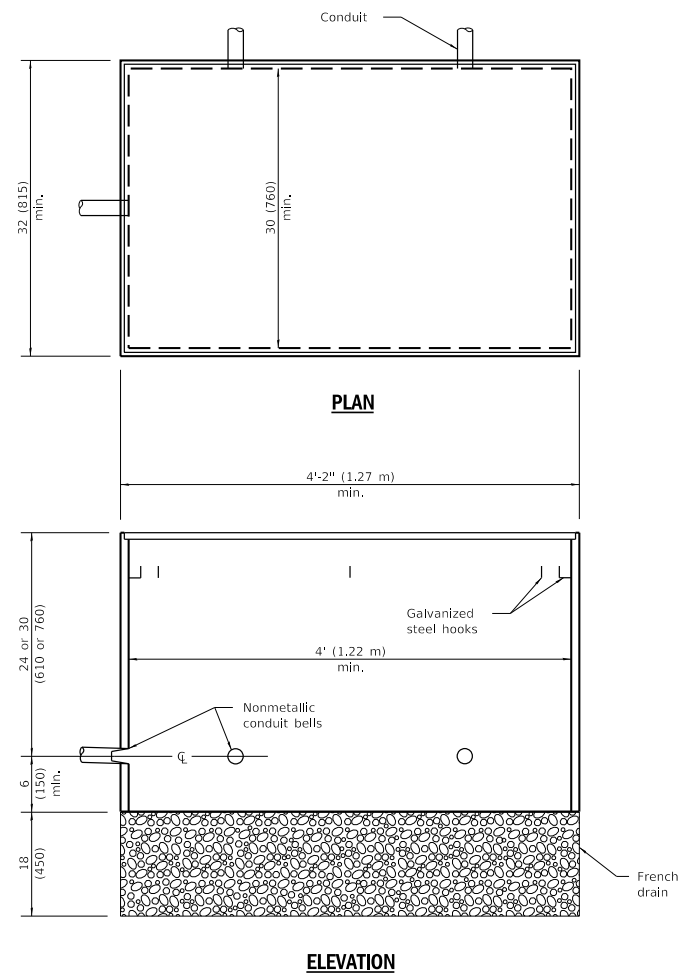
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation		ISSUED 1-1-17
PASSED	January 1, 2015	
ENGINEER OF OPERATIONS 		
APPROVED	January 1, 2015	
ENGINEER OF DESIGN AND ENVIRONMENT 		

DATE	REVISIONS	HANDHOLES
1-1-15	Corrected dimension on heavy duty handhole. Added concrete quantities table.	
1-1-09	Switched units to English (metric).	
		STANDARD 814001-03



PORTLAND CEMENT CONCRETE

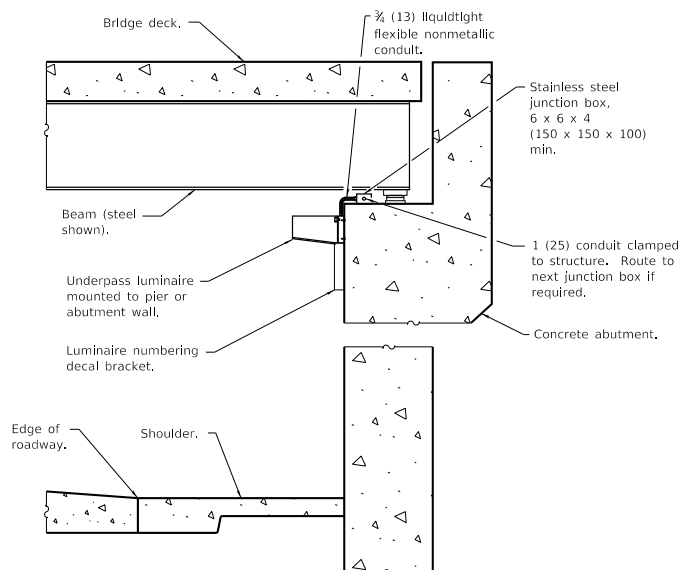


COMPOSITE CONCRETE

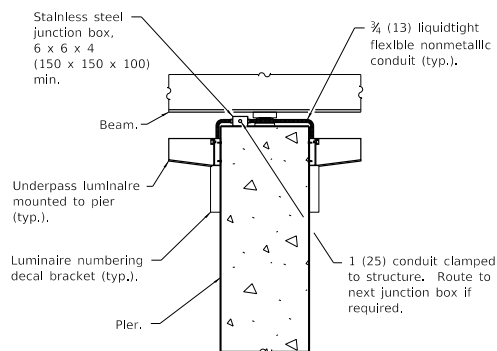
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS	DOUBLE HANDHOLES
1-1-09	Switched units to English (metric).	
1-1-07	Revised composite conc. handhole. Rem. weights of frames and covers.	STANDARD 814006-02

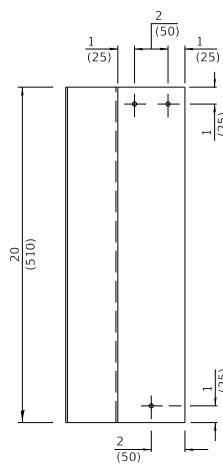
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	
155155	48-1-11 CHANGED



SECTION A-A

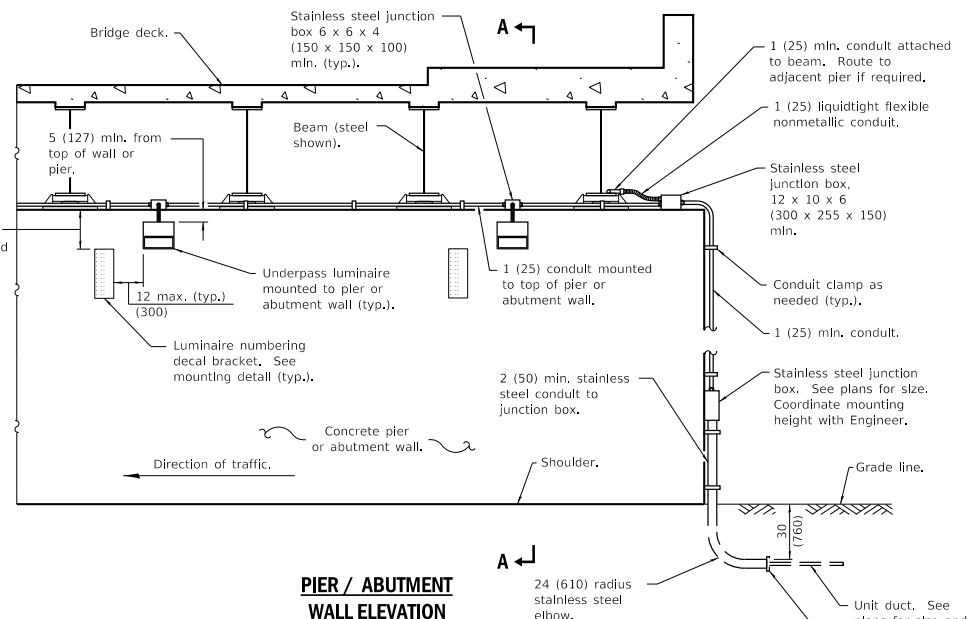


**CENTER PIER
DETAIL**

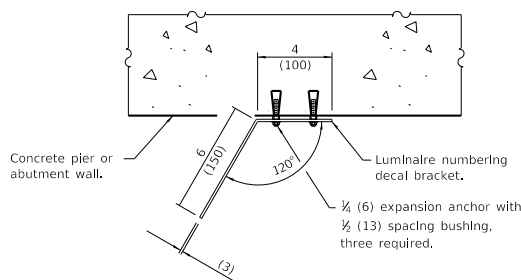


ELEVATION

**LUMINAIRE NUMBERING DECAL
BRACKET MOUNTING DETAIL**



**PIER / ABUTMENT
WALL ELEVATION**



TOP VIEW



**CONDUIT BEAM
CLAMP**



**CONDUIT
CLAMP**

GENERAL NOTES

See plans for underpass luminaire locations.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaire shown routed from underground. Branch circuits may be routed from bridge parapet above.

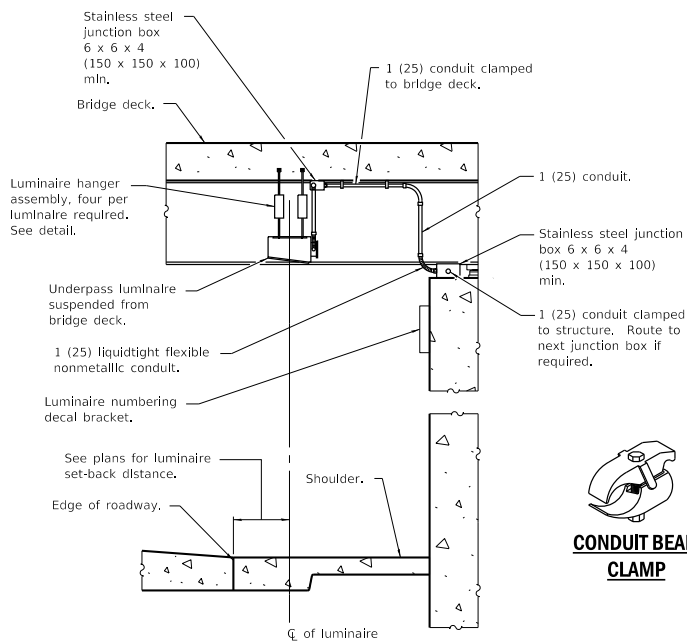
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
4-1-16	New standard.

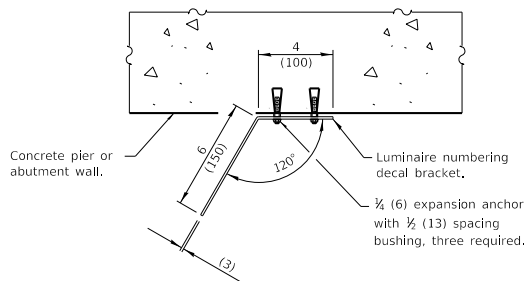
**UNDERPASS LIGHTING
WALL MOUNT**

STANDARD 821001

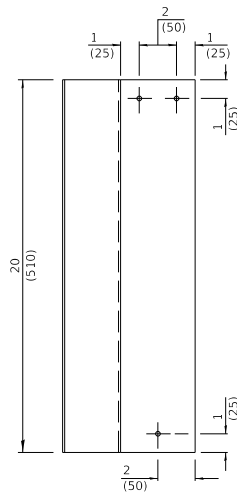
Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF PRELIMINARY ENGINEERING APPROVED: April 1, 2016	
ENGINEER OF DESIGN AND ENVIRONMENT	



SECTION A-A

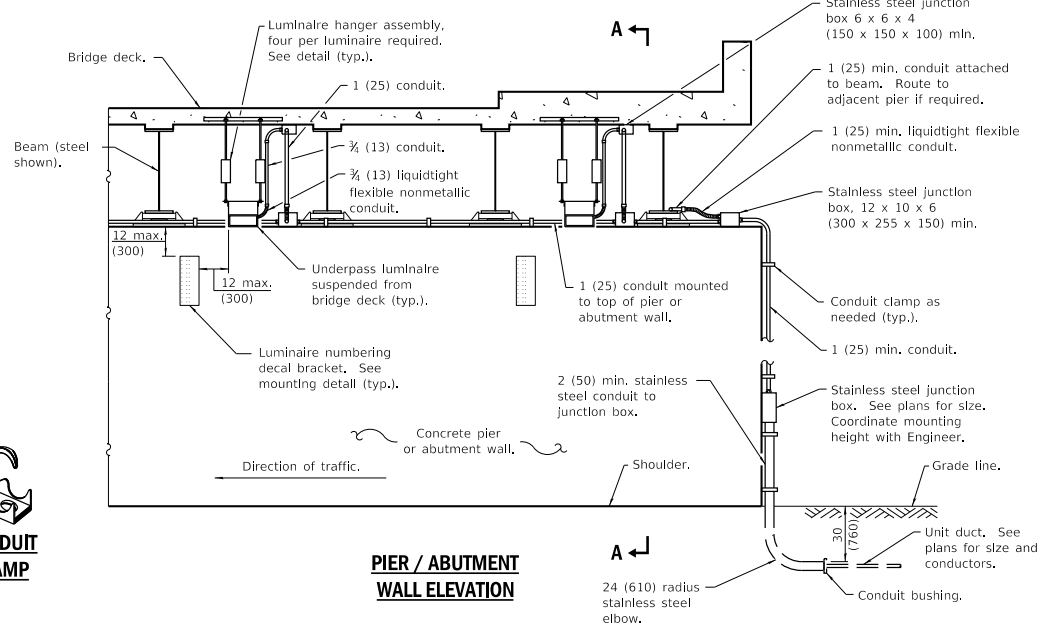


TOP VIEW

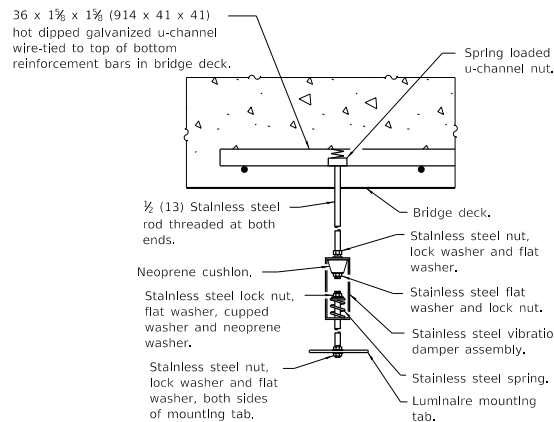


ELEVATION

**LUMINAIRE NUMBERING DECAL
BRACKET MOUNTING DETAIL**



**PIER / ABUTMENT
WALL ELEVATION**



**LUMINAIRE HANGER
ASSEMBLY DETAIL**

GENERAL NOTES

See plans for underpass luminaire locations.

Underpass luminaires shall be centered between beams unless otherwise directed by the Engineer.

Optics of underpass luminaires shall be installed 1 (25) above the bottom of the beams with no parts of the luminaire or attached conduit below the beams.

Rigid conduit may be used in lieu of flexible conduit.

Stainless steel conduit shall be used beneath any openings in the bridge deck.

Branch circuits to luminaires shown routed from underground. Branch circuits may also be routed from bridge parapet above.

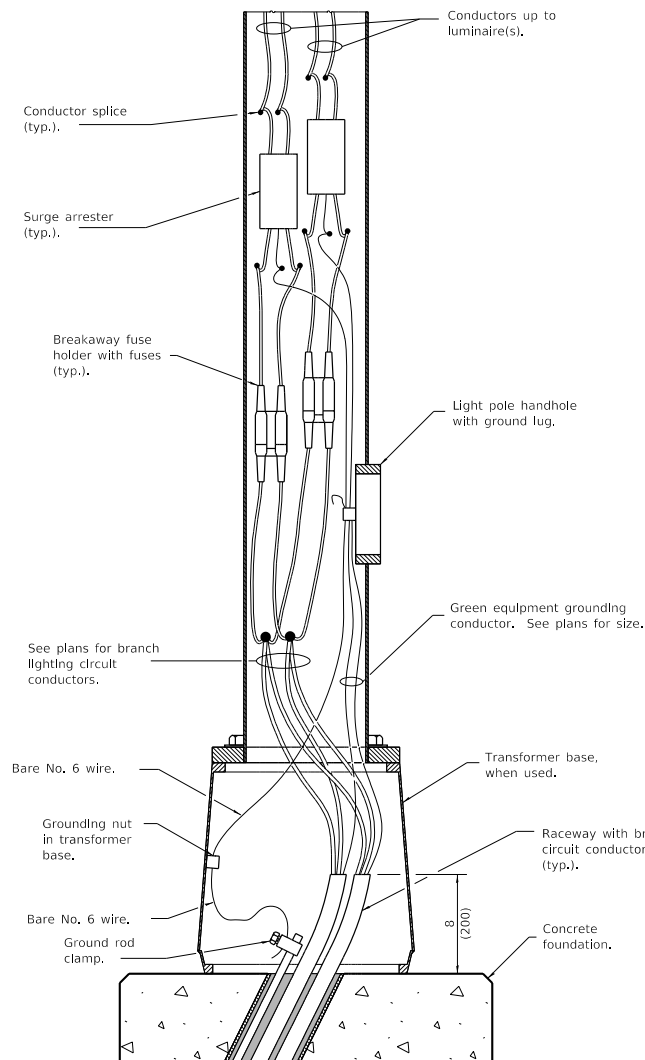
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

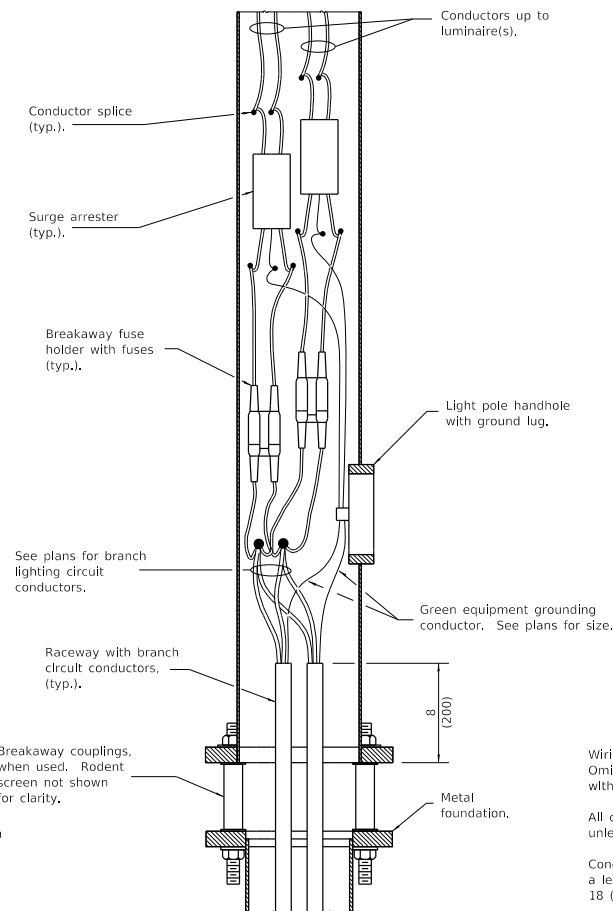
DATE	REVISIONS
4-1-16	New standard.

**UNDERPASS LIGHTING
SUSPENDED**

STANDARD 821006



**ELEVATION AT POLE BASE
WITH CONCRETE FOUNDATION**



**ELEVATION AT POLE BASE
WITH METAL FOUNDATION**
(Rodent screen not shown)

GENERAL NOTES

Wiring for twin luminaire installation shown. Omit one fuse holder and one surge arrester with connections for single luminaire installation.

All conductors originating in pole shall be No. 10 unless noted otherwise.

Conductors extended into light poles shall be of a length sufficient for splices to be withdrawn 18 (450) out of pole handhole.

Any voids in the foundation shall be filled with fine aggregate.

See Standard 836001 for Light Pole Foundation and ground rod.

All dimensions are in inches (millimeters) unless otherwise shown.

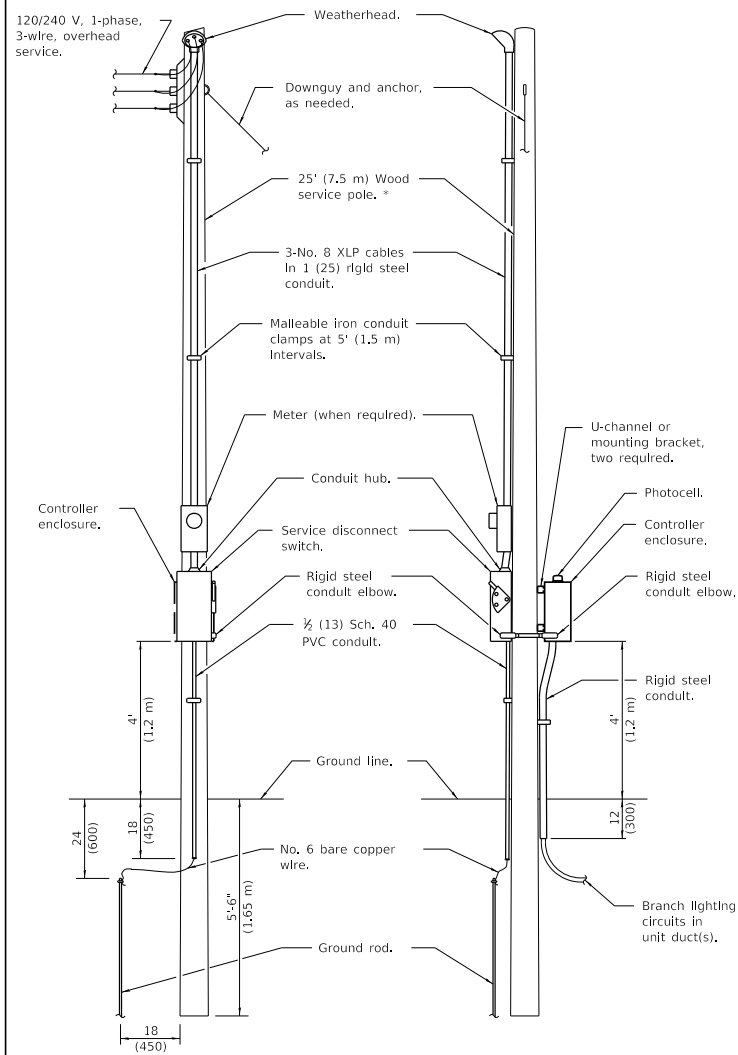
DATE	REVISIONS
1-1-17	Renamed standard.
1-1-15	Changed 'protector' to 'arrester'.

**LUMINAIRE WIRING
IN POLE**

STANDARD 821101-02

Illinois Department of Transportation	
PASSED	January 1, 2017
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED	January 1, 2017
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-17

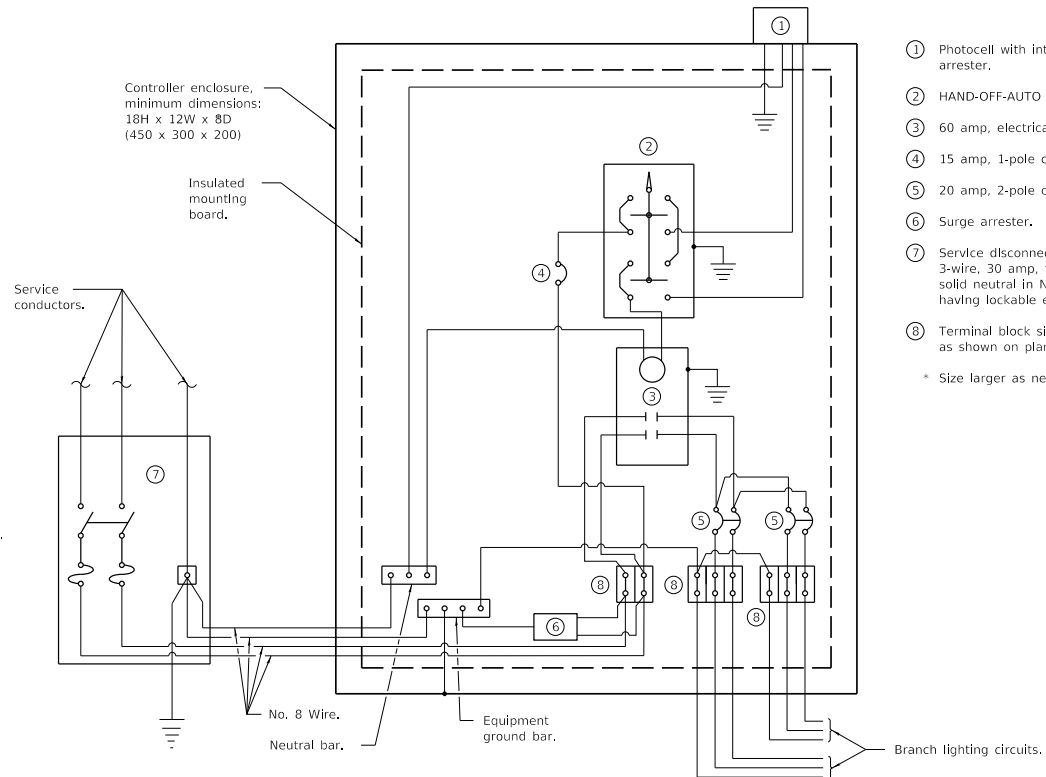


FRONT

SIDE

ELECTRIC SERVICE INSTALLATION

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)
* Size larger as needed.

**CONTROL SCHEMATIC**

- ① Photocell with integral surge arrester.
- ② HAND-OFF-AUTO selector switch.
- ③ 60 amp, electrically held contactor.
- ④ 15 amp, 1-pole circuit breaker.
- ⑤ 20 amp, 2-pole circuit breaker.
- ⑥ Surge arrester.
- ⑦ Service disconnect switch - 2-pole, 3-wire, 30 amp, fused at 30 amp, solid neutral in NEMA 4X enclosure having lockable external handle.
- ⑧ Terminal block sized for conductors as shown on plans.

* Size larger as needed.

GENERAL NOTES

Provide 12x9x1 (305x225x25) watertight pouch mounted inside controller door with as-built plans and schematics.

Provide engraved nameplate on front of enclosure reading "LIGHTING".

Enclosure shall be mounted to pole with pole-bands and lag-bolts.

Work pad not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

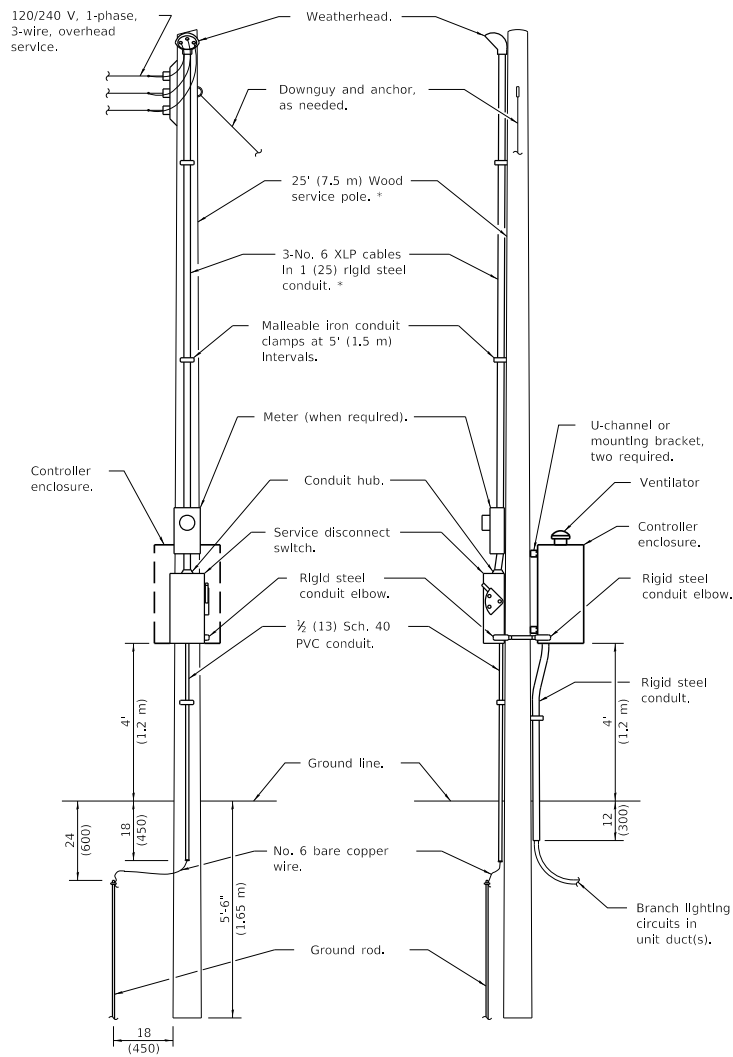
DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding consulting utility company standards for installation.
4-1-16	Corrected connection at terminal block.

LIGHTING CONTROLLER POLE MOUNTED, 240V

(Sheet 1 of 2)

STANDARD 825001-04

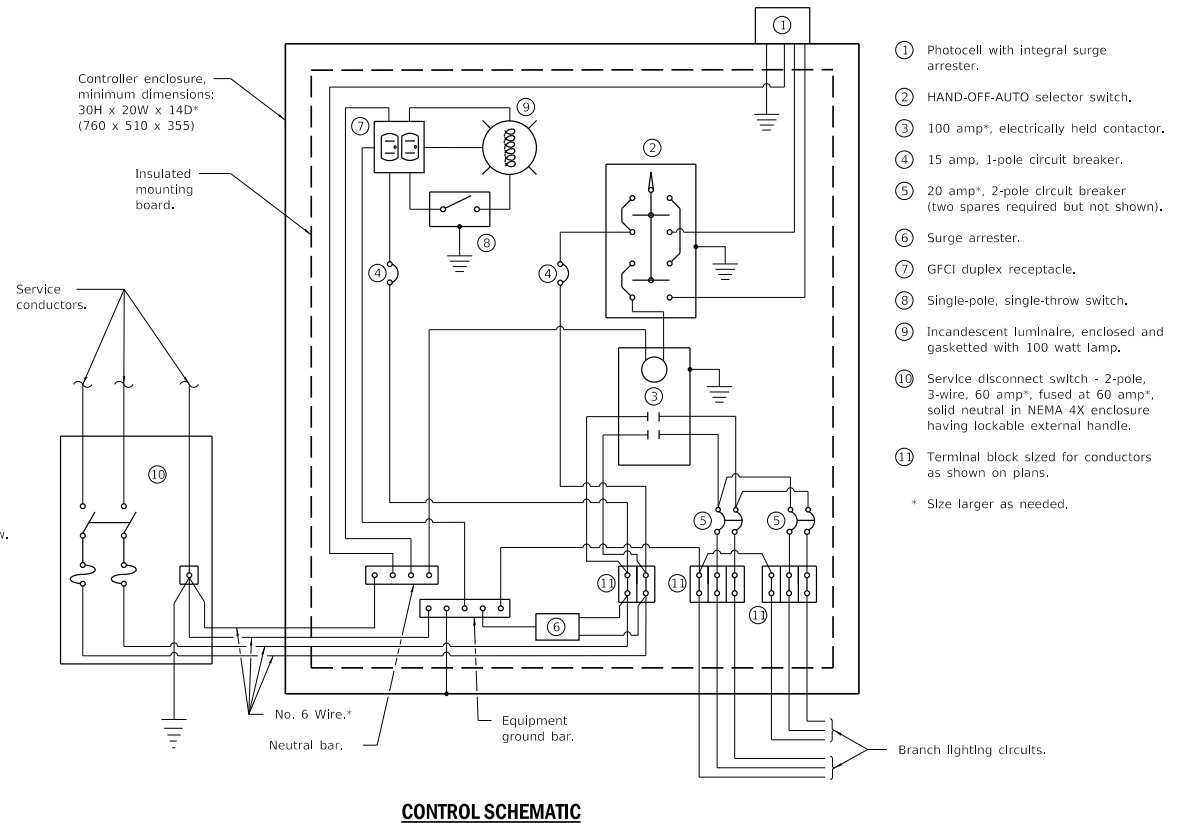
Illinois Department of Transportation	
PASSED <i>me. reppelt</i> ELECTRICAL AND MECHANICAL UNIT CHIEF APPROVED <i>S. J. [Signature]</i> ENGINEER OF DESIGN AND ENVIRONMENT	155155 01-1-19



ELECTRIC SERVICE INSTALLATION

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)

*Size larger as needed.



- ① Photocell with integral surge arrester.
- ② HAND-OFF-AUTO selector switch.
- ③ 100 amp*, electrically held contactor.
- ④ 15 amp, 1-pole circuit breaker.
- ⑤ 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- ⑥ Surge arrester.
- ⑦ GFCI duplex receptacle.
- ⑧ Single-pole, single-throw switch.
- ⑨ Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- ⑩ Service disconnect switch - 2-pole, 3-wire, 60 amp*, fused at 60 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.
- ⑪ Terminal block sized for conductors as shown on plans.

* Size larger as needed.

Illinois Department of Transportation

PASSED January 1, 2019

ME Ruppelt

ELECTRICAL AND MECHANICAL UNIT CHIEF

APPROVED January 1, 2019

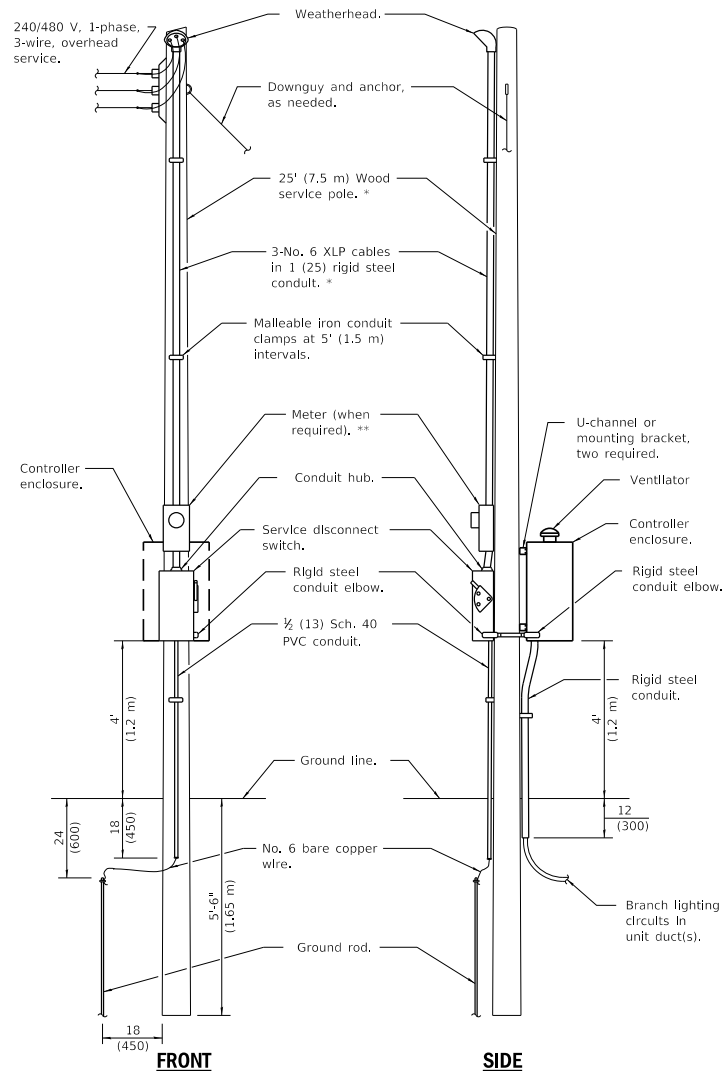
ENGINEER OF DESIGN AND ENVIRONMENT

01-1-1 CHIEF

LIGHTING CONTROLLER POLE MOUNTED, 240V

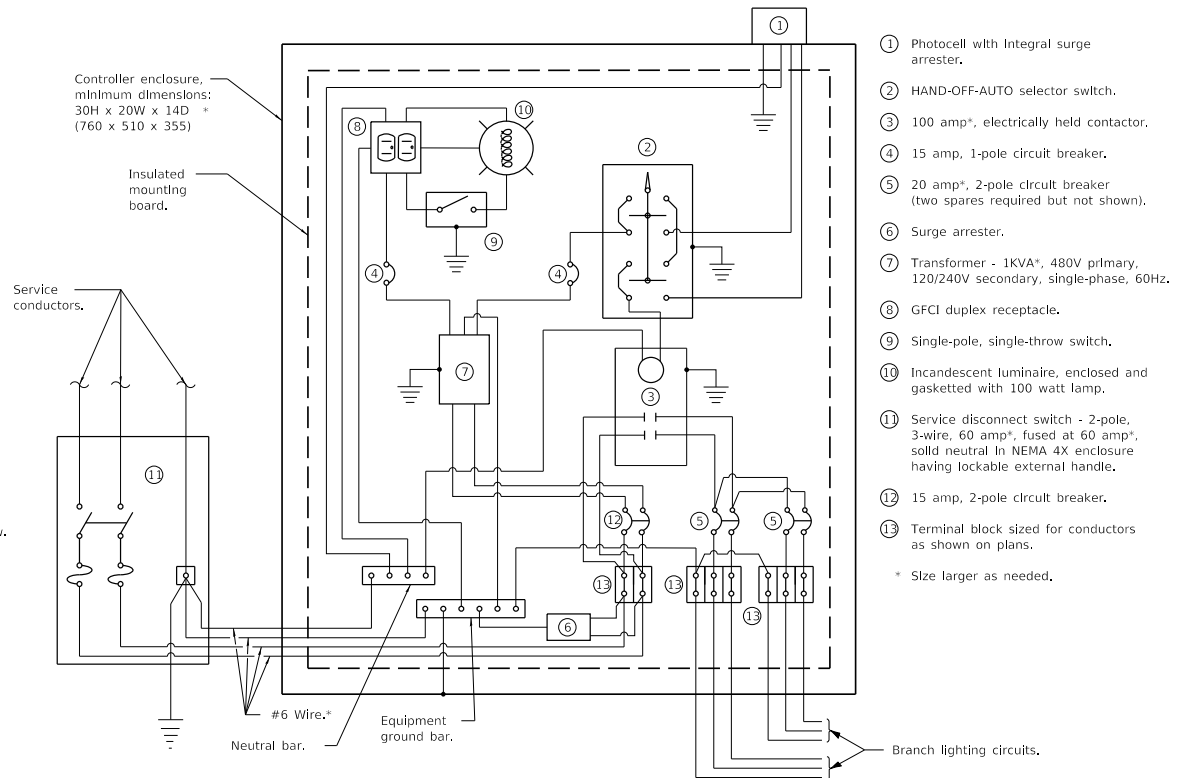
(Sheet 2 of 2)

STANDARD 825001-04



ELECTRIC SERVICE INSTALLATION

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)
 *Size larger as needed.
 **When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.



GENERAL NOTES

Provide 12x9x1 (305x225x25) watertight pouch mounted inside controller door with as-built plans and schematics.

Provide engraved nameplate on front of enclosure reading "LIGHTING".

Enclosure shall be mounted to pole with pole-bands and lag-bolts.

Work pad not shown.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding utility company standards. Made *** the ** note.
1-1-15	Added note (13).

LIGHTING CONTROLLER POLE MOUNTED, 480V

STANDARD 825006-03

Illinois Department of Transportation	
PASSED	January 1, 2019
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT	

120/240 V, 1-phase,
3-wire, overhead
service.

Weatherhead.

Downguy and
anchor, as
needed.

25' (7.5 m) Wood
service pole, *

Service conductors in
rigid steel conduit,
sized as required.

Malleable Iron conduit
clamps at 5' (1.5 m)
intervals.

Meter (when required).

Conduit hub.

Service disconnect
switch.

½ (13) Sch. 40
PVC conduit.

4' (1.2 m)
18 (450)
24 (600)

Ground line.

No. 6 bare
copper wire.

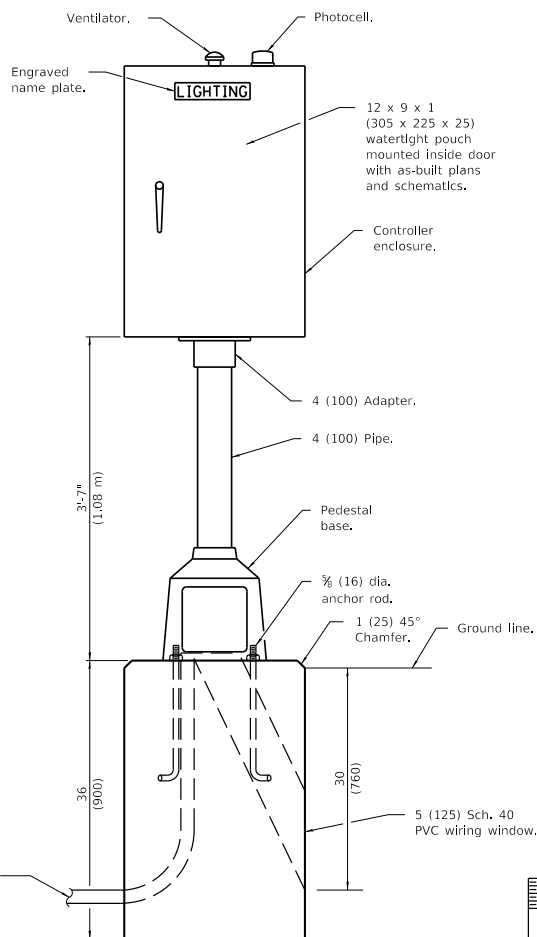
Ground
rod.

18 (450)

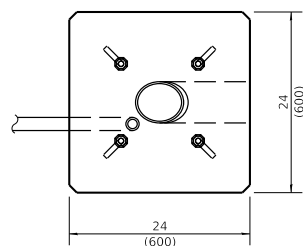
Feeder conductors
in rigid conduit to
lighting controller.

ELECTRIC SERVICE INSTALLATION

(Typical overhead service
shown. Cut pole off for
underground service and
treat cut surface with
preservative. Consult utility
company standards for
exact requirements.)
* Size larger as needed.



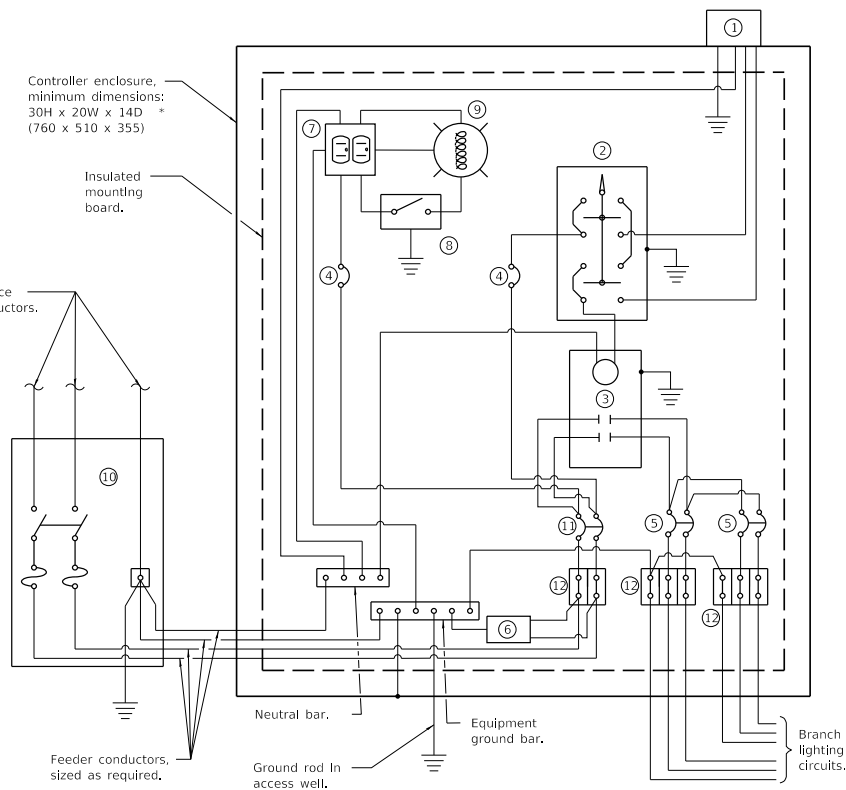
LIGHTING CONTROLLER



FOUNDATION (PLAN)

(Work pad not shown.)

Service conductors.

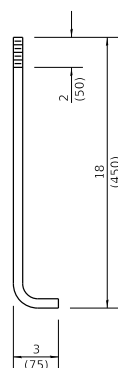


CONTROL SCHEMATIC

- ① Photocell with integral surge arrester.
- ② HAND-OFF-AUTO selector switch.
- ③ 100 amp*, electrically held contactor.
- ④ 15 amp, 1-pole circuit breaker.
- ⑤ 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- ⑥ Surge arrester.
- ⑦ GFCI duplex receptacle.
- ⑧ Single-pole, single-throw switch.
- ⑨ Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- ⑩ Service disconnect switch - 2-pole, 3-wire, 60 amp*, fused at 60 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.
- ⑪ 60 amp*, 2-pole circuit breaker.
- ⑫ Terminal block sized for conductors as shown on plans.

* Size larger as needed.

All dimensions are in inches (millimeters)
unless otherwise shown.



ANCHOR ROD DETAIL

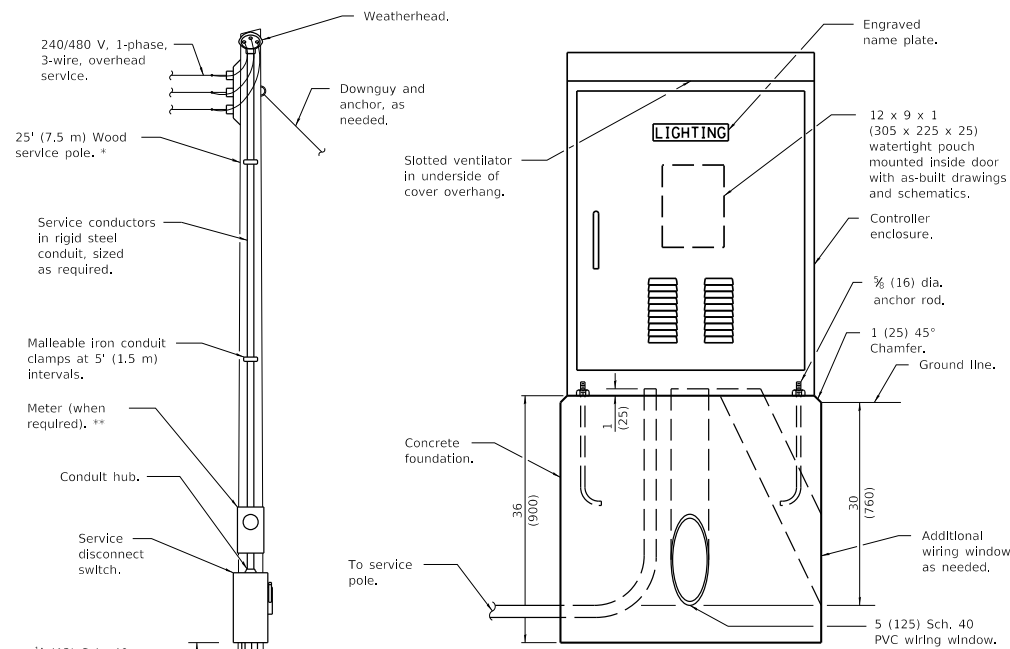
DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding consulting utility company standards for installation.
1-1-15	Added note ⑫.

LIGHTING CONTROLLER PEDESTAL MOUNTED, 240V

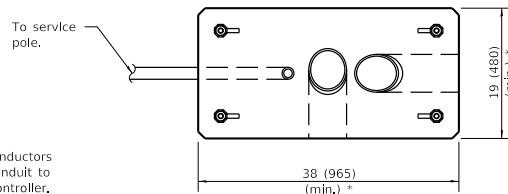
STANDARD 825011-04

Illinois Department of Transportation	
PASSED	January 1, 2019
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT	



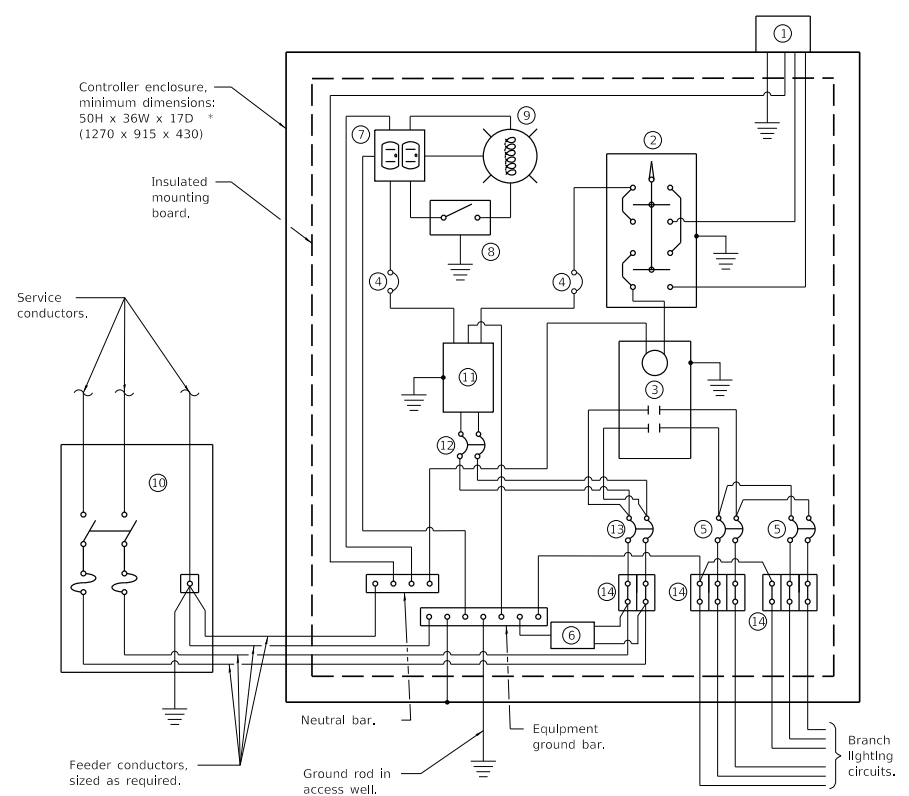


LIGHTING CONTROLLER



FOUNDATION (PLAN)

(Work pad not shown.)



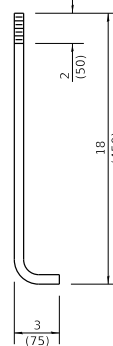
CONTROL SCHEMATIC

- | | |
|--|--|
| ① Photocell with integral surge arrester. | ⑨ Incandescent luminaire, enclosed and gasketed with 100 watt lamp. |
| ② HAND-OFF-AUTO selector switch. | ⑩ Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle. |
| ③ 100 amp*, electrically held contactor. | ⑪ Transformer - 1KVA*, 480V primary, 120/240V secondary, single-phase, 60Hz. |
| ④ 15 amp, 1-pole circuit breaker. | ⑫ 15 amp, 2-pole circuit breaker. |
| ⑤ 20 amp*, 2-pole circuit breaker (two spares required but not shown). | ⑬ 100 amp*, 2-pole circuit breaker. |
| ⑥ Surge arrester. | ⑭ Terminal block sized for conductors as shown on plans. |
| ⑦ GFCI duplex receptacle. | |
| ⑧ Single-pole, single-throw switch. | |

* Size larger as needed.

All dimensions are in inches (millimeters) unless otherwise shown.

ANCHOR ROD DETAIL



DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding utility company standards. Made *** the ** note.
1-1-15	Added note ⑭.

LIGHTING CONTROLLER BASE MOUNTED, 480V

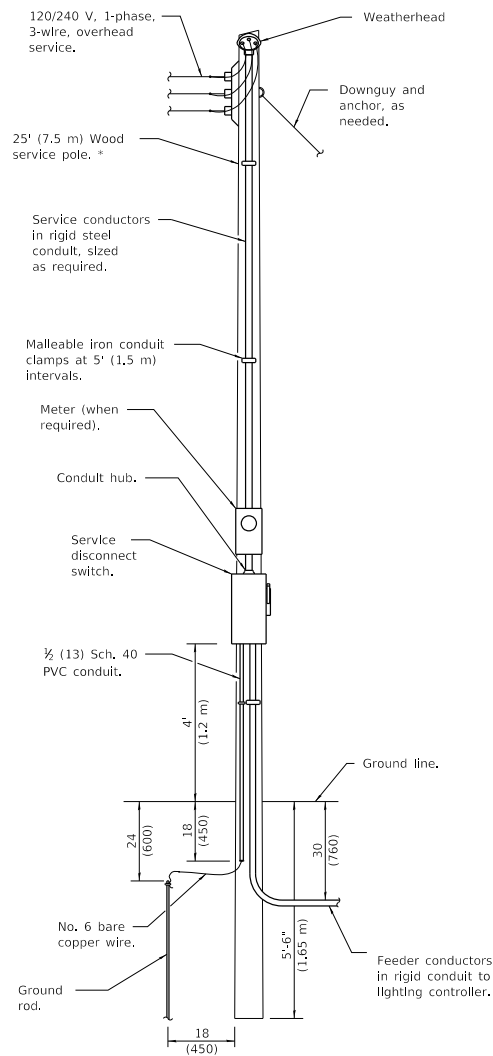
STANDARD 825026-04

Illinois Department of Transportation	
PASSED	January 1, 2019
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT	

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)

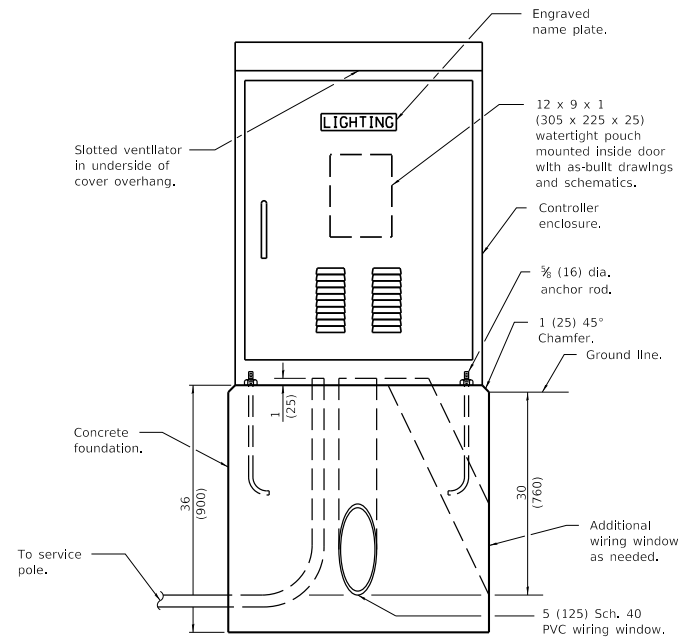
* Size larger as needed.

** When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.

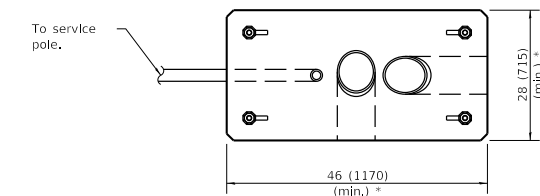


ELECTRIC SERVICE INSTALLATION

(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)
* Size larger as needed.



LIGHTING CONTROLLER



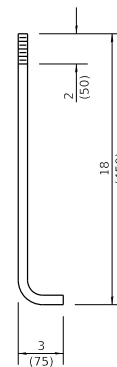
FOUNDATION (PLAN)

(Work pad not shown.)

* Size larger as needed.

All dimensions are in inches (millimeters) unless otherwise shown.

ANCHOR ROD DETAIL



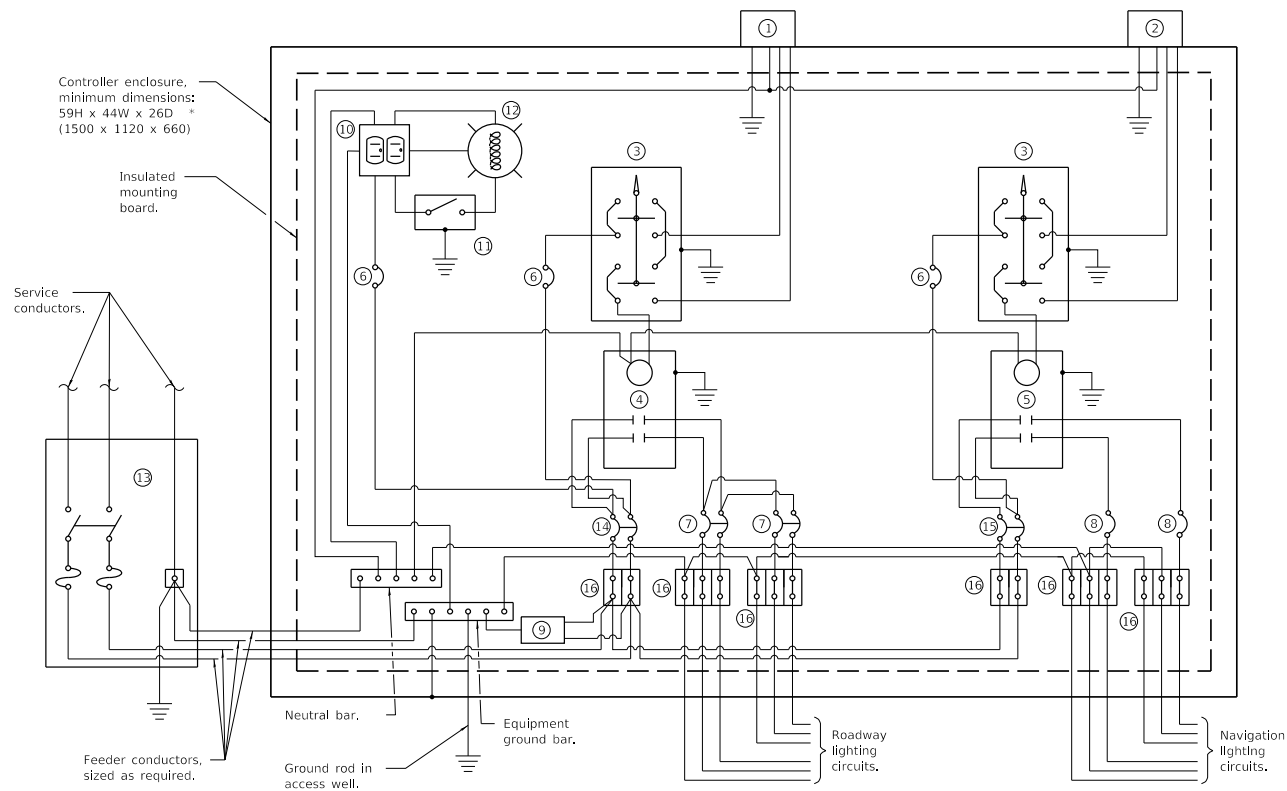
DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding consulting utility company standards for installation.
1-1-15	Added note (10).

NAVIGATION OBSTRUCTION LIGHTING CONTROLLER, 240V

(Sheet 1 of 2)

STANDARD 826001-02

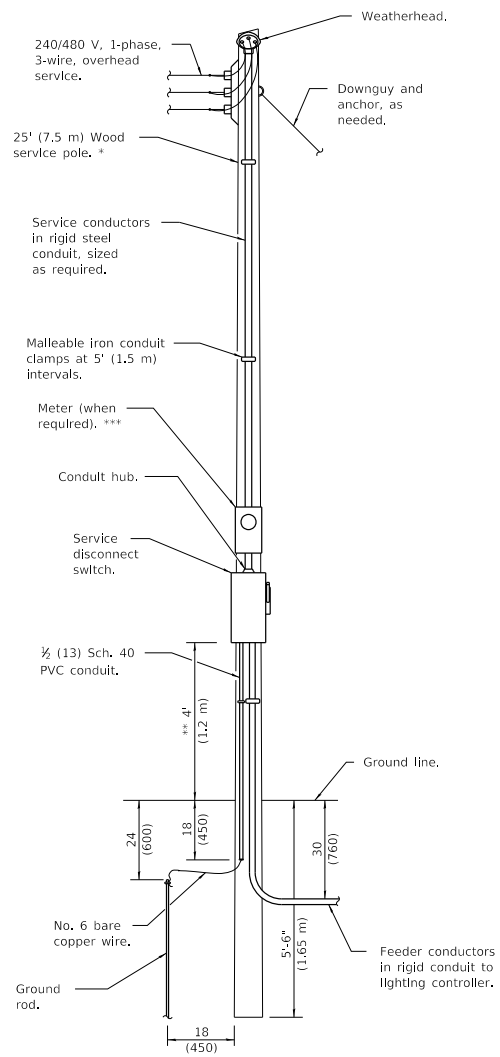
Illinois Department of Transportation	
PASSED	January 1, 2019
<i>me. ruppelt</i>	
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
<i>S. J. E. G.</i>	
ENGINEER OF DESIGN AND ENVIRONMENT	



CONTROL SCHEMATIC

- ① Photocell with integral surge arrester for roadway lighting.
- ② Photocell with integral surge arrester for navigation lighting.
- ③ HAND-OFF-AUTO selector switch.
- ④ 100 amp*, electrically held contactor.
- ⑤ 60 amp*, electrically held contactor.
- ⑥ 15 amp, 1-pole circuit breaker.
- ⑦ 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- ⑧ 20 amp*, single-pole circuit breaker (two shown, quantity as required).
- ⑨ Surge arrester.
- ⑩ GFCI duplex receptacle.
- ⑪ Single-pole, single-throw switch.
- ⑫ Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- ⑬ Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.
- ⑭ 60 amp*, 2-pole circuit breaker.
- ⑮ 30 amp*, 2-pole circuit breaker.
- ⑯ Terminal block sized for conductors as shown on plans.

* Size larger as needed.

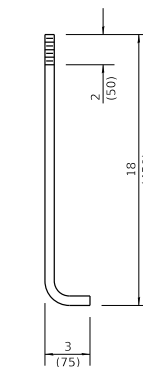


ELECTRIC SERVICE INSTALLATION

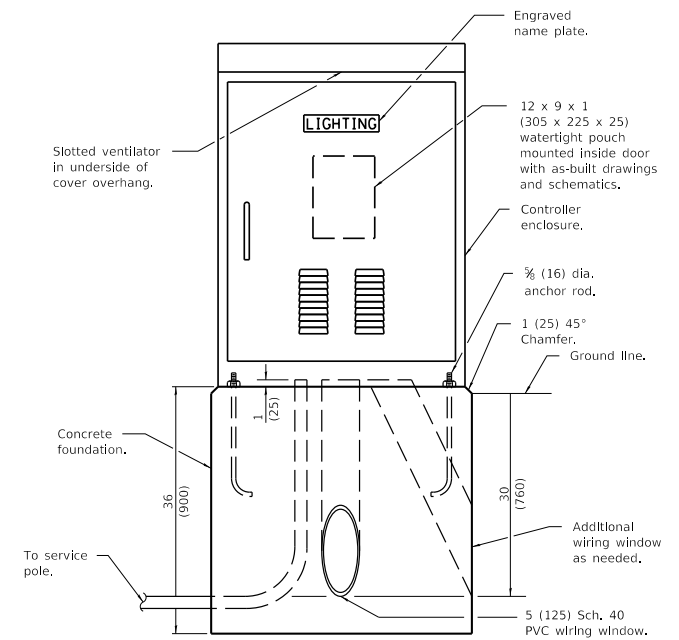
(Typical overhead service shown. Cut pole off for underground service and treat cut surface with preservative. Consult utility company standards for exact requirements.)

* Size larger as needed.

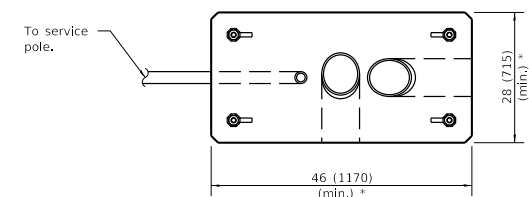
** When cold sequencing is required, provide a meter disconnect switch as directed by Utility Company.



ANCHOR ROD DETAIL



LIGHTING CONTROLLER



FOUNDATION (PLAN)

(Work pad not shown.)

All dimensions are in inches (millimeters) unless otherwise shown.

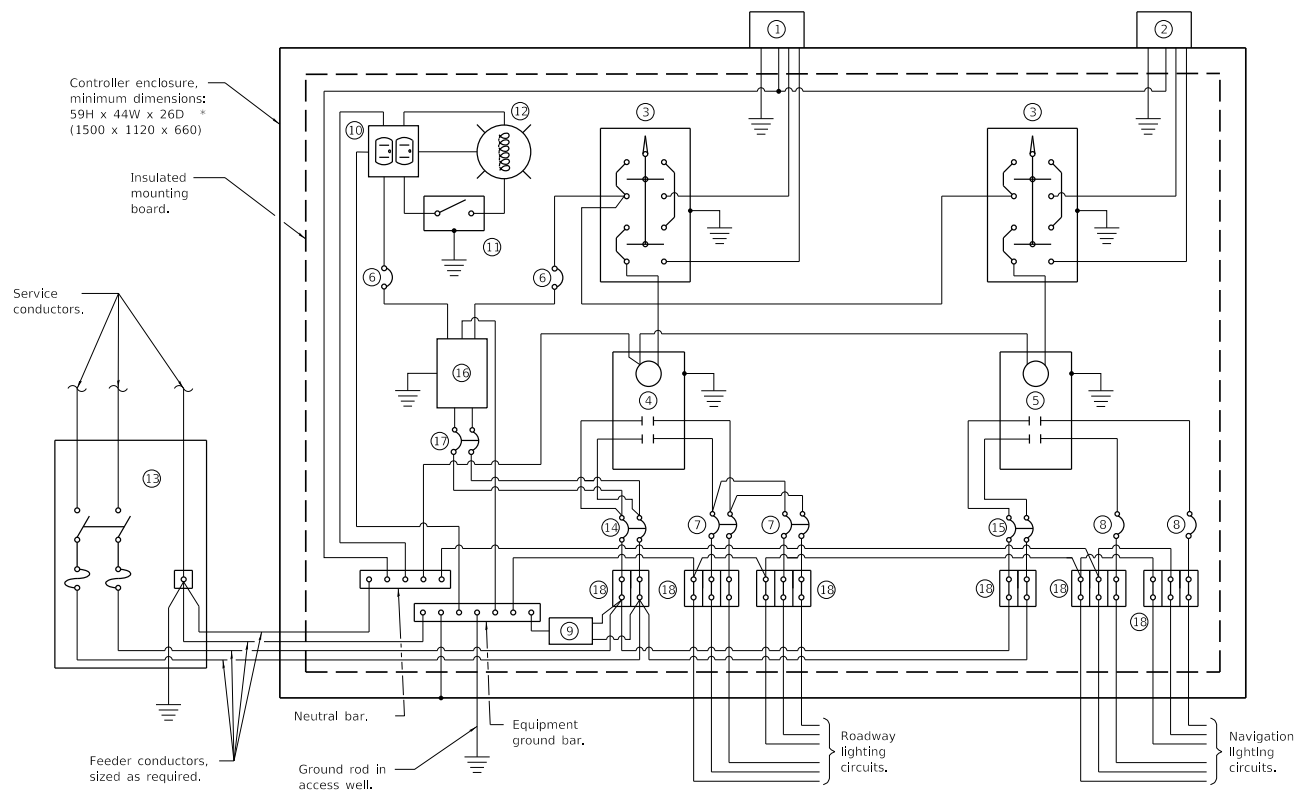
DATE	REVISIONS
1-1-19	Replaced ** note with new note regarding utility company standards. Made *** the ** note.
1-1-15	Added note (18).

NAVIGATION OBSTRUCTION LIGHTING CONTROLLER, 480V

(Sheet 1 of 2)

STANDARD 826006-02

Illinois Department of Transportation	
PASSED <i>me</i> ELECTRICAL AND MECHANICAL UNIT CHIEF APPROVED <i>S. J. E. G.</i> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-19



CONTROL SCHEMATIC

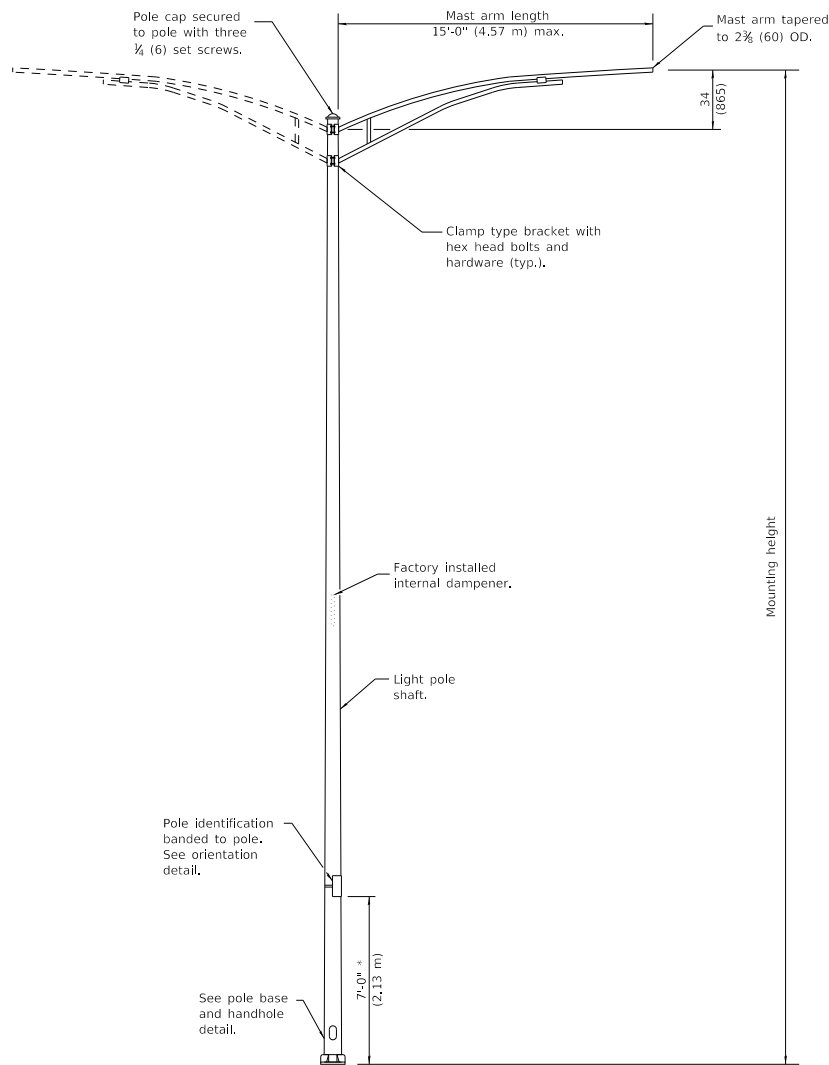
- ① Photocell with integral surge arrester for roadway lighting.
- ② Photocell with integral surge arrester for navigation lighting.
- ③ HAND-OFF-AUTO selector switch.
- ④ 100 amp*, electrically held contactor.
- ⑤ 60 amp*, electrically held contactor.
- ⑥ 15 amp, 1-pole circuit breaker.
- ⑦ 20 amp*, 2-pole circuit breaker (two spares required but not shown).
- ⑧ 20 amp*, single-pole circuit breaker (two shown, quantity as required).
- ⑨ Surge arrester.
- ⑩ GFCI duplex receptacle.
- ⑪ Single-pole, single-throw switch.
- ⑫ Incandescent luminaire, enclosed and gasketed with 100 watt lamp.
- ⑬ Service disconnect switch - 2-pole, 3-wire, 100 amp*, fused at 100 amp*, solid neutral in NEMA 4X enclosure having lockable external handle.
- ⑭ 60 amp*, 2-pole circuit breaker.
- ⑮ 30 amp*, 2-pole circuit breaker.
- ⑯ Transformer - 1 KVA*, 480V primary, 120/240V secondary, single phase, 60 Hz.
- ⑰ 15 amp, 2-pole circuit breaker.
- ⑱ Terminal block sized for conductors as shown on plans.

* Size larger as needed.

Illinois Department of Transportation	
PASSED	January 1, 2019
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT	

**NAVIGATION OBSTRUCTION
LIGHTING CONTROLLER, 480V**
(Sheet 2 of 2)

STANDARD 826006-02



MAST ARM LIGHT POLE

(Single or twin mount)

* Unless directed otherwise by the Engineer.

POLE		
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
35' (10.7 m) or less	8 tapered to 4 1/2 (200 to 114)	0.25 (6)
Greater than 35' (10.7 m) to 45' (13.7 m)	10 tapered to 6 (250 to 150)	0.25 (6)
Greater than 45' (13.7 m) to 50' (15.2 m)	10 tapered to 6 (250 to 150)	0.312 (8)

POLE BASE	
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER
35' (10.7 m) or less	11 1/2 (290)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

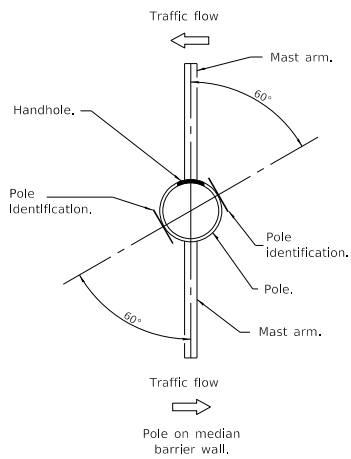
DATE	REVISIONS
1-1-15	Revised note on HANDHOLE DETAIL.
1-1-14	Added pole mounted on bridge parapet. Modified attachment of screen.

LIGHT POLE ALUMINUM MAST ARM

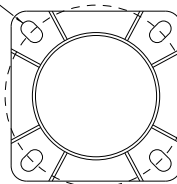
(Sheet 1 of 2)

STANDARD 830001-03

Illinois Department of Transportation		ISSUED 1-1-12
APPROVED	January 1, 2015	
ENGINEER OF PRELIMINARY ENGINEERING		
APPROVED	January 1, 2015	
ENGINEER OF DESIGN AND ENVIRONMENT		



1 1/4 x 2 (32 x 50) slot (typ.).

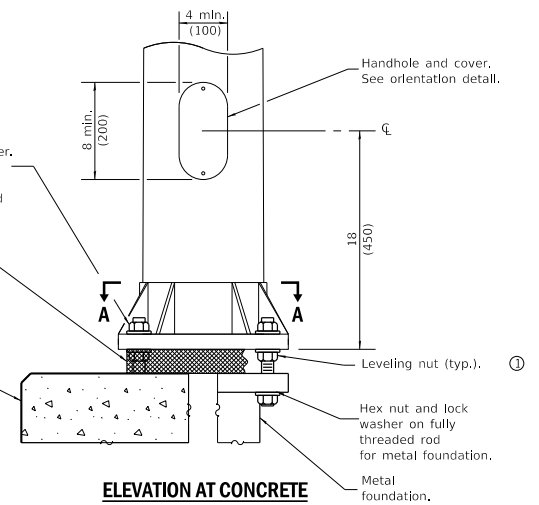


SECTION A-A
(Bolts not shown)

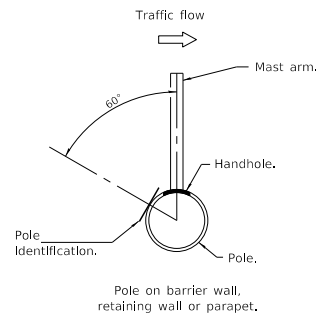
Hex nut with washer. Washer shall cover entire slot (typ.). Nut covers required but not shown.

Screen wrapped around nuts and anchor rods between foundation and bottom of pole base. Provide 6 (150) minimum overlap and wire-tie with matching wire.

Concrete foundation, barrier or retaining wall.



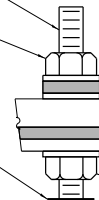
① Omit leveling nuts when breakaway devices are required.



See Bridge Plans for 1 (25) anchor rod by others.

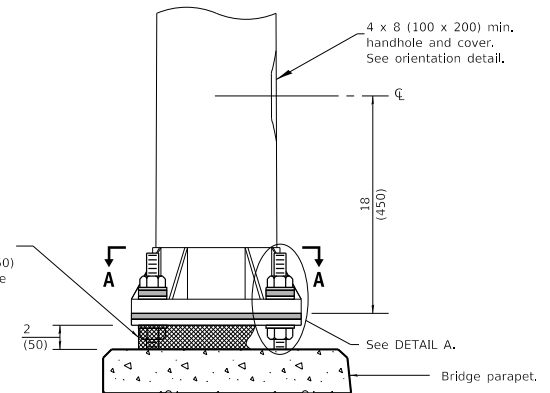
1 (25) self-locking nut. Install with torque wrench to isolation pad man. specifications.

Bridge parapet.

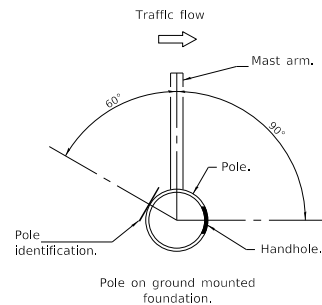


DETAIL A

Screen wrapped around nuts and anchor rods between foundation and bottom of leveling plate. Provide 6 (150) minimum overlap and wire-tie with matching wire.



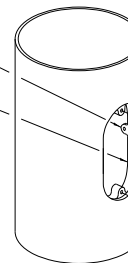
POLE BASE DETAILS



HANDHOLE / IDENTIFICATION ORIENTATION DETAIL

Tapped 1/2 (13) hole for grounding connector.

Reinforcing frame with full circumferential weld.



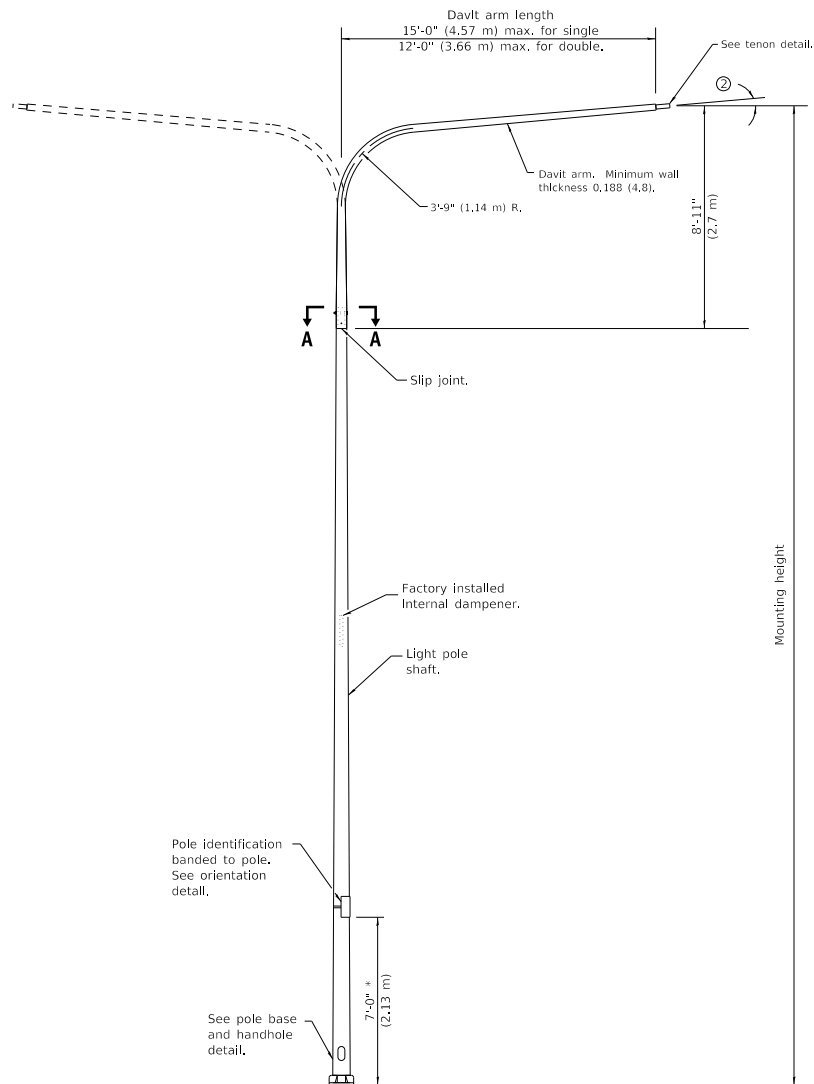
HANDHOLE DETAIL

Illinois Department of Transportation	
APPROVED	January 1, 2015
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

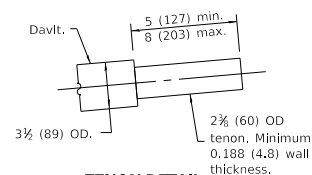
**LIGHT POLE
ALUMINUM MAST ARM**

(Sheet 2 of 2)

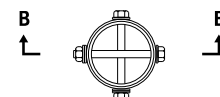
STANDARD 830001-03



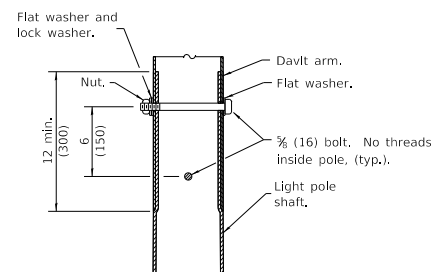
POLE BASE	
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER
35' (10.7 m) or less	11½ (290)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)



TENON DETAIL



SECTION A-A



SECTION B-B

POLE LOWER SHAFT			
MOUNTING HEIGHT	LOWER SHAFT LENGTH ①	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
30' (9.1 m)	21'-1" (6.4 m)	8 tapered to 6 (200 to 114)	0.25 (6)
35' (10.7 m)	26'-1" (7.9 m)	8 tapered to 6 (200 to 114)	0.25 (6)
40' (12.2 m)	31'-1" (9.5 m)	10 tapered to 6 (250 to 150)	0.25 (6)
45' (13.7 m)	36'-1" (11.0 m)	10 tapered to 6 (250 to 150)	0.25 (6)
50' (15.2 m)	41'-1" (12.5 m)	10 tapered to 6 (250 to 150)	0.312 (8)

- ① Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- ② 5° max. for unloaded pole, 1.5° max. for loaded pole.

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Voids in light pole base shall be sealed to prevent rodent entry.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED <i>me. ruppelt</i> ELECTRICAL AND MECHANICAL UNIT CHIEF APPROVED <i>S. J. E. G.</i> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-12

DAVIT LIGHT POLE

(Single or twin mount)

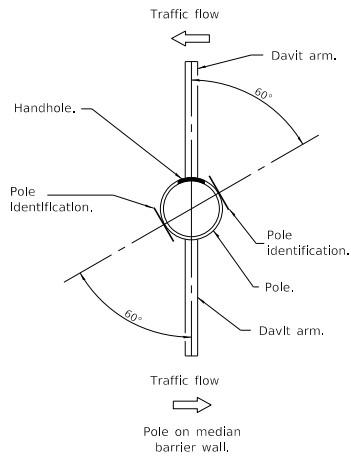
* Unless directed otherwise by the Engineer.

DATE	REVISIONS
1-1-19	Revised standard to comply with the 2013 version of AASHTO.
1-1-17	Added notes ③ and ④.

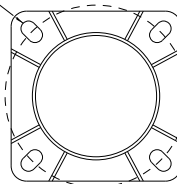
LIGHT POLE ALUMINUM DAVIT ARM

(Sheet 1 of 2)

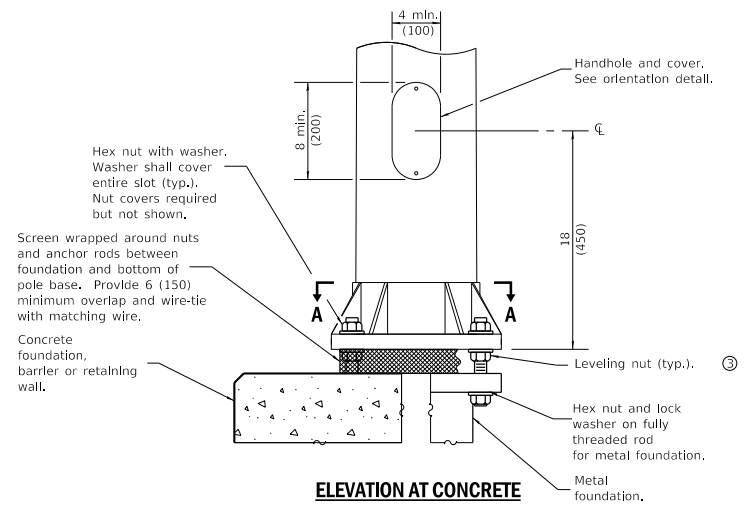
STANDARD 830006-05



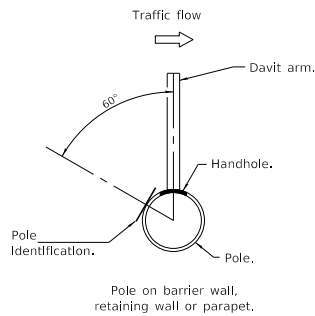
1 1/4 x 2 (32 x 50) slot (typ.).



SECTION A-A
(Bolts not shown)



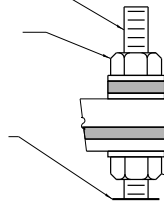
③ Omit leveling nuts when breakaway devices are required.



See Bridge Plans for 1 (25) anchor rod by others.

1 (25) self-locking nut. Install with torque wrench to Isolation pad man. specifications.

Bridge parapet.



2 1/2 O.D. x 1/2 (64 x 7) washers both sides of 2 1/2 O.D. x 1/2 (64 x 13) min. isolation washer.

Pole base.

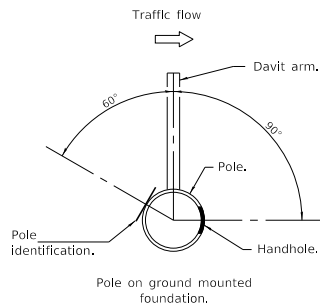
1/2 (13) min. Isolation pad sized to match pole base.

1/2 (13) leveling plate sized to match pole base.

1 (25) leveling nut.

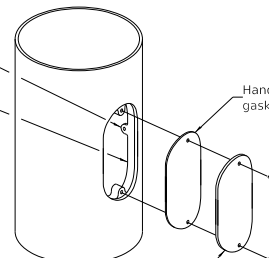
DETAIL A

Screen wrapped around nuts and anchor rods between foundation and bottom of leveling plate. Provide 6 (150) minimum overlap and wire-tie with matching wire.

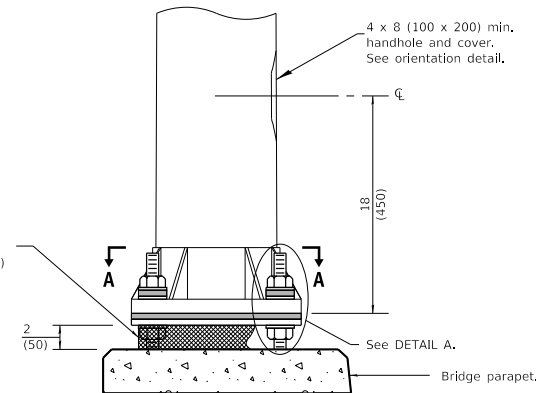


Tapped 1/2 (13) hole for grounding connector.

Reinforcing frame with full circumferential weld.



HANDHOLE DETAIL



POLE BASE DETAILS

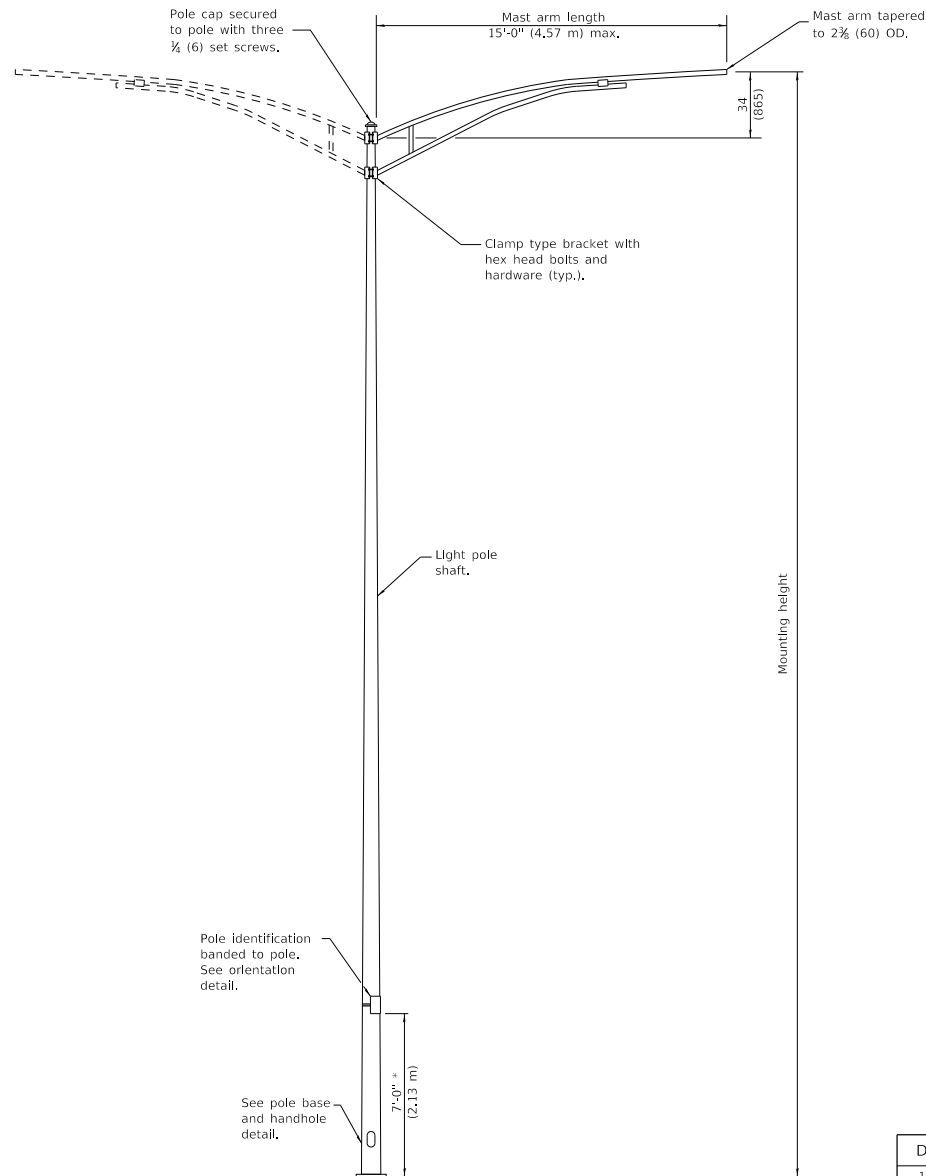
LIGHT POLE ALUMINUM DAVIT ARM

(Sheet 2 of 2)

STANDARD 830006-05

Illinois Department of Transportation	
PASSED	January 1, 2019
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
ENGINEER OF DESIGN AND ENVIRONMENT	

HANDHOLE / IDENTIFICATION ORIENTATION DETAIL



POLE		
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
35' (10.7 m) or less	8 tapered to 4 (200 to 100)	10 gauge
Greater than 35' (10.7 m) to 50' (15.2 m)	10 tapered to 4 (250 to 100)	7 gauge

BASE PLATE		
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS
35' (10.7 m) or less	11 1/2 (290)	1 (25)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1 1/4 (32)

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-19	Revised POLE and BASE POLE tables.
1-1-14	Added pole mounted on bridge parapet. Modified attachment of screen.

LIGHT POLE STEEL MAST ARM

(Sheet 1 of 2)

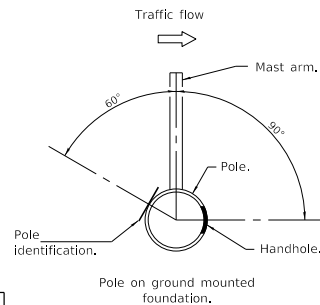
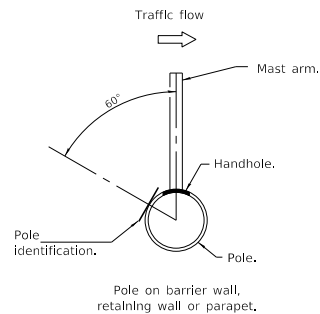
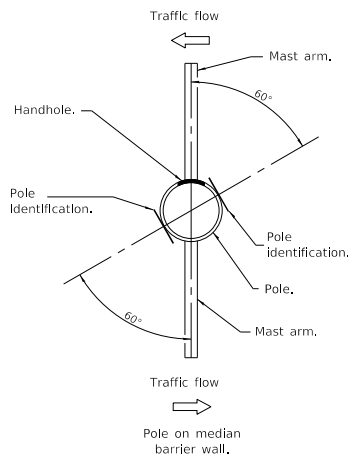
STANDARD 830011-03

Illinois Department of Transportation	
PASSED <u>me ruppelt</u> January 1, 2019 ELECTRICAL AND MECHANICAL UNIT CHIEF	ISSUED 1-1-12
APPROVED <u>S. J. Lee</u> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	

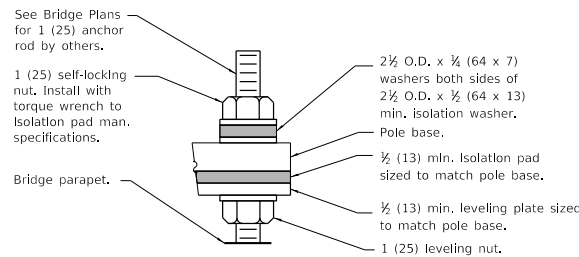
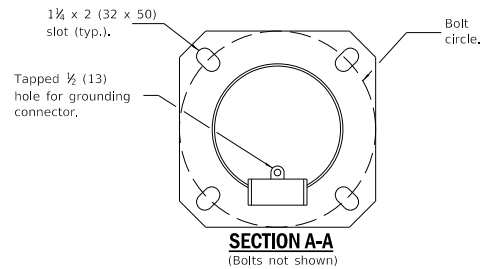
MAST ARM LIGHT POLE

(Single or twin mount)

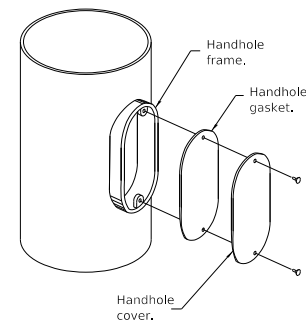
* Unless directed otherwise by the Engineer.



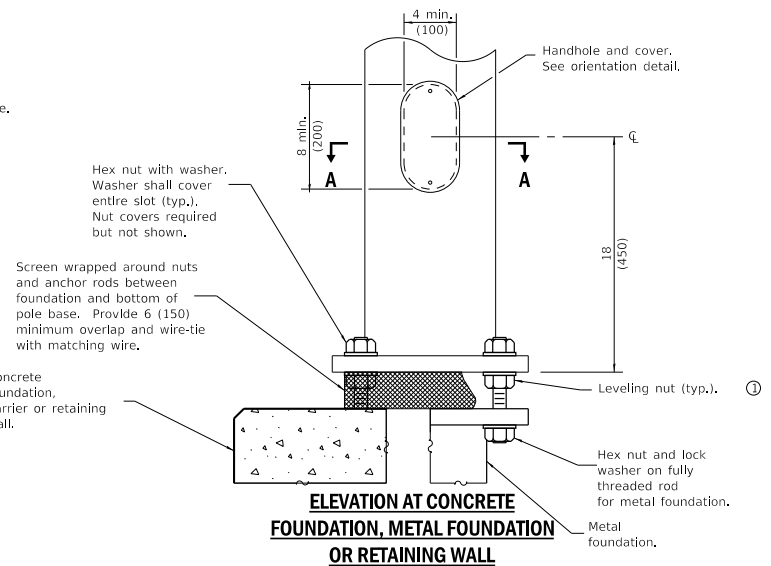
HANDHOLE / IDENTIFICATION ORIENTATION DETAIL



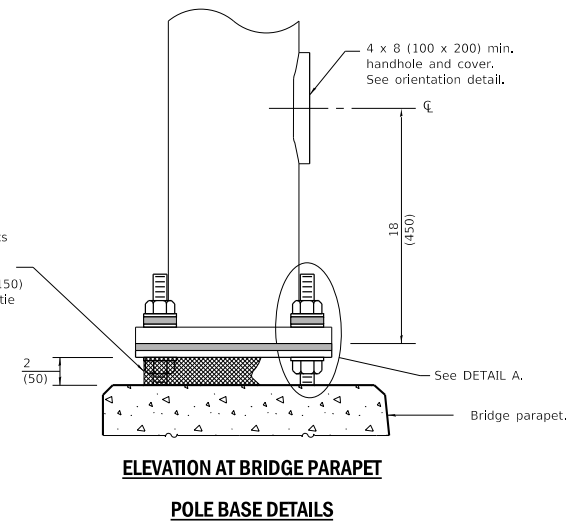
DETAIL A



HANDHOLE DETAIL



① Omit leveling nuts when breakaway devices are required.

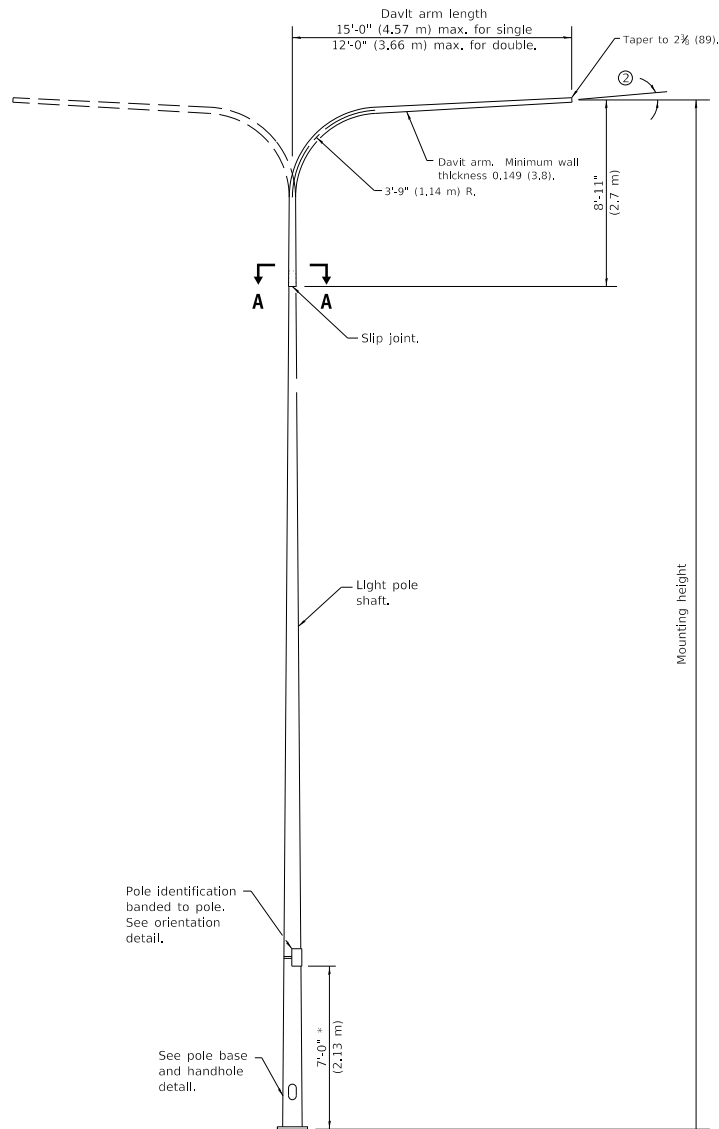


LIGHT POLE STEEL MAST ARM

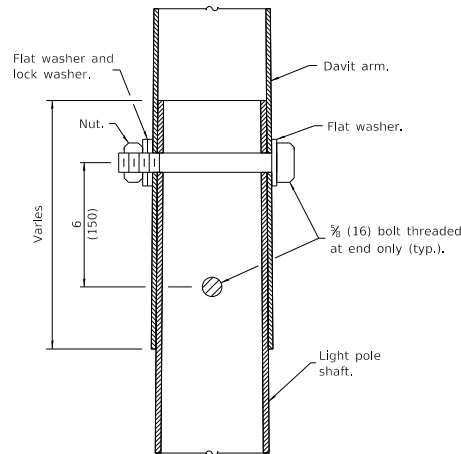
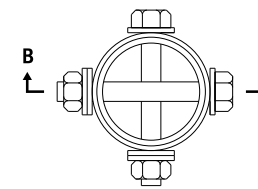
(Sheet 2 of 2)

STANDARD 830011-03

Illinois Department of Transportation	
PASSED <u>me ruppelt</u> January 3, 2019 ELECTRICAL AND MECHANICAL UNIT CHIEF	ISSUED 1-1-12
APPROVED <u>S. J. Lee</u> January 3, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	



BASE PLATE		
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS
35' (10.7 m) or less	11 1/2 (290)	1 (25)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1 1/2 (32)



POLE LOWER SHAFT			
MOUNTING HEIGHT	LOWER SHAFT LENGTH ①	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
30' (9.1 m)	21'-1" (6.4 m)	8 tapered to 6 (200 to 114)	10 gauge
35' (10.7 m)	26'-1" (7.9 m)	8 tapered to 6 (200 to 114)	10 gauge
40' (12.2 m)	31'-1" (9.5 m)	10 tapered to 6 (250 to 150)	7 gauge
45' (13.7 m)	36'-1" (11.0 m)	10 tapered to 6 (250 to 150)	7 gauge
50' (15.2 m)	41'-1" (12.5 m)	10 tapered to 6 (250 to 150)	7 gauge

- ① Lower shaft length shall be from the bottom of the pole base to the bottom of the slip joint.
- ② 3° max. for unloaded pole, 1.5° max. for loaded pole.

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-19	Revised BASE PLATE table.
1-1-14	Added pole mounted on bridge parapet. Modified attachment of screen.

LIGHT POLE STEEL DAVIT ARM

(Sheet 1 of 2)

STANDARD 830016-03

Illinois Department of Transportation

PASSED January 1, 2019

APPROVED January 1, 2019

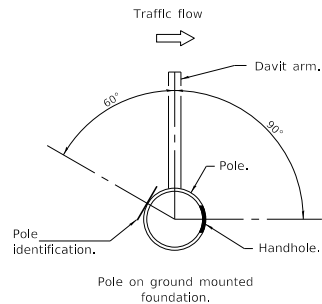
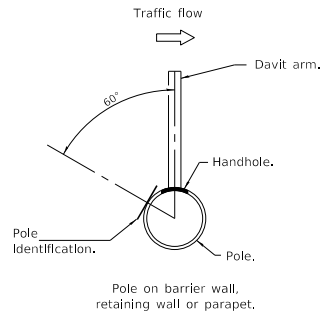
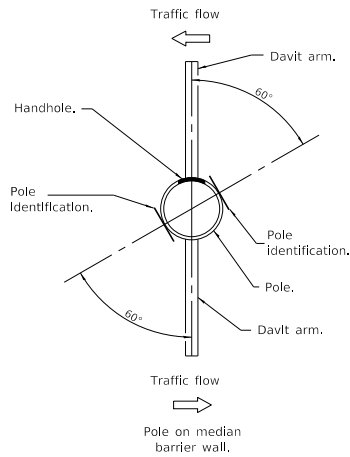
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-12

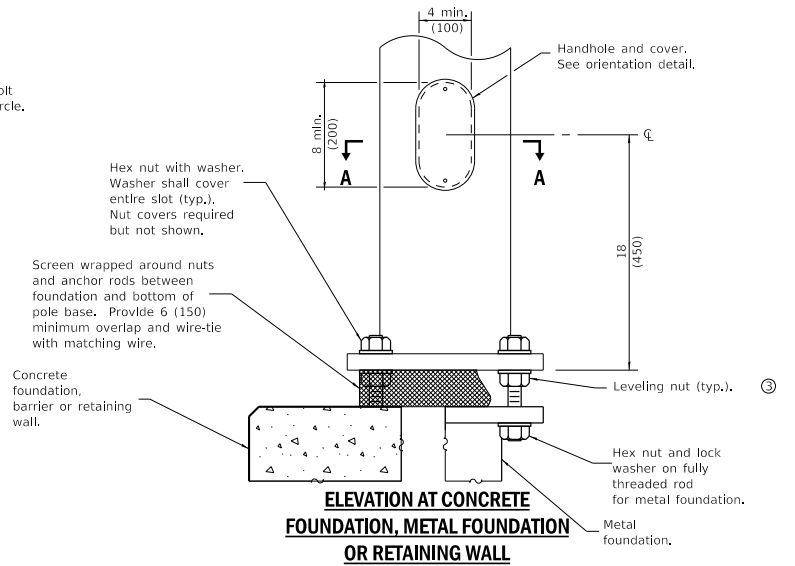
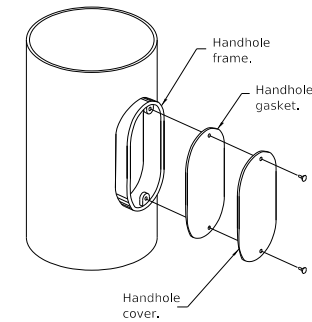
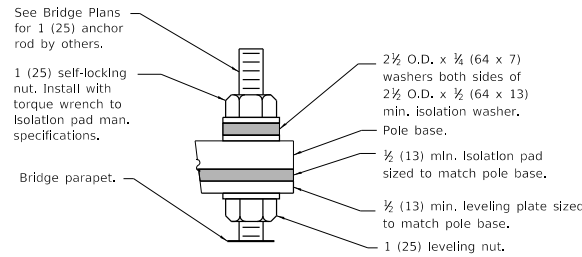
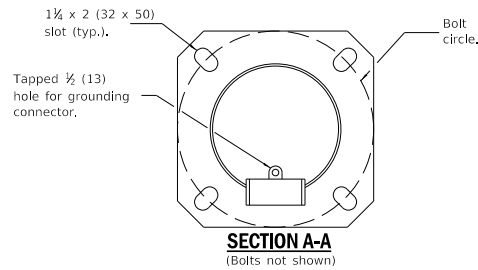
DAVIT LIGHT POLE

(Single or twin mount)

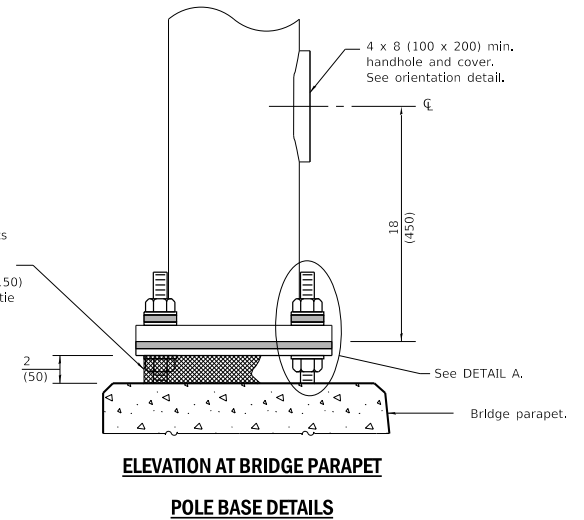
* Unless directed otherwise by the Engineer.



HANDHOLE / IDENTIFICATION ORIENTATION DETAIL



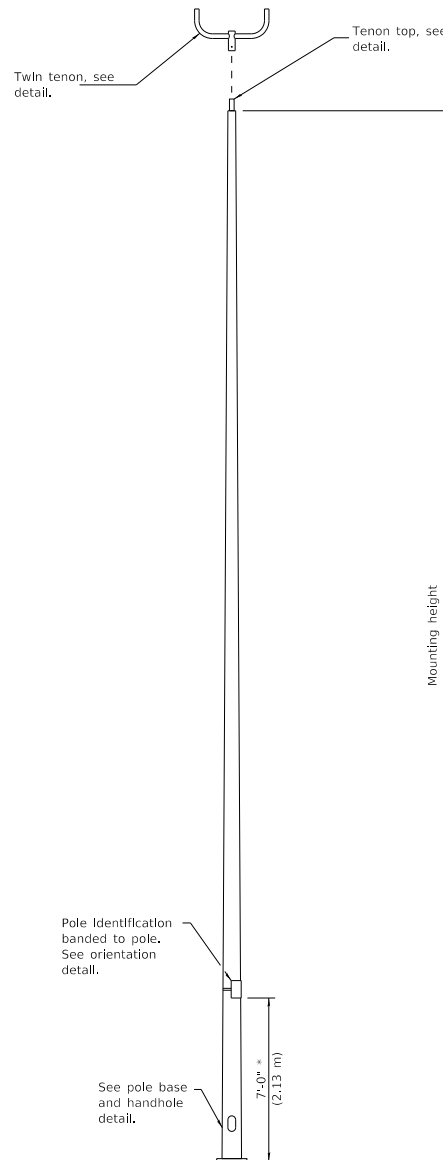
③ Omit leveling nuts when breakaway devices are required.



LIGHT POLE STEEL DAVIT ARM

(Sheet 2 of 2)

STANDARD 830016-03



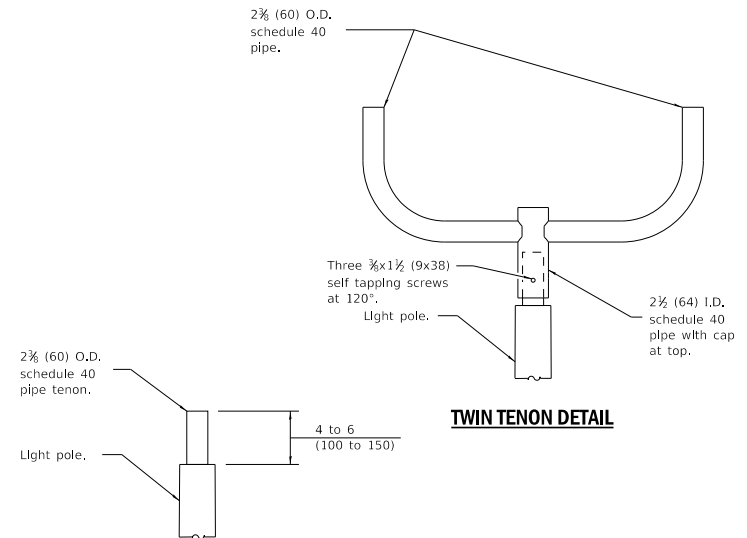
TENON TOP LIGHT POLE

(Single or twin mount)

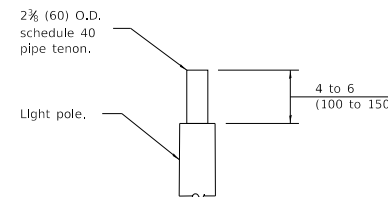
* Unless directed otherwise by the Engineer.

BASE PLATE		
MOUNTING HEIGHT	BOLT CIRCLE DIAMETER	BASE PLATE THICKNESS
35' (10.7 m) or less	11½ (290)	1 (25)
Greater than 35' (10.7 m) to 50' (15.2 m)	15 (380)	1¼ (32)

LIGHT POLE		
MOUNTING HEIGHT	MINIMUM SHAFT DIAMETER	MINIMUM WALL THICKNESS
35' (10.7 m) or less	8 tapered to 4 (200 to 100)	10 gauge
Greater than 35' (10.7 m) to 50' (15.2 m)	10 tapered to 4 (250 to 100)	7 gauge



TWIN TENON DETAIL



TENON DETAIL

GENERAL NOTES

See Standard 836001 for Light Pole Foundation and grounding electrode.

See Standard 720001 for pole Identification banding to pole.

Provide breakaway devices where required.

Where anchor rods on existing bridge parapets are too short to mount poles as shown, install leveling plate directly on concrete and level with stainless steel washers.

All dimensions are in inches (millimeters) unless otherwise shown.

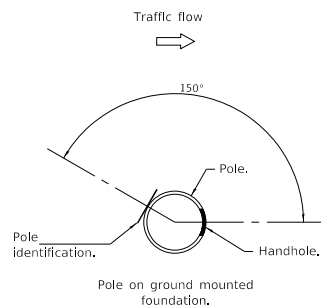
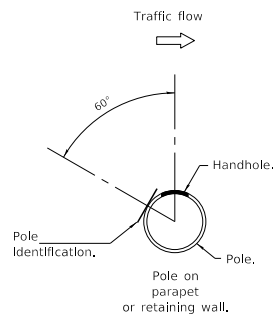
DATE	REVISIONS
1-1-19	Revised BASE PLATE and LIGHT POLE tables.
1-1-14	Added pole mounted on bridge parapet. Modified attachment of screen.

LIGHT POLE STEEL TENON TOP

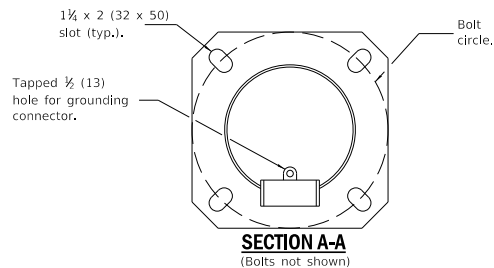
(Sheet 1 of 2)

STANDARD 830021-03

Illinois Department of Transportation	
PASSED <u>me ruppelt</u> January 1, 2019 ELECTRICAL AND MECHANICAL UNIT CHIEF	ISSUED 1-1-12
APPROVED <u>S. J. [Signature]</u> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	



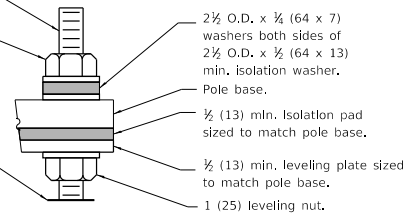
HANDHOLE / IDENTIFICATION ORIENTATION DETAIL



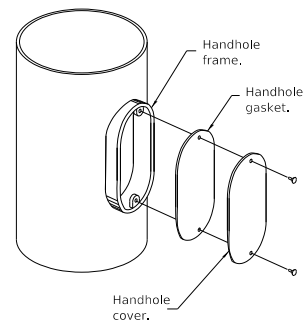
See Bridge Plans for 1 (25) anchor rod by others.

1 (25) self-locking nut, install with torque wrench to isolation pad man. specifications.

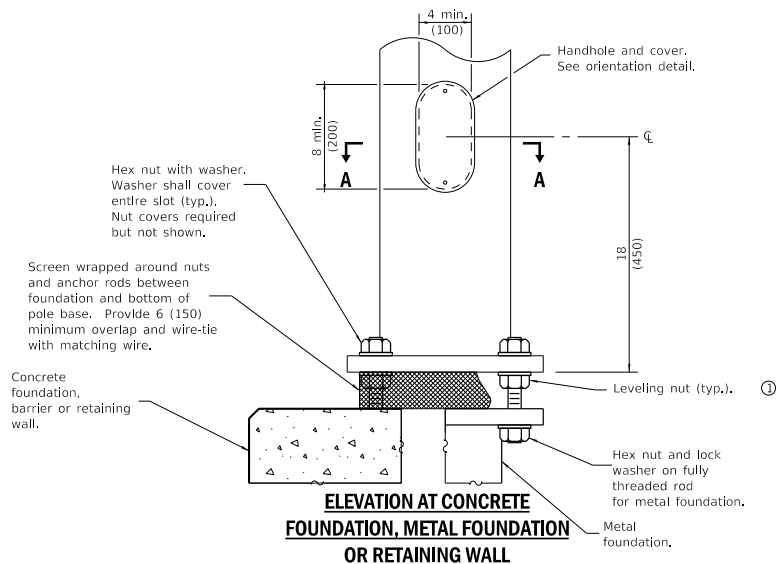
Bridge parapet.



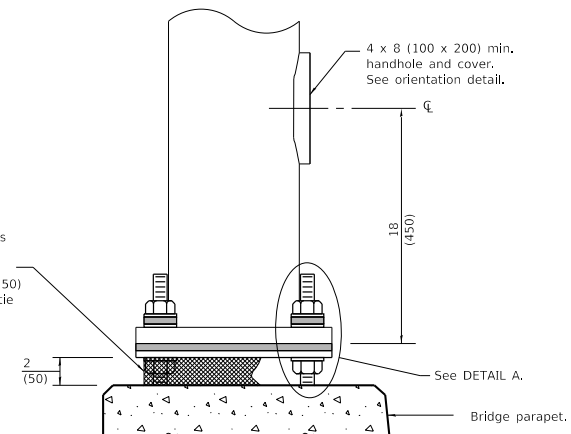
DETAIL A



HANDHOLE DETAIL



① Omit leveling nuts when breakaway devices are required.



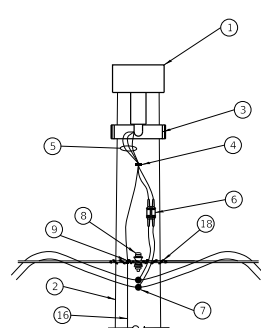
ELEVATION AT BRIDGE PARAPET POLE BASE DETAILS

LIGHT POLE STEEL TENON TOP

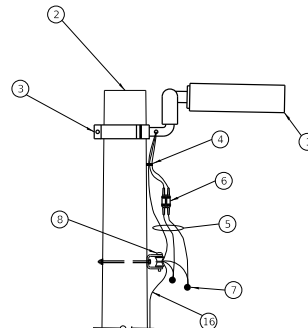
(Sheet 2 of 2)

STANDARD 830021-03

Illinois Department of Transportation	
PASSED	January 1, 2019
<i>me. ruppelt</i>	
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 1, 2019
<i>S. J. Egan</i>	
ENGINEER OF DESIGN AND ENVIRONMENT	



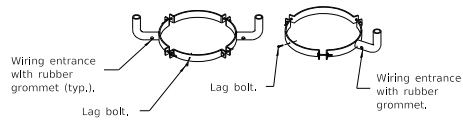
FACING VIEW



SIDE VIEW

**LUMINAIRE
MOUNTING DETAILS**

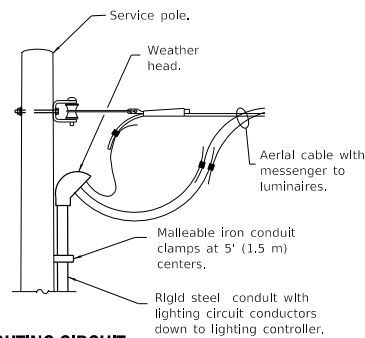
43' - 44' (13.1 m - 13.4 m) mounting height
unless noted otherwise on plans.



TWIN

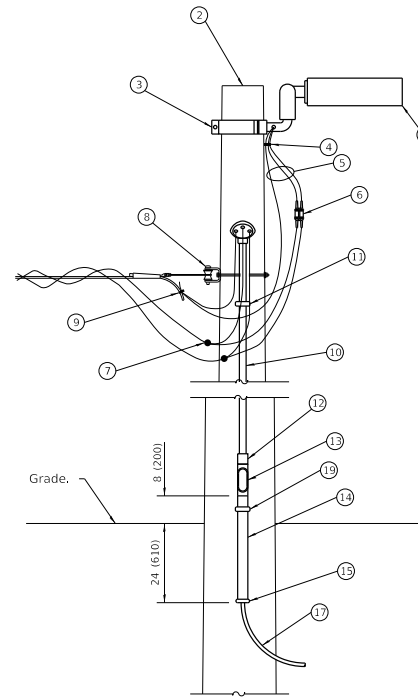
SINGLE

MOUNTING BRACKET DETAILS



**LIGHTING CIRCUIT
AT SERVICE/CONTROLLER**

See standard 825001 for
service installation.



**LIGHT POLE WITH
CIRCUIT ROUTED
UNDERGROUND**

- ① Luminaire.
- ② Wood light pole, 50' (15.2 m), class 3 (typ.). *
- ③ Luminaire mounting bracket.
- ④ Cable clamps on 24 (600) centers.
- ⑤ Three #10 XLP-USE cable.
- ⑥ Waterproof, two-pole fuse holder with fuses.
- ⑦ Waterproof insulation piercing tap connector.
- ⑧ Heavy duty insulated pulley clevis with mounting bolt and hardware.
- ⑨ Ground clamp.
- ⑩ 1 (25) rigid steel conduit. *
- ⑪ Malleable iron conduit clamps, 5' (1.5 m) intervals.
- ⑫ Threaded conduit reducer.
- ⑬ "C" conduit, threaded.
- ⑭ 1½ (40) rigid steel conduit. *
- ⑮ Conduit bushing.
- ⑯ #6 Bare copper ground wire to 10 ft. ground rod, every third light pole.
- ⑰ Unit duct.
- ⑱ Wire tie.
- ⑲ Malleable iron conduit clamp below "C" conduit.

* Size larger as needed.

GENERAL NOTES

See plans for wire and unit duct sizes and pole locations not shown.

Provide guy wires with strain Insulators and anchors, as needed.

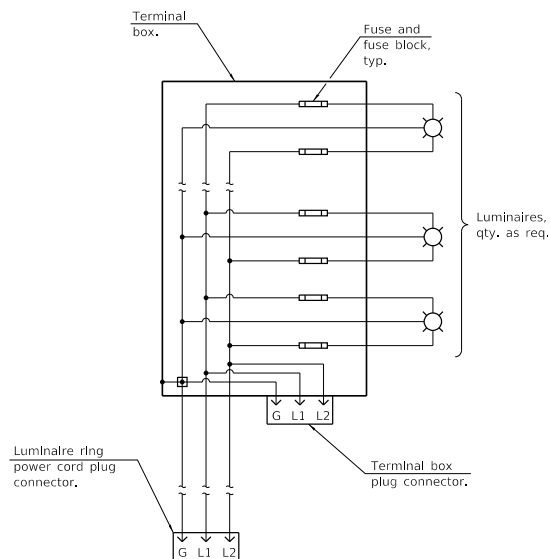
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED <u>me ruppelt</u> January 1, 2019 ELECTRICAL AND MECHANICAL UNIT CHIEF	ISSUED 1-1-17
APPROVED <u>S. J. [Signature]</u> January 1, 2019 ENGINEER OF DESIGN AND ENVIRONMENT	

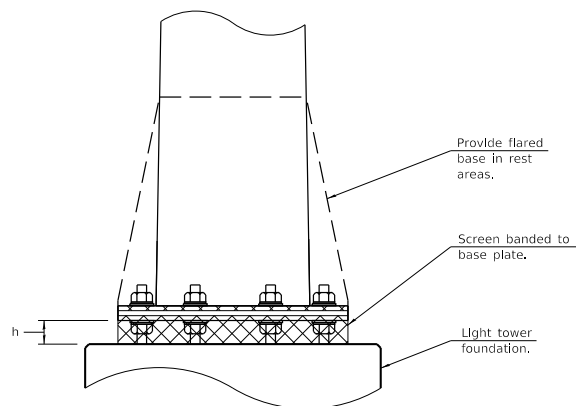
DATE	REVISIONS
1-1-19	Revised Luminaire to be horizontal.
1-1-13	New standard.

**TEMPORARY ROADWAY
LIGHTING**

STANDARD 830026-01

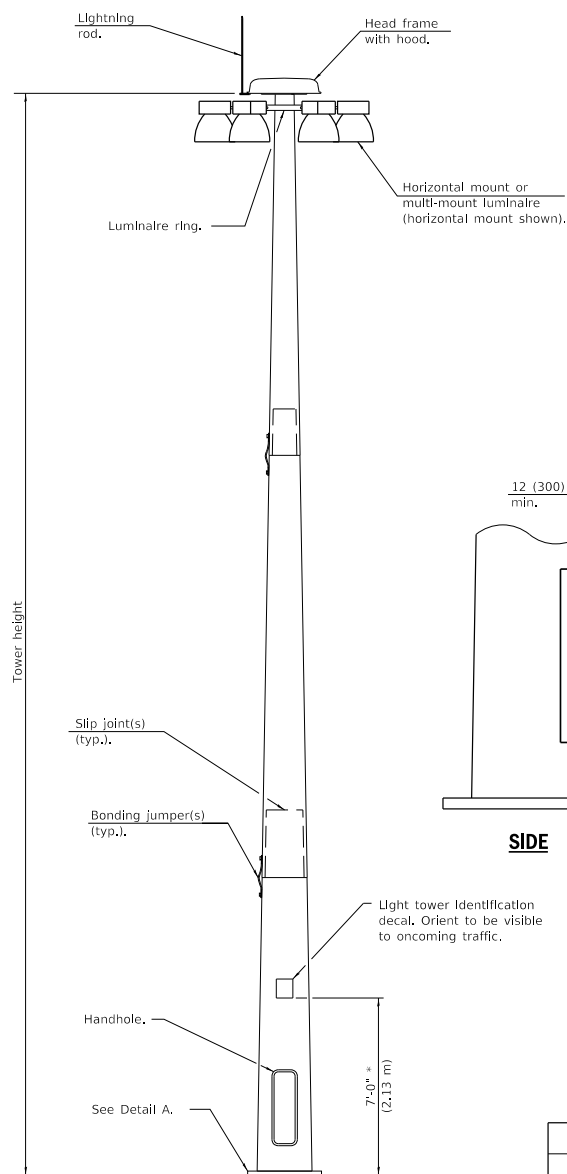


**LUMINAIRE RING
WIRING DIAGRAM**



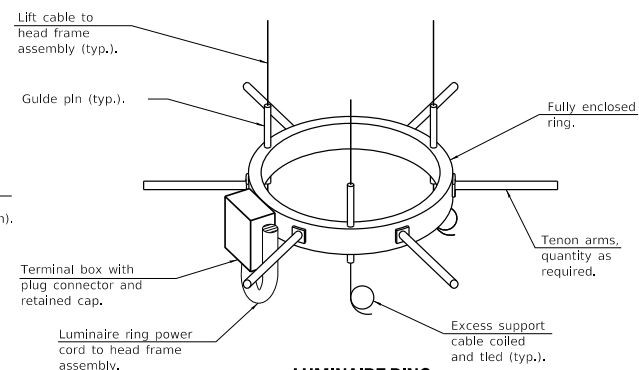
DETAIL A

h = Anchor rod dia. + leveling nut and washer thickness.



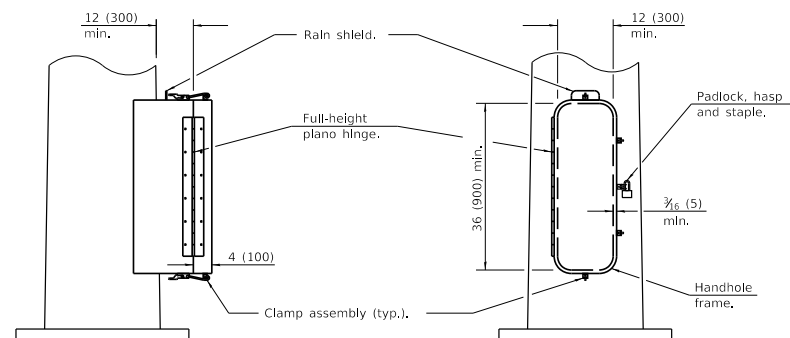
LIGHT TOWER

* Unless directed otherwise by the Engineer.



LUMINAIRE RING

(Two or three lift cable system permitted, three lift cable type shown.)



SIDE

FRONT

HANDHOLE

GENERAL NOTES

See Standard 837001 for High Mast Tower Foundation and grounding electrode.

All dimensions are in inches (millimeters) unless otherwise shown.

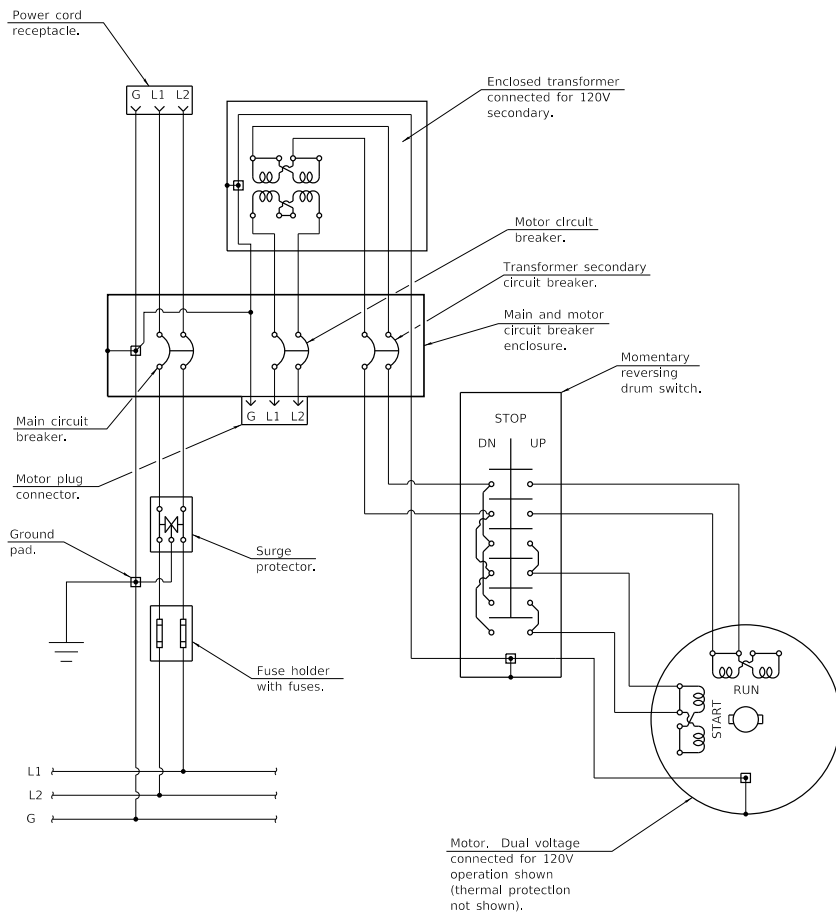
DATE	REVISIONS
1-1-15	Added light tower
	Identification decal.
	Modified Detail A.
1-1-11	New Standard.

LIGHT TOWER

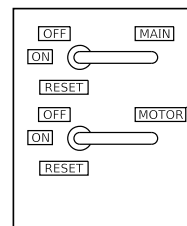
(Sheet 1 of 2)

STANDARD 835001-01

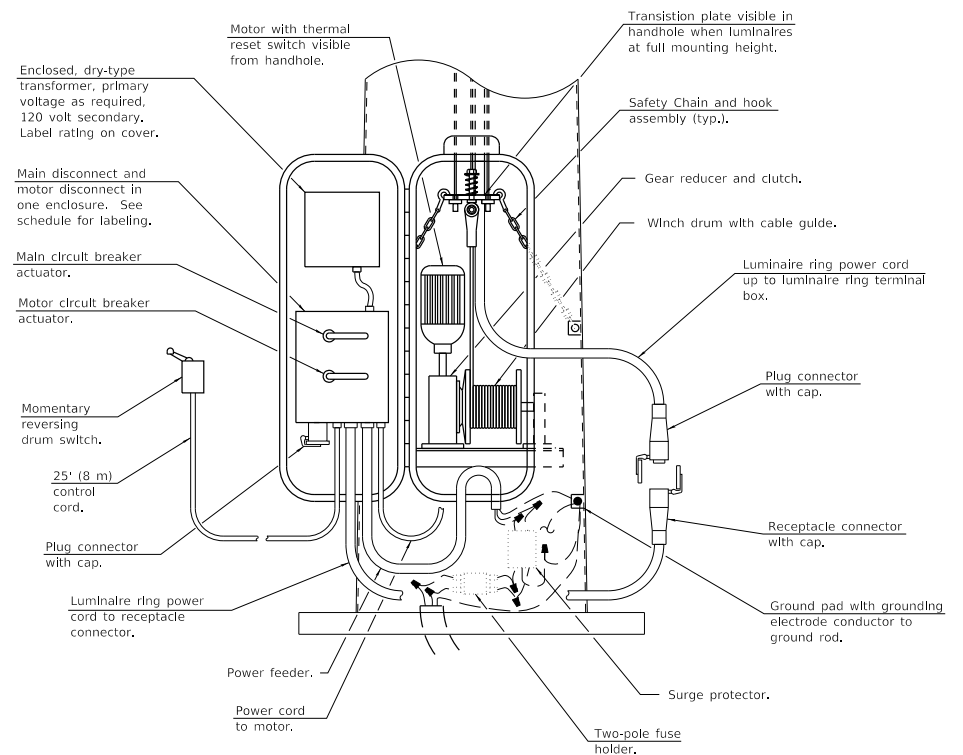
Illinois Department of Transportation	
APPROVED: <i>Charles G. [Signature]</i> January 1, 2015 ENGINEER OF PRELIMINARY ENGINEERING	ISSUED: 1-1-15
APPROVED: <i>[Signature]</i> January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	



LOWERING SYSTEM WIRING DIAGRAM



**DISCONNECT
SCHEDULE**



LOWERING AND SUPPORT MECHANISM

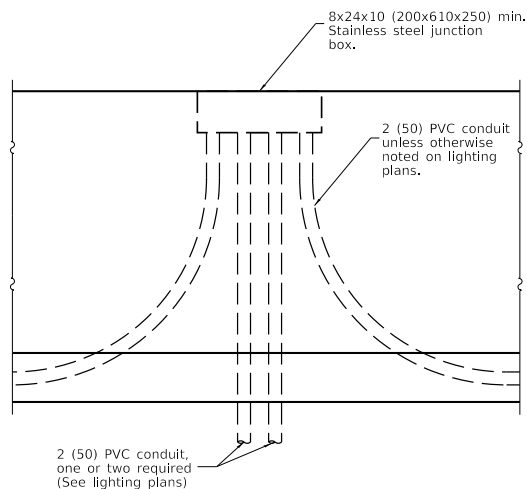
Illinois Department of Transportation	
APPROVED <i>Charles G. Miller</i> January 1, 2015 ENGINEER OF PRELIMINARY ENGINEERING	ISSUED 11-11-11
APPROVED <i>Charles G. Miller</i> January 1, 2015 ENGINEER OF DESIGN AND ENVIRONMENT	

LIGHT TOWER

(Sheet 2 of 2)

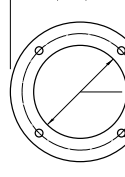
STANDARD 835001-01

FOUNDATION TABLE				
LIGHT POLE MOUNTING HEIGHT	SHAFT DIAMETER	SHAFT DEPTH	ANCHOR ROD LENGTH	ANCHOR ROD CIRCLE DIA.
≤30'	24	36	6'-2"	11½
(9.1 m)	(610)	(914)	(1.88 m)	(292)
31'-35'	24	3'-6"	6'-8"	11½
(9.4 m - 10.7 m)	(610)	(1.06 m)	(2.03 m)	(292)
36'-40'	30	4'-0"	7'-2"	15
(10.9 m - 12.2 m)	(762)	(1.22 m)	(2.18 m)	(381)
41'-45'	30	4'-6"	7'-8"	15
(12.5 m - 13.7 m)	(762)	(1.37 m)	(2.34 m)	(381)
46'-50'	30	5'-0"	8'-2"	15
(14.0 m - 15.2 m)	(762)	(1.52 m)	(2.49 m)	(381)

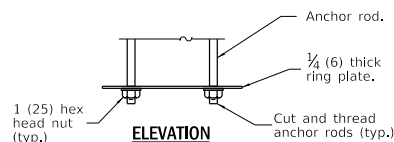


**JUNCTION BOX
ELEVATION**

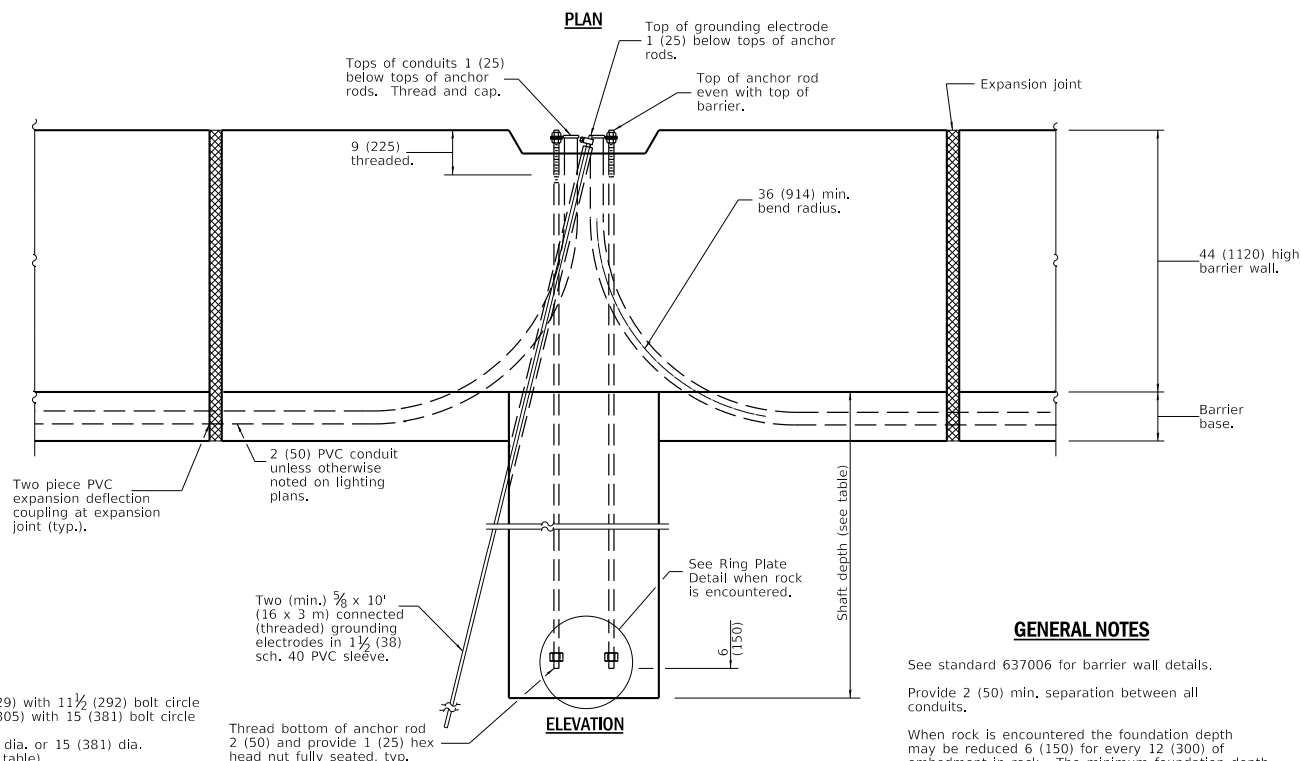
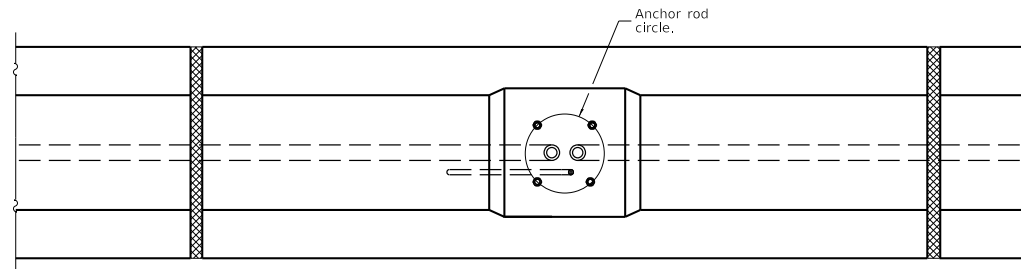
15 (381) O.D.
18 (457) O.D.



PLAN



RING PLATE DETAIL



ELEVATION

**LIGHT POLE
FOUNDATION**

GENERAL NOTES

See standard 637006 for barrier wall details.

Provide 2 (50) min. separation between all conduits.

When rock is encountered the foundation depth may be reduced 6 (150) for every 12 (300) of embedment in rock. The minimum foundation depth shall be 30 (760) with cut anchor rods 6 (150) above bottom of excavated hole. See ring plate detail.

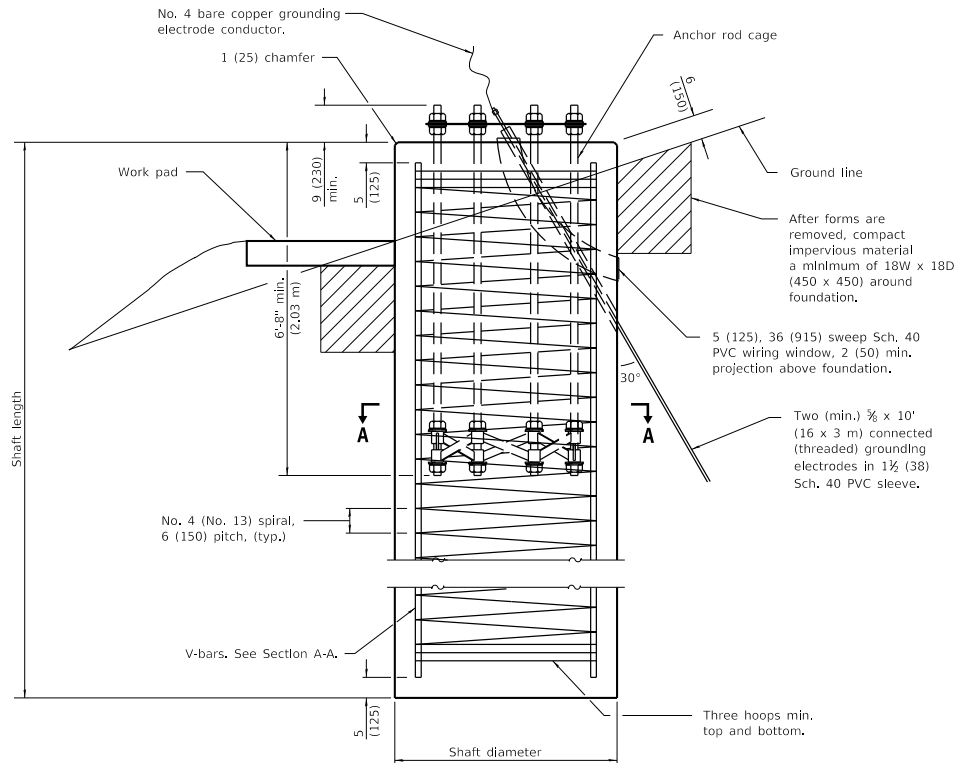
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	October 3, 2019
ME Repetto	
ELECTRICAL AND MECHANICAL UNIT CHIEF	
APPROVED	January 3, 2019
S. E. E.	
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED	1-1-13

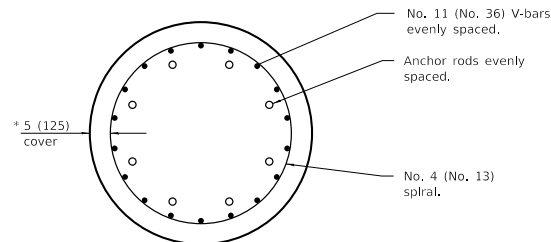
DATE	REVISIONS
1-1-19	Revised standard for new constant slope median barrier.
	Renamed standard.
1-1-14	Modified grounding method.
	Revised general notes.

LIGHT POLE FOUNDATION WITH 44 IN. (1120 mm) CONCRETE BARRIER

STANDARD 836011-02



FOUNDATION ELEVATION



SECTION A-A

* See Rod and Reinforcement Table.

SHAFT LENGTH TABLE														
SOIL CONSISTENCY		AVERAGE STRENGTH	LIGHT TOWER HEIGHT											
			80' (24 m)	90' (27 m)	100' (30 m)	110' (34 m)	120' (37 m)	130' (40 m)	140' (43 m)	150' (46 m)	160' (49 m)			
Cohesive	SOFT	< 0.5 (< 50)	20'-6" (6.2 m)	21'-6" (6.5 m)	22'-6" (6.9 m)	24'-0" (7.2 m)	25'-0" (7.6 m)	26'-6" (8.0 m)	27'-6" (8.3 m)	28'-6" (8.7 m)	30'-0" (9.1 m)			
	MEDIUM	0.5 to 1 (50 to 100)	17'-0" (5.1 m)	17'-6" (5.3 m)	18'-6" (5.6 m)	19'-0" (5.8 m)	20'-6" (6.2 m)	21'-6" (6.4 m)	22'-0" (6.7 m)	23'-6" (7.0 m)	24'-0" (7.3 m)			
	STIFF	1 to 2 (100 to 200)	14'-6" (4.4 m)	15'-0" (4.5 m)	15'-6" (4.7 m)	16'-0" (4.8 m)	17'-6" (5.2 m)	18'-0" (5.4 m)	18'-6" (5.5 m)	19'-6" (5.9 m)	20'-0" (6.1 m)			
	VERY STIFF	2 to 4 (200 to 400)	13'-0" (3.8 m)	13'-6" (3.9 m)	13'-6" (4.1 m)	14'-0" (4.2 m)	15'-0" (4.5 m)	15'-6" (4.6 m)	16'-0" (4.7 m)	17'-0" (5.1 m)	17'-6" (5.2 m)			
	HARD	> 4 (> 400)	11'-6" (3.5 m)	12'-0" (3.5 m)	12'-0" (3.6 m)	12'-6" (3.7 m)	13'-6" (4.0 m)	13'-6" (4.1 m)	14'-0" (4.2 m)	15'-0" (4.5 m)	15'-6" (4.6 m)			
			N in BLOWS/FT. (N in BLOWS/0.3m)											
Granular	VERY LOOSE	< 5 (< 5)	16'-6" (5.0 m)	17'-6" (5.2 m)	18'-0" (5.4 m)	18'-6" (5.6 m)	19'-0" (5.8 m)	20'-0" (6.0 m)	20'-6" (6.2 m)	21'-0" (6.3 m)	21'-6" (6.5 m)			
	LOOSE	5 to 10 (5 to 10)	15'-0" (4.6 m)	16'-0" (4.8 m)	16'-6" (4.9 m)	17'-0" (5.1 m)	17'-6" (5.3 m)	18'-0" (5.5 m)	18'-6" (5.6 m)	19'-0" (5.7 m)	19'-6" (5.9 m)			
	MEDIUM	10 to 25 (10 to 25)	14'-6" (4.4 m)	15'-0" (4.5 m)	15'-6" (4.7 m)	16'-0" (4.9 m)	16'-6" (5.0 m)	17'-0" (5.2 m)	17'-6" (5.3 m)	18'-0" (5.5 m)	18'-6" (5.6 m)			
	DENSE	25 to 50 (25 to 50)	14'-0" (4.1 m)	14'-6" (4.3 m)	15'-0" (4.5 m)	15'-6" (4.6 m)	15'-6" (4.7 m)	16'-6" (4.9 m)	16'-6" (5.0 m)	17'-0" (5.2 m)	17'-6" (5.3 m)			
	VERY DENSE	> 50 (> 50)	13'-0" (3.9 m)	13'-6" (4.1 m)	14'-0" (4.2 m)	14'-6" (4.4 m)	15'-0" (4.5 m)	15'-6" (4.7 m)	16'-0" (4.8 m)	16'-6" (4.9 m)	17'-0" (5.1 m)			

See Sheet 2 for GENERAL NOTES.

DATE	REVISIONS
1-1-15	Added 6'-8" min. anchor rod embedment in foundation.
1-1-14	Revised diameter of grd. electrode sleeve.

LIGHT TOWER FOUNDATION

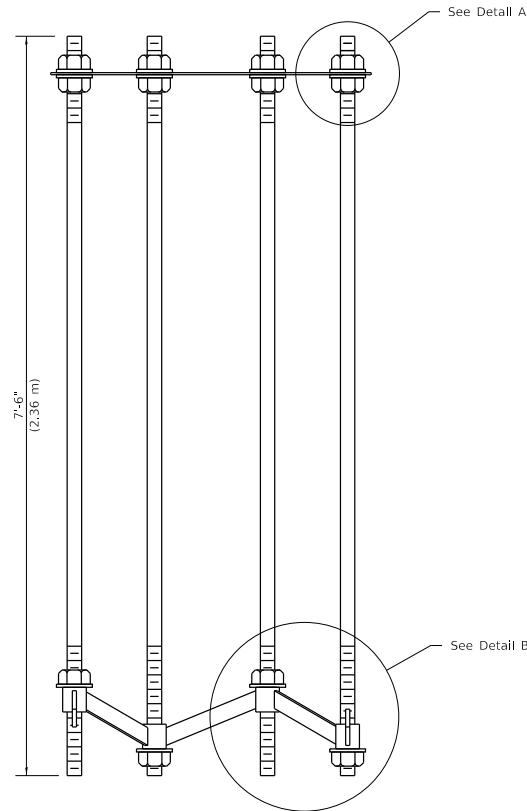
(Sheet 1 of 2)

STANDARD 837001-04

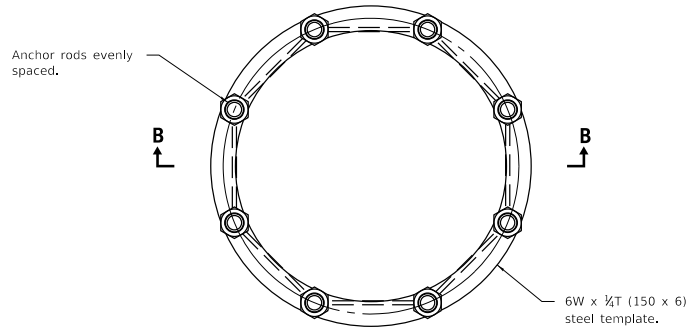
Illinois Department of Transportation	
APPROVED: <i>Charles G. Gentry</i>	January 1, 2015
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED: <i>John R. Gentry</i>	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

ROD AND REINFORCEMENT TABLE					
TOWER HEIGHT	ANCHOR ROD DIAM. (MIN)	ROD CIRCLE DIAM. (MIN)	TOWER BASE DIAM. (MIN)	DRILLED SHAFT DIAM. ①	V BAR QTY.
80' (25 m)	1½ (38)	30 (760)	24 (610)	4'-0" (1.2 m)	14
90' (27 m)	1½ (38)	30 (760)	24 (610)	4'-0" (1.2 m)	14
100' (30 m)	1½ (38)	30 (760)	24 (610)	4'-0" (1.2 m)	14
110' (34 m)	1½ (38)	30 (760)	24 (610)	4'-0" (1.2 m)	14
120' (37 m)	1¾ (44)	36 (915)	26 (660)	4'-6" (1.4 m)	18
130' (40 m)	1¾ (44)	36 (915)	28 (710)	4'-6" (1.4 m)	18
140' (43 m)	1¾ (44)	36 (915)	28 (710)	4'-6" (1.4 m)	18
150' (46 m)	2¼ (57)	38 (965)	30 (760)	5'-0" (1.5 m)	22
160' (49 m)	2¼ (57)	38 (965)	32 (810)	5'-0" (1.5 m)	22

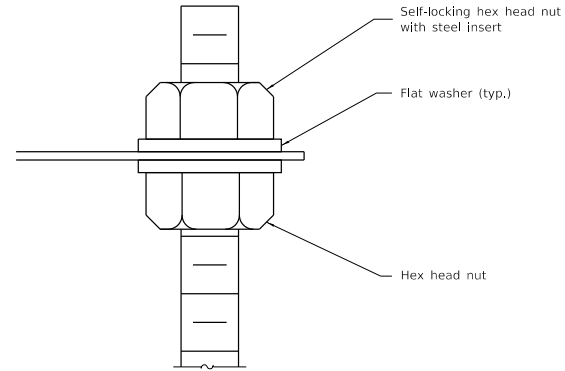
① Diameter based on a 5 (125) conc. cover. The min. cover shall be 3 (75) in dry shaft excavation and 4 (100) in a wet hole. When rock is encountered a 5 (125) cover against soil and a 2 (50) cover against rock shall be required.



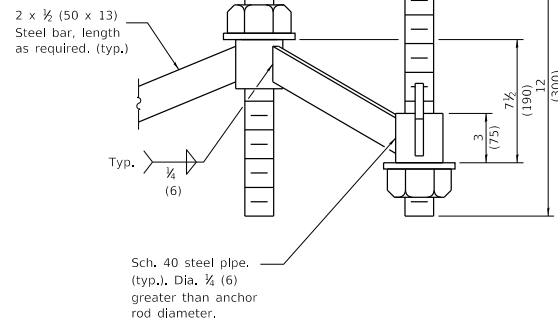
SECTION B-B



ANCHOR ROD CAGE (PLAN)



DETAIL A



DETAIL B

GENERAL NOTES

The shaft length(s) are based on soil borings in the plans. If different soils are encountered, the engineer shall be notified to provide a revised length.

Anchor rod quantity, diameter, and length shall be determined by the tower manufacturer and approved by the Engineer. Each foundation shall have a minimum of 8 anchor rods.

All foundation reinforcement steel shall be epoxy coated.

The cost of reinforcement shall be included in the cost of the foundation.

Steel anchor rod forms shall not be removed for a minimum of 3 days after concrete is poured. The tower shall not be set for a minimum of 7 days or as approved by the Engineer.

Coordinate the rod circle diameter of the tower with the diameter of the anchor rod cage.

The foundation shall be poured monolithically and shall have no construction joints.

Grounding electrodes shall be installed in an access well when there is a conflict in using the method shown.

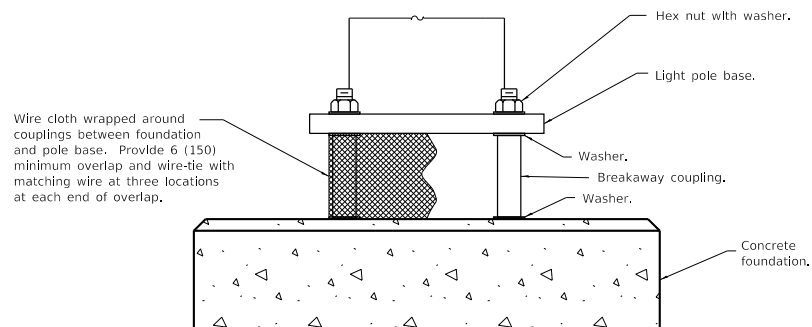
All dimensions are in inches (millimeters) unless otherwise shown.

LIGHT TOWER FOUNDATION

(Sheet 2 of 2)

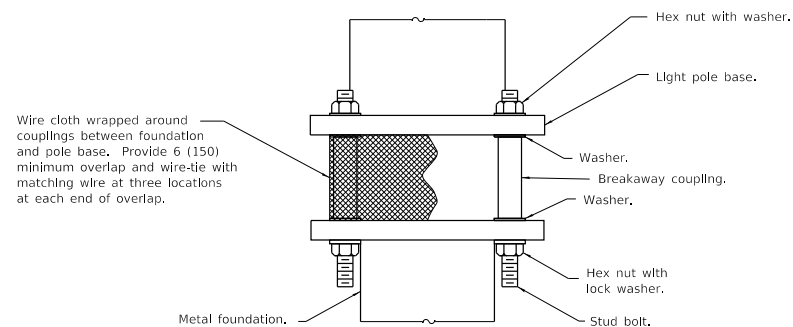
STANDARD 837001-04

Illinois Department of Transportation	
APPROVED January 1, 2015	ISSUED 11-1-10
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED January 1, 2015	
ENGINEER OF DESIGN AND ENVIRONMENT	



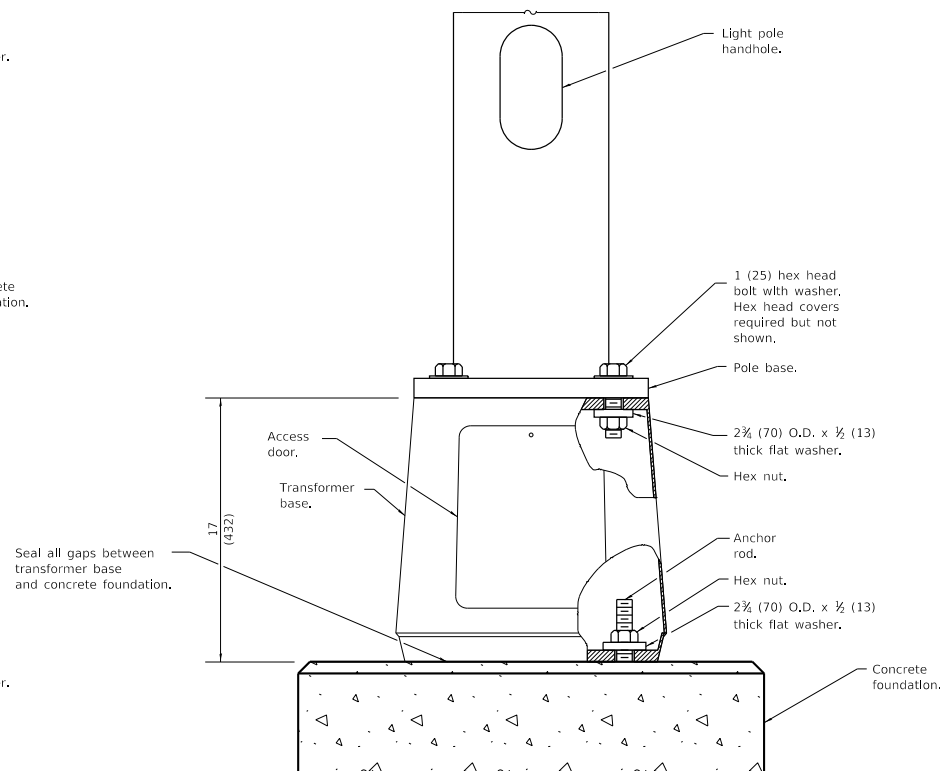
**BREAKAWAY COUPLINGS ON CONCRETE
FOUNDATION FOR STEEL LIGHT POLE**

(Provide pole base skirt around wire cloth when required.)



**BREAKAWAY COUPLINGS ON METAL
FOUNDATION FOR STEEL POLE**

(Provide pole base skirt around wire cloth when required.)



**BREAKAWAY TRANSFORMER BASE FOR
STEEL OR ALUMINUM POLE**

(Steel pole shown)

See Sheet 2 for GENERAL NOTES.

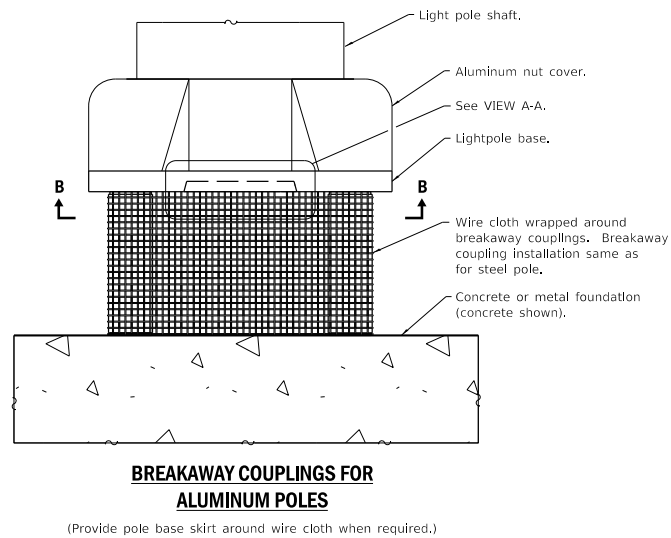
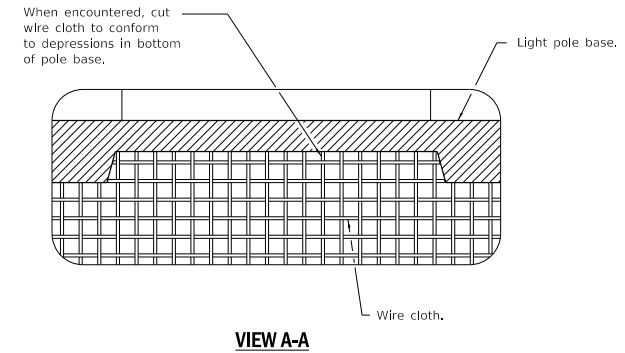
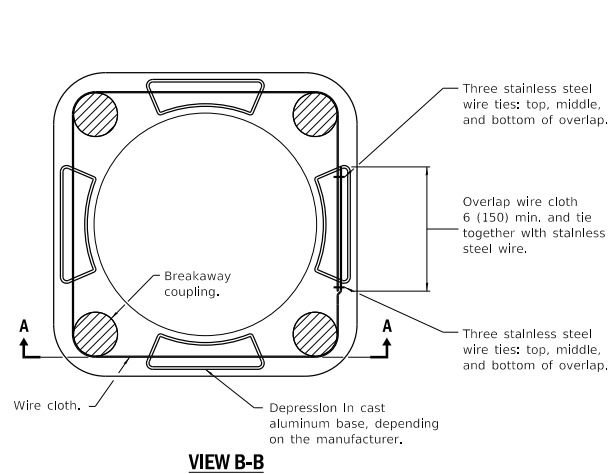
Illinois Department of Transportation	
PASSED	January 1, 2018
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED	January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-18	Revised to show rodent shield installation for aluminum poles.
1-1-14	New Standard.

BREAKAWAY DEVICES

(Sheet 1 of 2)

STANDARD 838001-01



GENERAL NOTES

See light pole standard for details not shown.

Use largest transformer base bolt circle possible.

Transformer bases shall not be installed on metal foundations.

Washers on top of pole base shall cover the entire bolt slot.

See Standard 836001 for Light Pole Foundation.

Wire cloth shall be stainless steel, have a maximum opening of $\frac{1}{4}$ (6), and have a minimum wire size of AWG No. 16 (1.6).

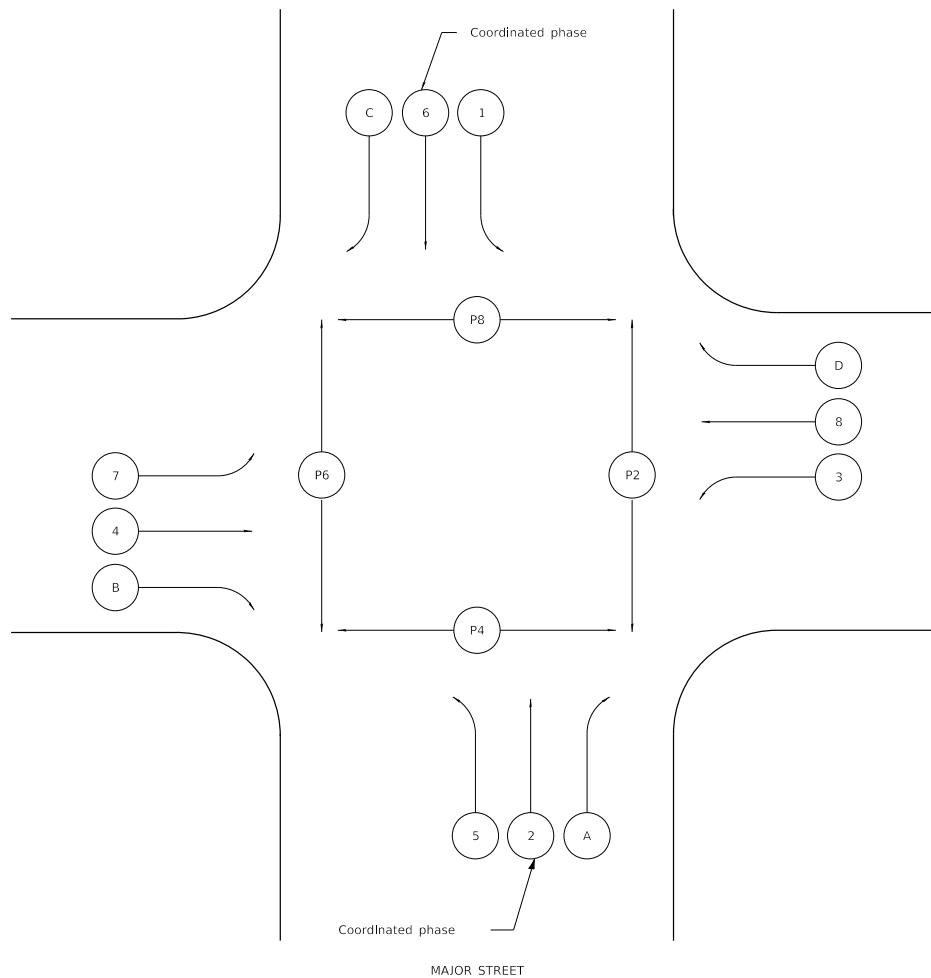
All dimensions are in inches (millimeters) unless otherwise shown.

BREAKAWAY DEVICES

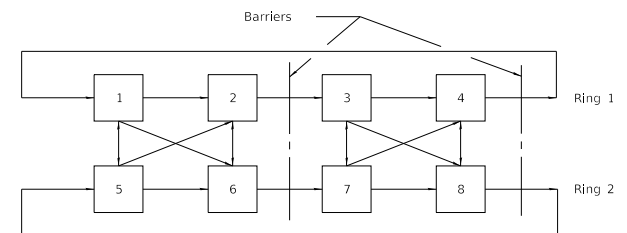
(Sheet 2 of 2)

STANDARD 838001-01

Illinois Department of Transportation	
PASSED	January 1, 2018
ENGINEER OF PRELIMINARY ENGINEERING	
APPROVED	January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED 1-1-12	



STANDARD PHASE DESIGNATION DIAGRAM (NEMA)



**NEMA EIGHT PHASE DUAL RING
ACTUATED CONFIGURATION**

LEGEND

(X) , [X]

Vehicular phase no. x

(PX)

Pedestrian phase no. x

(A) , (B) , (C) , (D)

Right turn overlaps where:

(A) = (2) + (3)

(B) = (4) + (5)

(C) = (6) + (7)

(D) = (8) + (1)

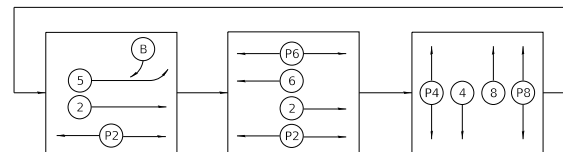
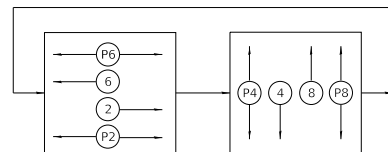
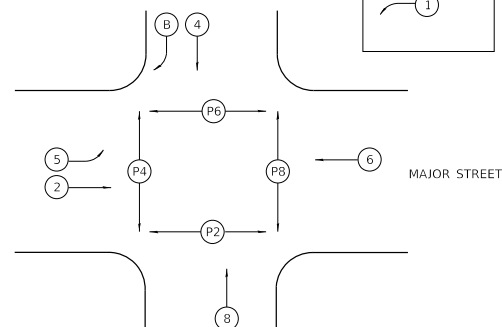
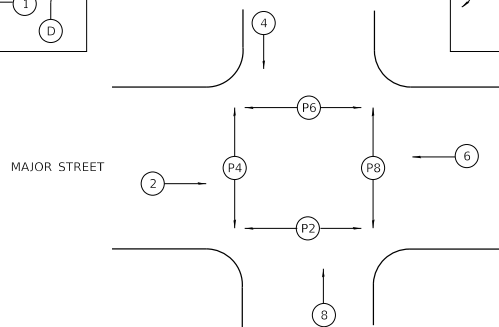
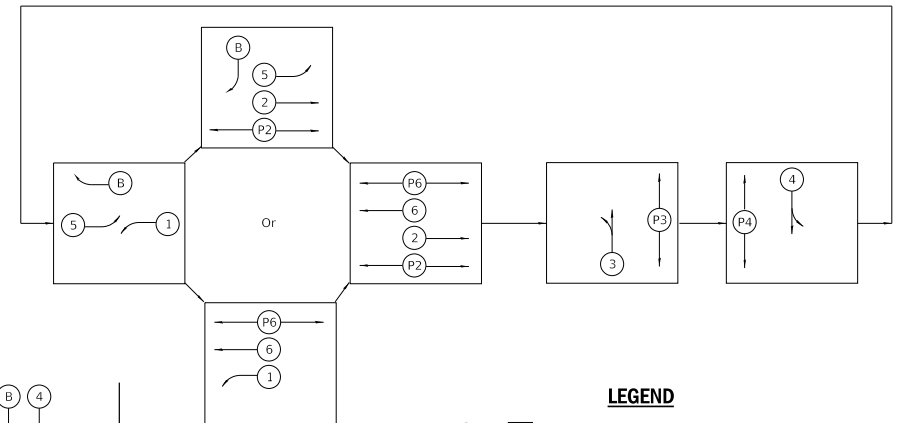
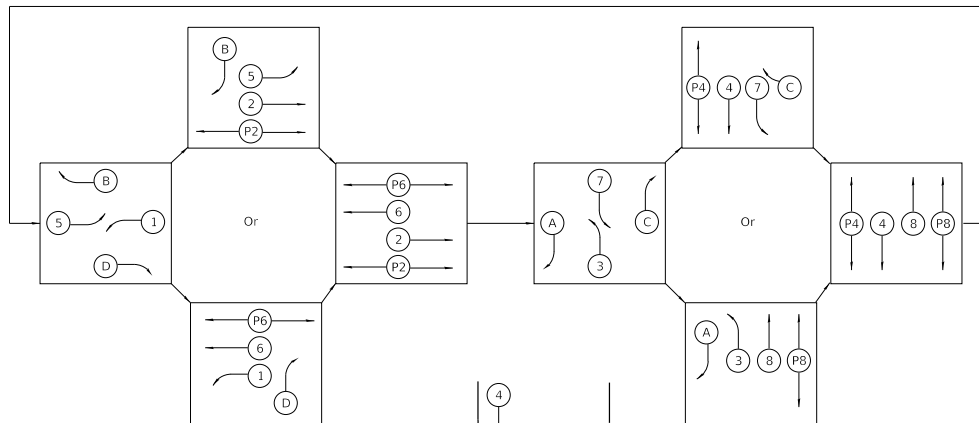
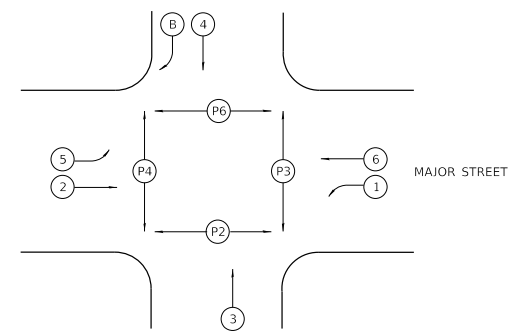
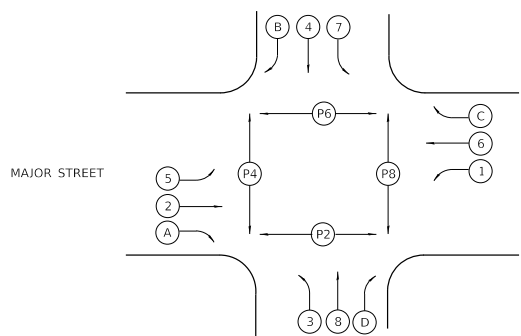
NEMA

National Electrical Manufacturers
Association

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-97

DATE	REVISIONS	STANDARD PHASE DESIGNATION DIAGRAMS AND PHASE SEQUENCES (Sheet 1 of 2)
1-1-09	Omitted note regarding units of length.	
1-1-97	Renum. Standard 2393-2.	
		STANDARD 857001-01



LEGEND

- (X) , (X) Vehicular phase no. x
- (PX) Pedestrian phase no. x
- (A) , (B) , (C) , (D) Right turn overlaps where:
- A = 2 + 3
- B = 4 + 5
- C = 6 + 7
- D = 8 + 1
- NEMA National Electrical Manufacturers Association

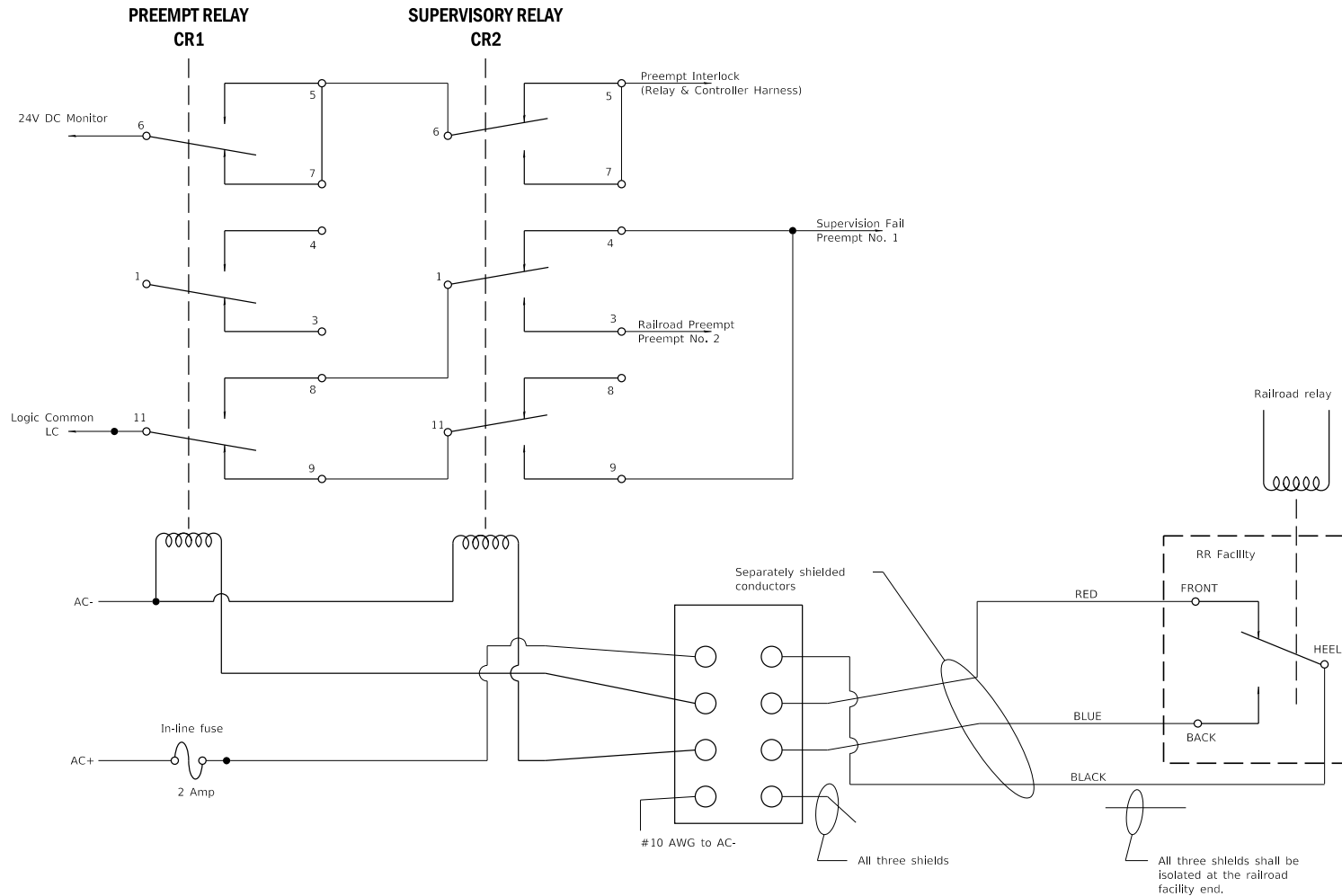
PHASE DESIGNATION DIAGRAMS AND CORRESPONDING PHASE SEQUENCES

STANDARD PHASE DESIGNATION DIAGRAMS AND PHASE SEQUENCES

(Sheet 2 of 2)

STANDARD 857001-01

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED	1-1-07



RELAYS IN NON-PREEMPT STATE - RAILROAD AND PREEMPT RELAYS ENERGIZED

GENERAL NOTES

CR1 and CR2 are 120VAC 3PDT Relays.

Supervision Fail is Preempt No. 1, causing traffic signal controller to implement all-red flash following track clearance phase.

Railroad Preempt is Preempt No. 2, causing traffic signal controller to implement railroad preemption routine following 1 second delay.

Preempt No. 1 and Preempt No. 2 shall have priority over all other preempts. The railroad preemption routine shall abbreviate each and all active pedestrian phases by immediately entering into flashing DON'T WALK and timing concurrently with the associated vehicle yellow change interval.

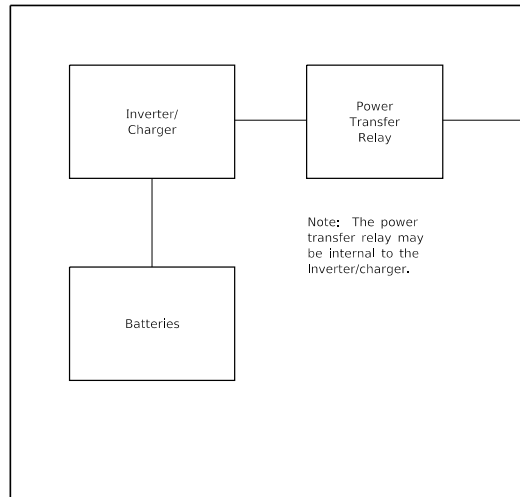
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-09	Omitted note regarding units of length.
1-1-04	New Standard.

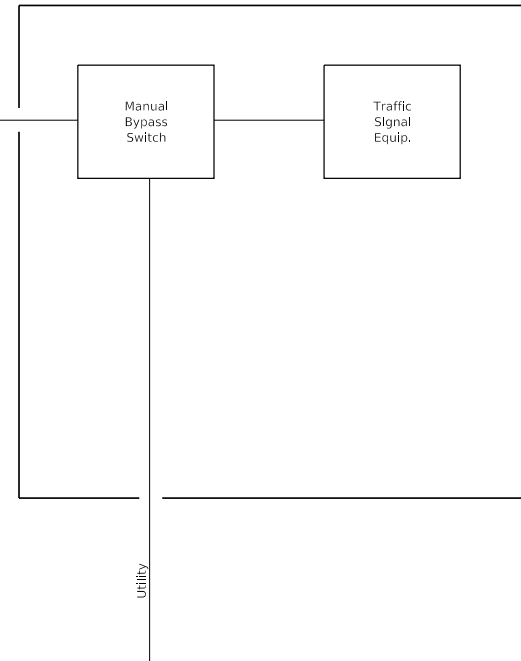
SUPERVISED RAILROAD INTERCONNECT CIRCUIT

STANDARD 857006-01

UPS CABINET



TRAFFIC SIGNAL (NEMA) CABINET



SINGLE LINE BLOCK DIAGRAM

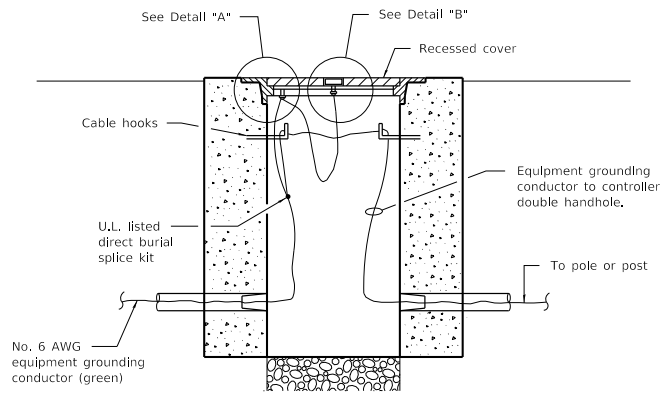
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 6-1-09

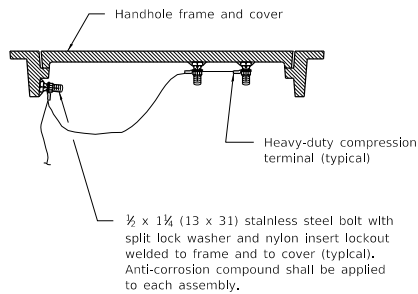
DATE	REVISIONS
1-1-09	Omitted note regarding units of length.
4-1-06	New Standard

UNINTERRUPTABLE POWER SUPPLY (UPS)

STANDARD 862001-01



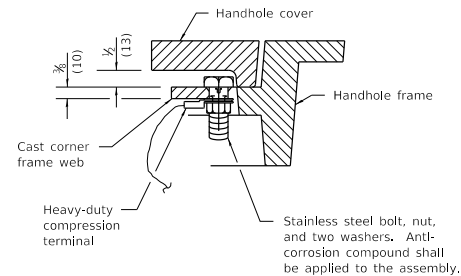
**BONDING A HANDHOLE
COVER & FRAME**



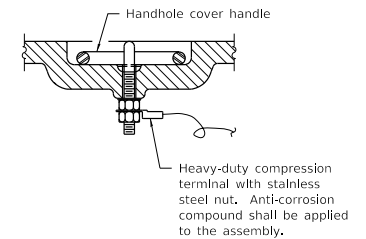
**BONDING AN EXISTING
HANDHOLE COVER & FRAME**



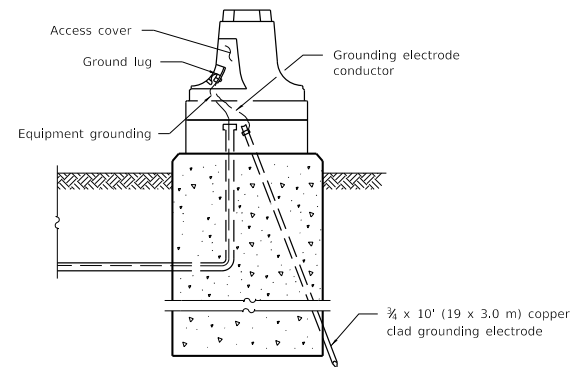
**HEAVY-DUTY
COMPRESSION TERMINAL**



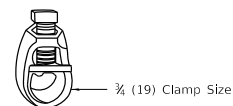
DETAIL "A"



DETAIL "B"



GROUNDING A MAST ARM POLE/POST



**HEAVY-DUTY
GROUND ROD CLAMP**

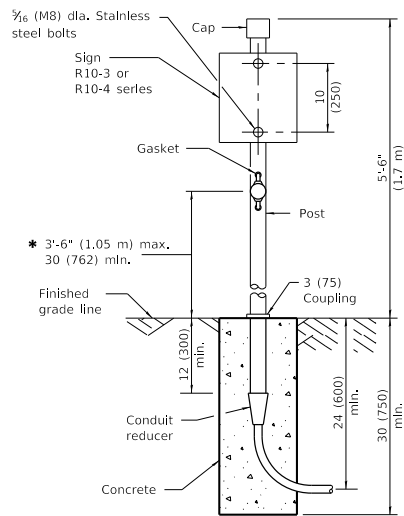
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

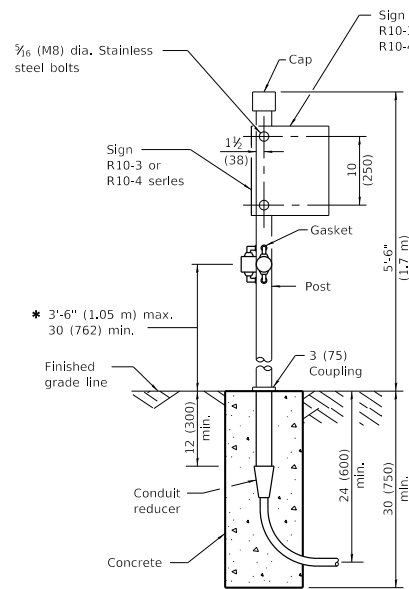
DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-07	Revised terminology.

TRAFFIC SIGNAL GROUNDING & BONDING

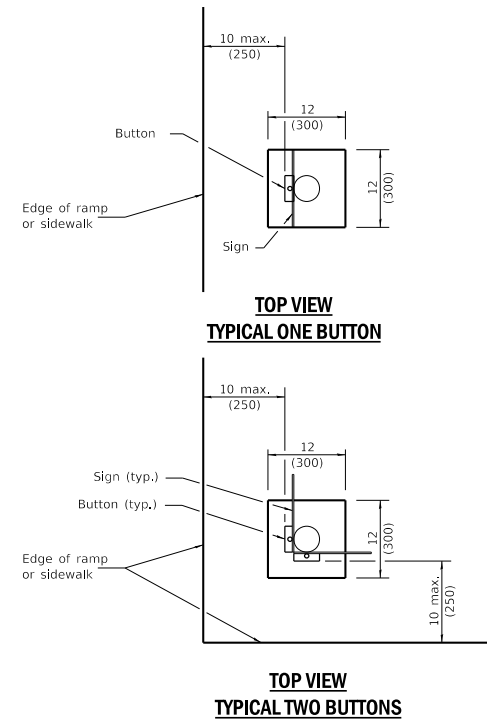
STANDARD 873001-02



PEDESTRIAN ONE PUSH BUTTON POST



PEDESTRIAN TWO PUSH BUTTON POST

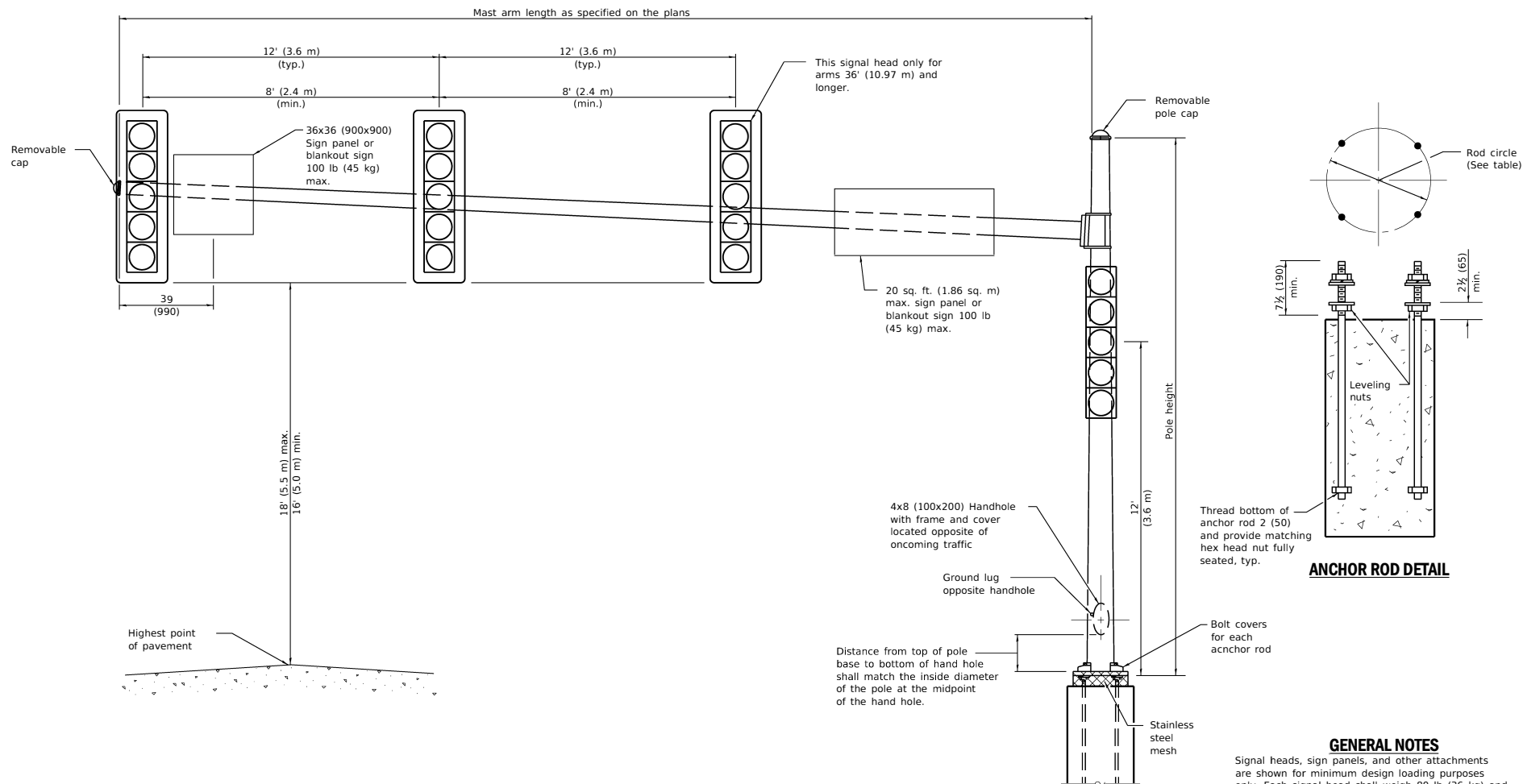


* 36 (914) preferred

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	April 1, 2016
ENGINEER OF OPERATIONS	
APPROVED	April 1, 2016
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS	PEDESTRIAN PUSH BUTTON POST STANDARD 876001-04
4-1-16	Revised sign numbers	
	for consistency with	
	current MUTCD.	
1-1-14	Revised and added	
	dimensions for PROWAG	
	reach range requirements.	



MAST ARM LENGTH	ANCHOR ROD CIRCLE	ANCHOR ROD SIZE
16' thru 20' (4.87 m thru 6.10 m)	18 (450)	1 3/4" x 7' (44 x 2.10 m)
42' thru 55' (12.80 m thru 16.80 m)	21 (535)	1 3/4" x 7' (44 x 2.10 m)

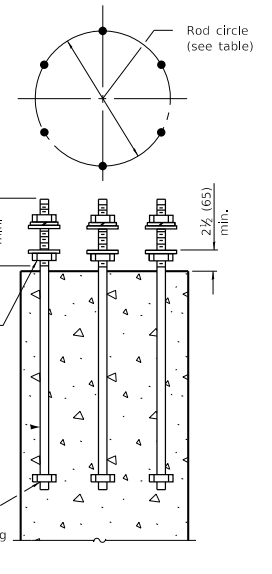
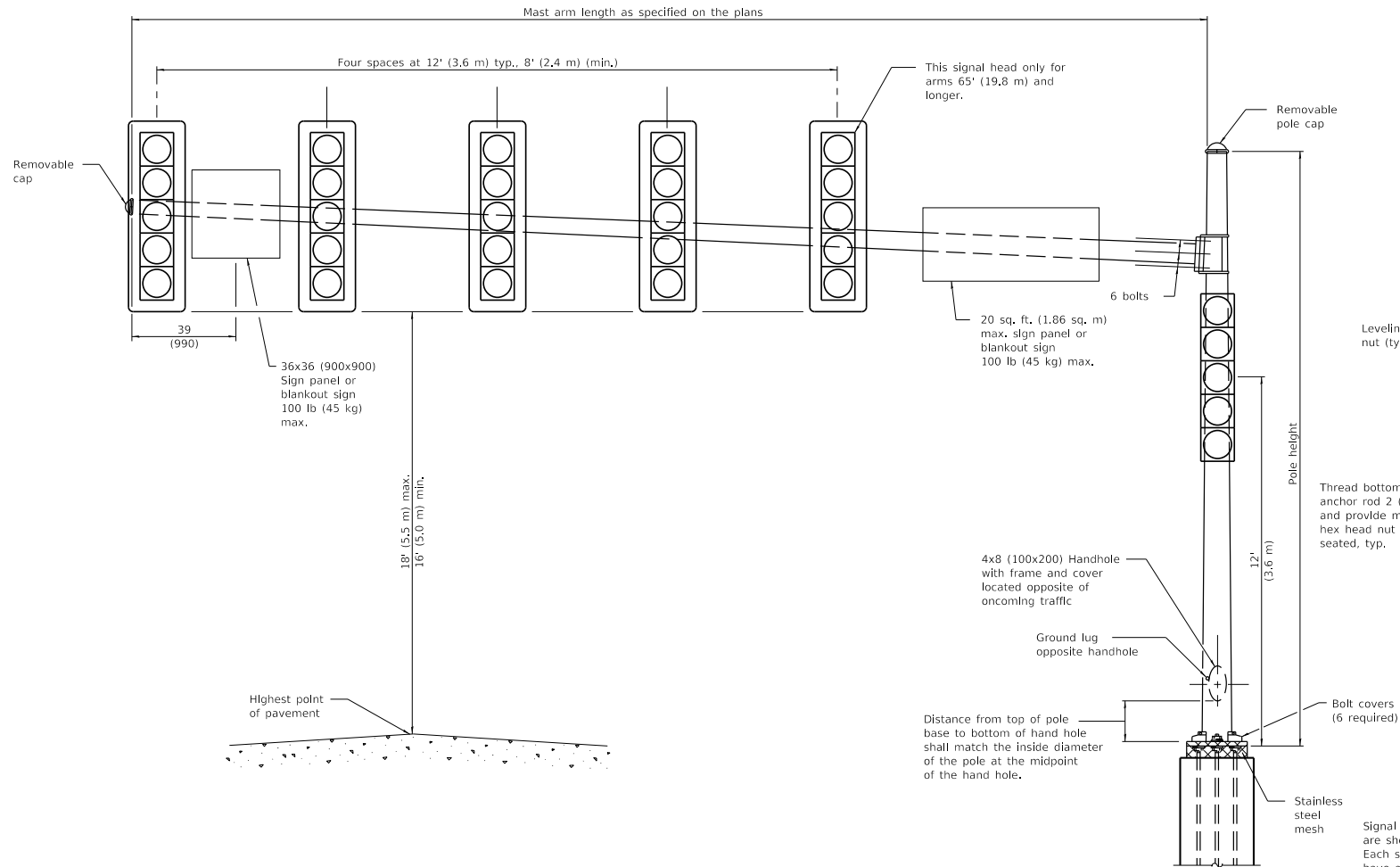
DATE	REVISIONS
1-1-18	Revised table for LRFD reqs.
	Revised GEN. NOTES for sign location. Rep. rod hooks with nuts.
4-1-16	Changed sign panel to 36x36.
	Added max. weight of 100 lb.
	Modified dim. to outer signal.

STEEL MAST ARM ASSEMBLY AND POLE 16' THROUGH 55'

STANDARD 877001-07

Illinois Department of Transportation	
PASSED	January 1, 2018
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-02



ANCHOR ROD DETAIL

GENERAL NOTES

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lbs. (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

See Standard 720016 for location of sign panel or blankout sign closest to pole.

All dimensions are in inches (millimeters) unless otherwise shown.

MAST ARM LENGTH	ANCHOR ROD CIRCLE	ANCHOR ROD SIZE
56' thru 64' (17.07 m thru 19.51 m)	24 (610)	1 3/4 x 7' (44 x 2.10 m)
65' thru 75' (19.81 m thru 22.86 m)	27 (685)	2 x 7'-6" (51 x 2.29 m)

DATE	REVISIONS
1-1-18	Rev. hand hole loc. Rev.
	Gen. Notes for sign loc.
	Replaced rod hooks with nuts.
4-1-16	Changed sign panel to
	36x36 and 100 lb max.

**STEEL MAST ARM
ASSEMBLY AND POLE
56' THROUGH 75'**

STANDARD 877002-04

Illinois Department of Transportation

PASSED January 1, 2018

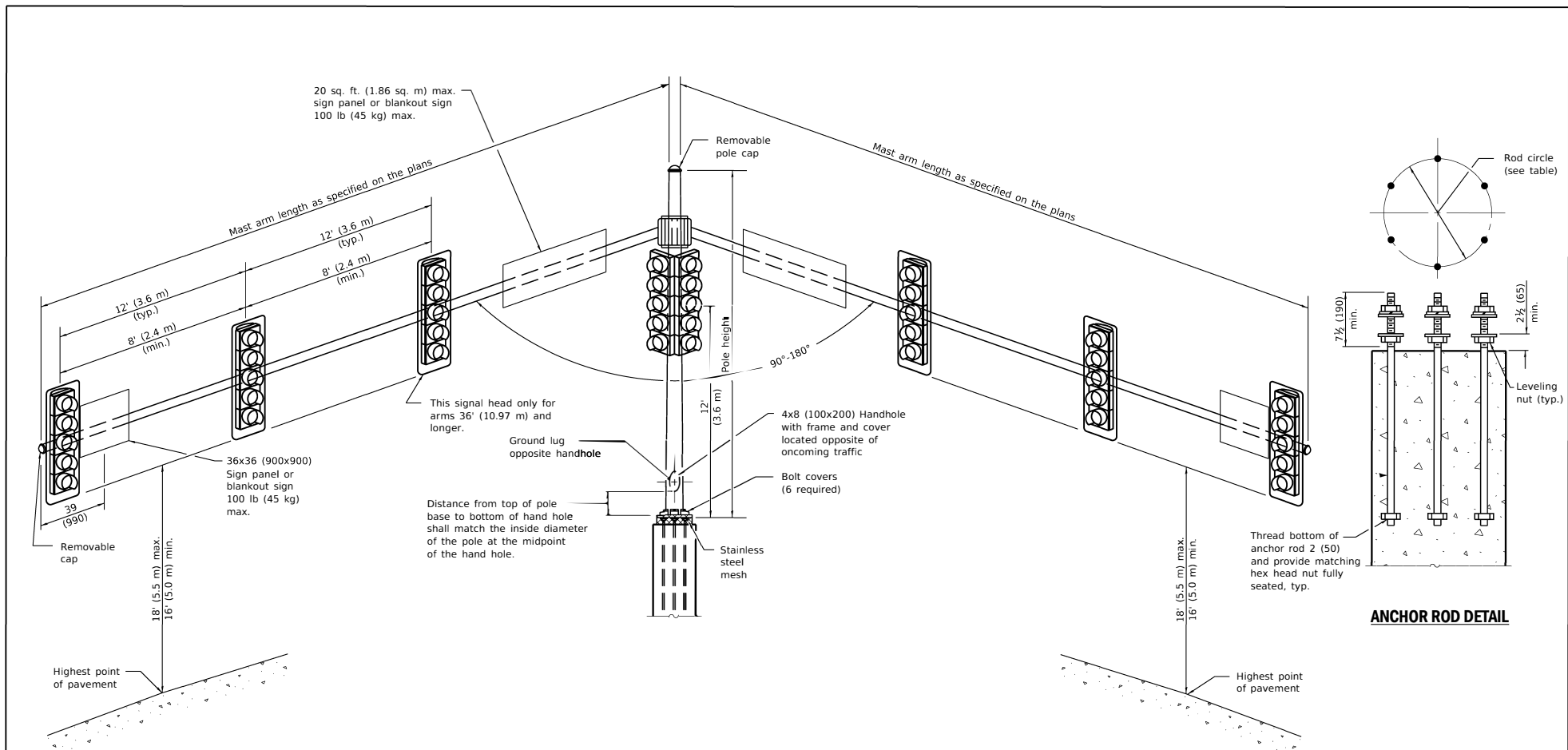
ENGINEER OF OPERATIONS

APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

15/15/18

80-1-1 CERTIFIED



ANCHOR ROD DETAIL

GENERAL NOTES

Signal heads, sign panels, and other attachments are shown for minimum design loading purposes only. Each signal head shall weigh 80 lb (36 kg) and have a projected area of 14.7 sq. ft. (1.37 sq. m).

See Standard 720016 for location of sign panels or blankout signs closest to pole.

All dimensions are in inches (millimeters) unless otherwise shown.

MAST ARM LENGTH	ANCHOR ROD CIRCLE	ANCHOR ROD SIZE
16' thru 30' (4.87 m thru 9.14 m)	18 (450)	1 3/4 x 7' (44 x 2.10 m)
32' thru 50' (9.75 m thru 15.24 m)	21 (535)	2 x 7'-6" (51 x 2.29 m)

DATE	REVISIONS	STEEL MAST ARM ASSEMBLY AND POLE WITH DUAL MAST ARMS STANDARD 877006-06
1-1-18	Revised for LRFD reqs. Revised GEN. NOTES for sign locaton.	
	Revised ANCHOR ROD DETAIL.	
4-1-16	Changed sign panel to 36x36.	
	Added max weight of 100 lb. Modified dim. to outer signal.	

Illinois Department of Transportation

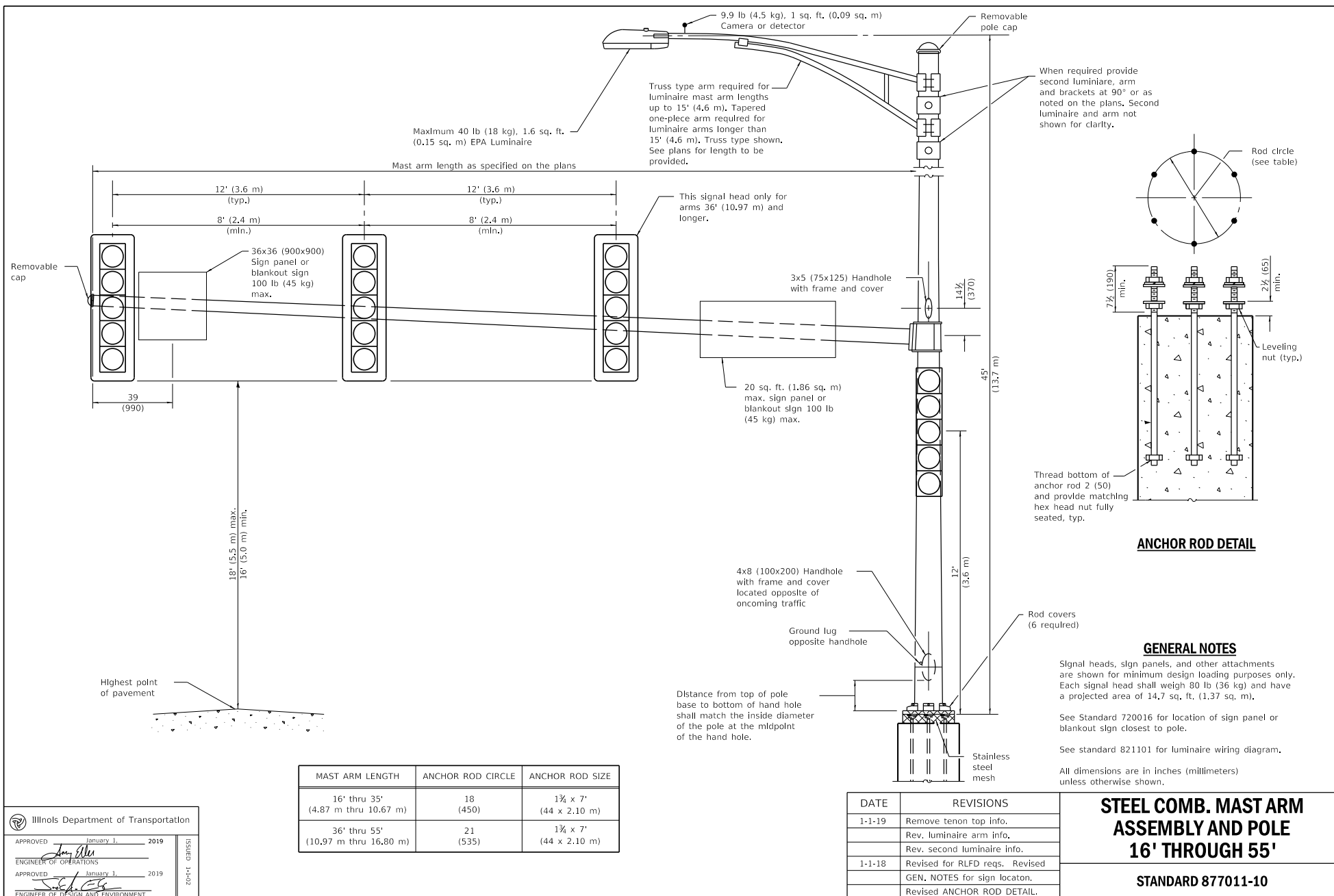
PASSED January 1, 2018

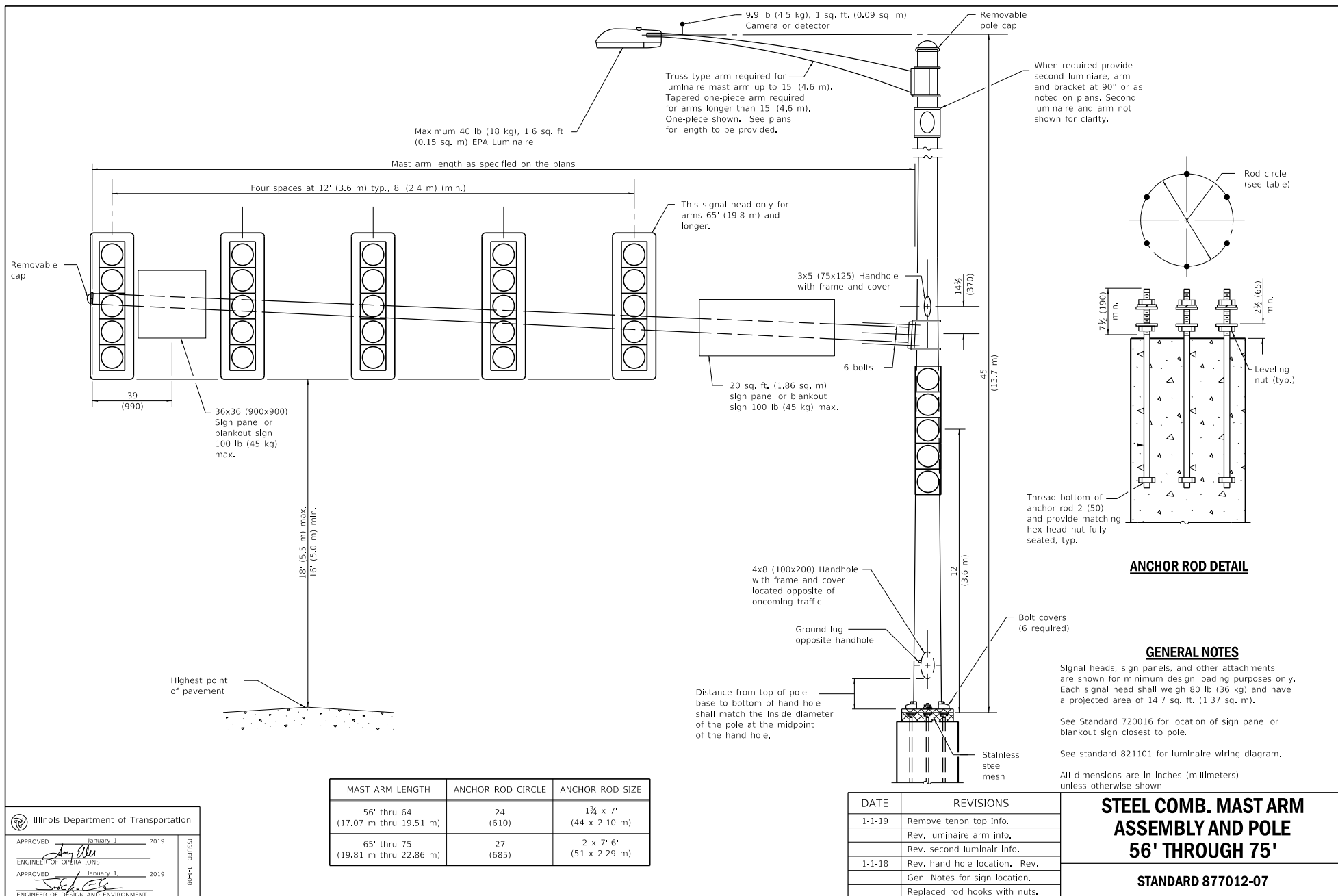
ENGINEER OF OPERATIONS

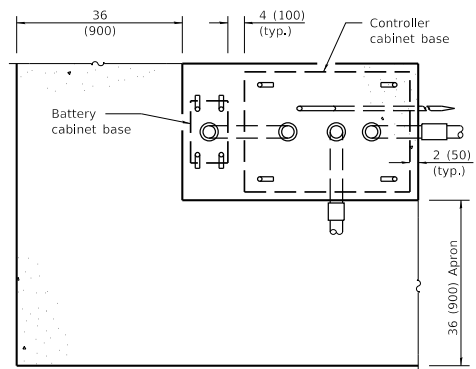
APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

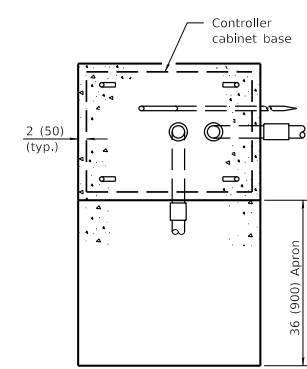
ISSUED 1-1-02



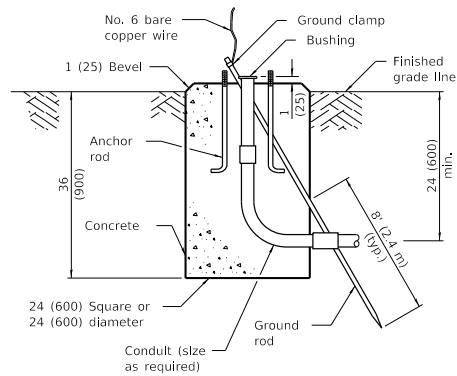




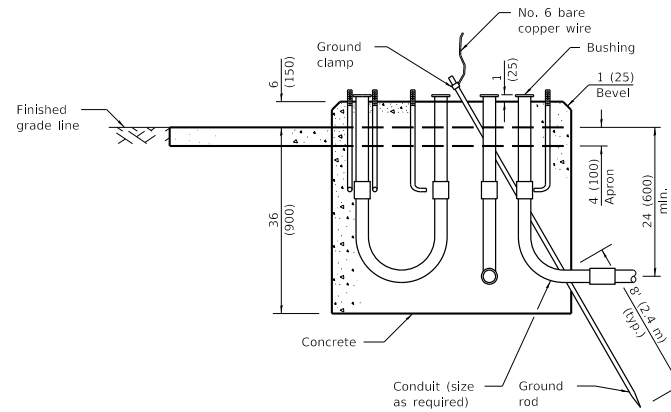
TOP VIEW



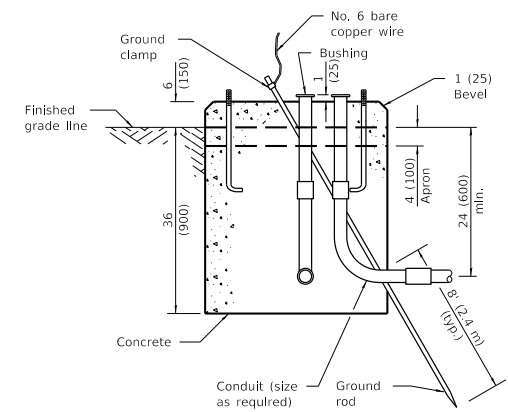
TOP VIEW



TYPE A



**TYPE C
FOR GROUND MOUNTED
CONTROLLER CABINET
AND UPS BATTERY CABINET**



**TYPE D
FOR GROUND MOUNTED
CONTROLLER CABINET**

All dimensions are in inches (millimeters)
unless otherwise shown.

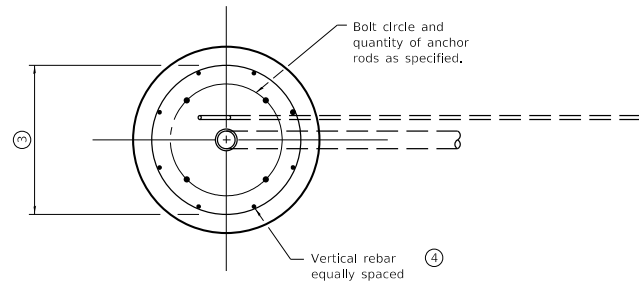
Illinois Department of Transportation	
PASSED	January 1, 2015
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

DATE	REVISIONS
1-1-15	Revised TYPE E detail.
1-1-12	Replaced rebar No.'s
	with 'Vertical' for TYPE E
	foundation detail.

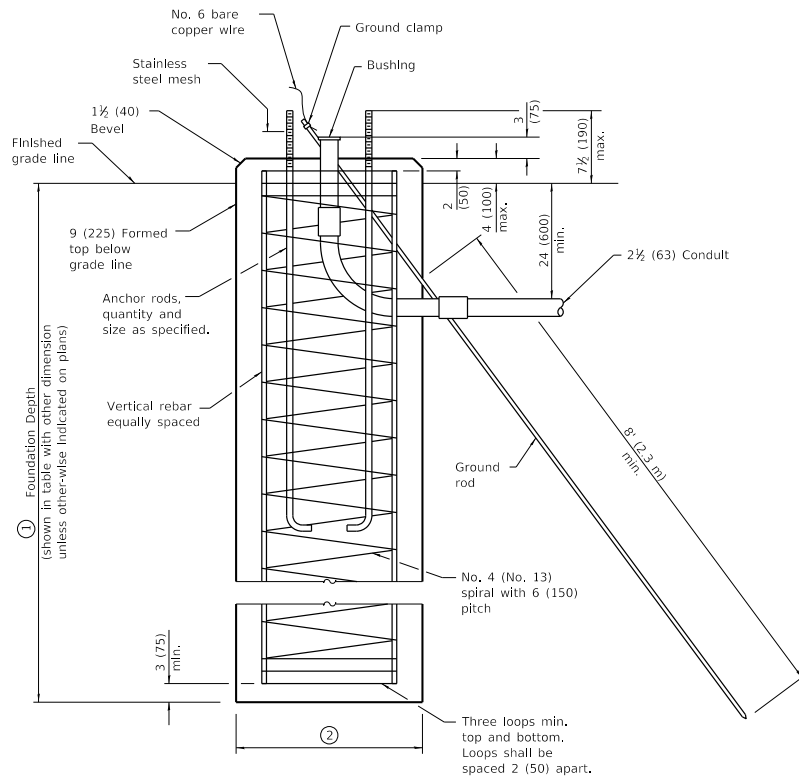
CONCRETE FOUNDATION DETAILS

(Sheet 1 of 2)

STANDARD 878001-10



TOP VIEW



TYPE E

Mast Arm Length	① Foundation Depth *	② Foundation Diameter	③ Spiral Diameter	④ Quantity of Rebars	Size of Rebars
Less than 30' (9.1 m)	10'-0" (3.0 m)	30 (750)	24 (600)	8	6 (19)
Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)	13'-6" (4.1 m)	30 (750)	24 (600)	8	6 (19)
Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)	11'-0" (3.4 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)	13'-0" (4.0 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 55' (16.8 m) and less than 65' (19.8 m)	15'-0" (4.6 m)	36 (900)	30 (750)	12	7 (22)
Greater than or equal to 65' (19.8 m) and up to 75' (22.9 m)	21'-0" (6.4 m)	42 (1060)	36 (900)	16	8 (25)
Greater than or equal to 75' (22.9 m)	25'-0" (7.6 m)	42 (1060)	36 (900)	16	8 (25)

* For standard and combination mast arm assemblies. Foundation depths for standard dual mast arms with the longest arm length upto and including 55' (16.8 m) shall be increased by 1' (0.3 m) of that shown in the table, based on the longer of the two arms.

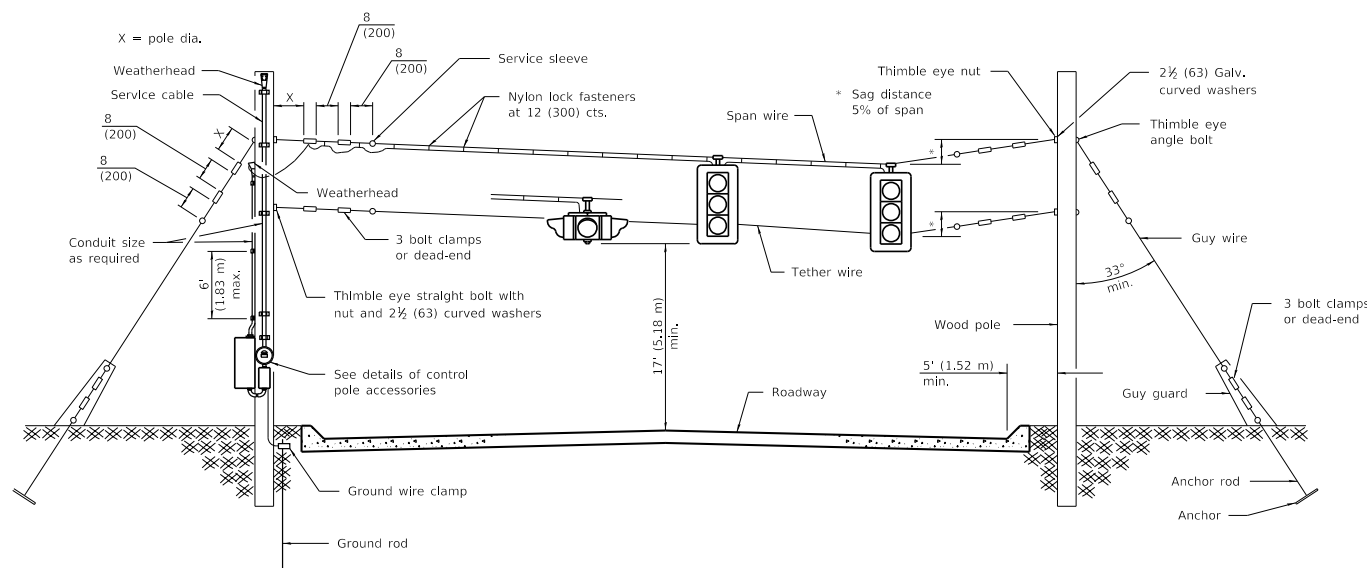
These foundation depths are for sites which have cohesive soils (clayey silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive Strength (Q_u) > 1.0 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

Illinois Department of Transportation	
PASSED	January 1, 2015
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2015
ENGINEER OF DESIGN AND ENVIRONMENT	

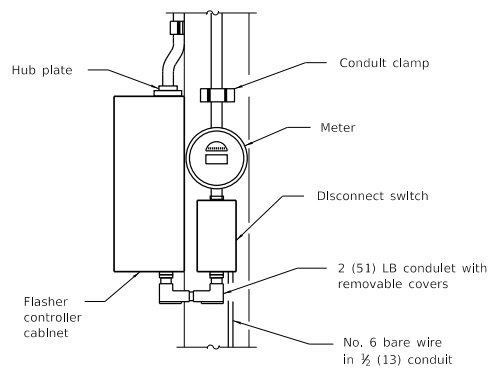
CONCRETE FOUNDATION DETAILS

(Sheet 2 of 2)

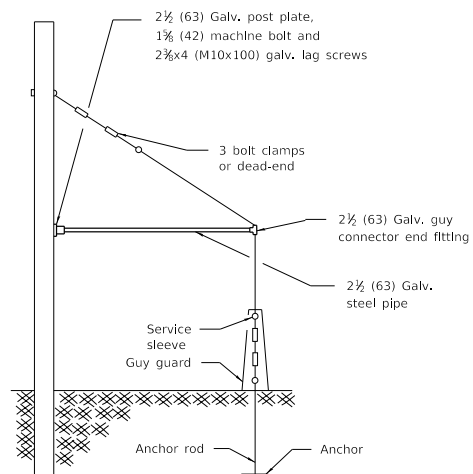
STANDARD 878001-10



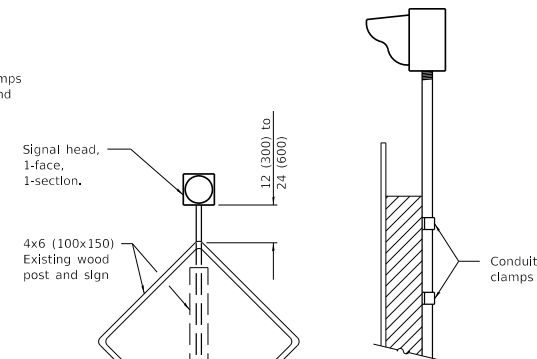
SPAN WIRE MOUNTED SIGNALS AND FLASHING BEACON



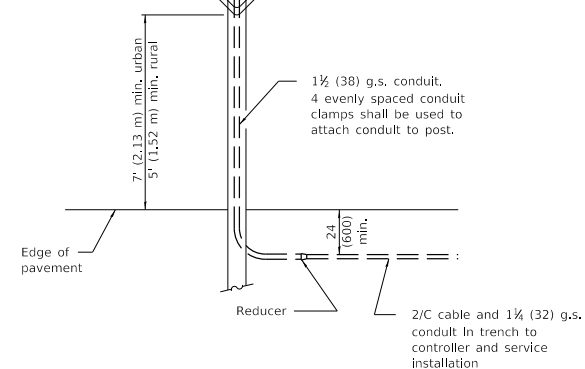
CONTROL POLE DETAIL



SIDEWALK GUY DETAIL



MOUNTING DETAIL



POST MOUNTED FLASHING BEACON

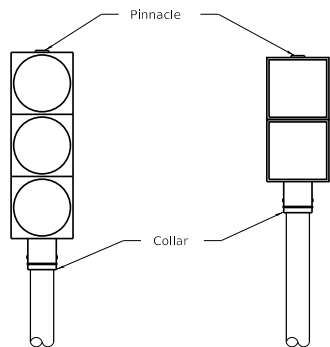
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-02	Renum. Standard 840001.

SPAN WIRE MOUNTED SIGNALS AND FLASHING BEACON INSTALLATION

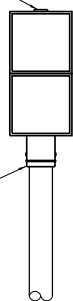
STANDARD 880001-01

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

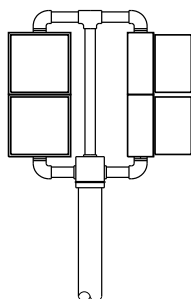


**POST MOUNTED
TRAFFIC SIGNAL HEAD**

ONE WAY

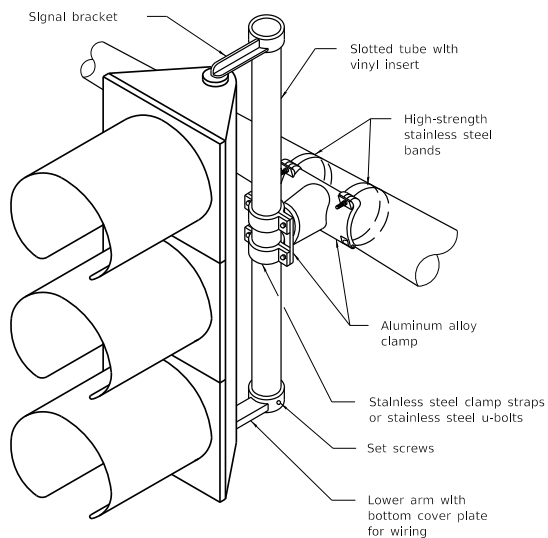


**POST MOUNTED
PEDESTRIAN SIGNAL HEAD**

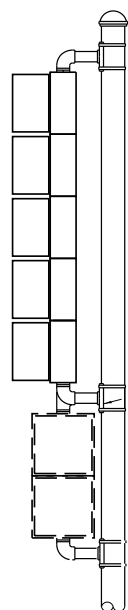


**POST MOUNTED
PEDESTRIAN SIGNAL HEAD**

TWO WAY

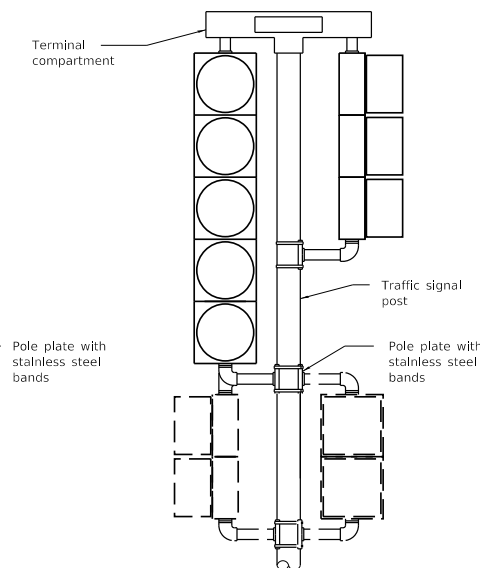


STEEL MAST ARM MOUNTING



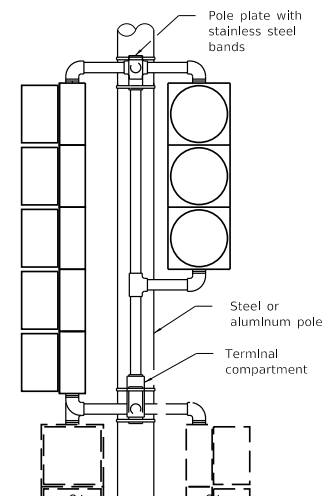
**BRACKET MOUNTED
TRAFFIC SIGNAL HEAD**

ONE WAY



**BRACKET MOUNTED
TRAFFIC SIGNAL HEAD**

TWO WAY



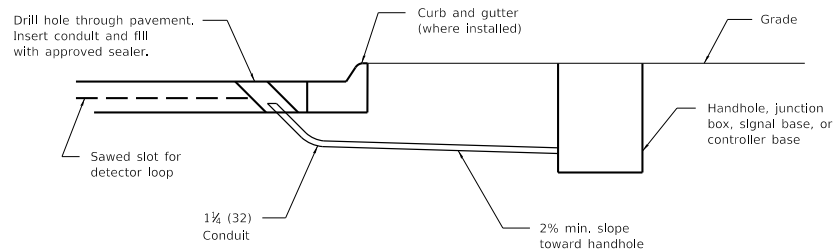
**BRACKET MOUNTED
TRAFFIC SIGNAL HEAD**

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED	1-1-02

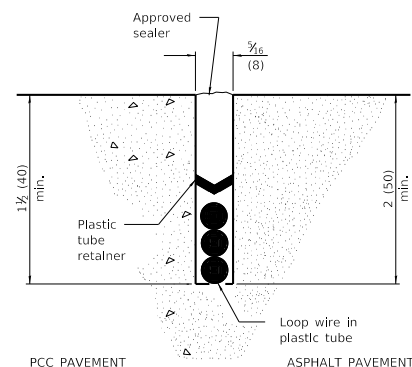
DATE	REVISIONS
1-1-09	Omitted note regarding units of length.
1-1-02	Renum. Standard 840006.

TRAFFIC SIGNAL MOUNTING DETAILS

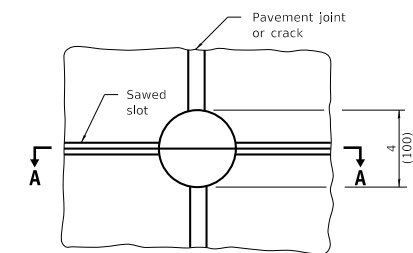
STANDARD 880006-01



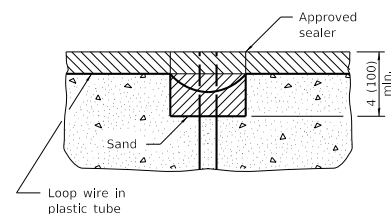
DETECTOR LOOP LEAD-IN



DETECTOR LOOP INSTALLATION



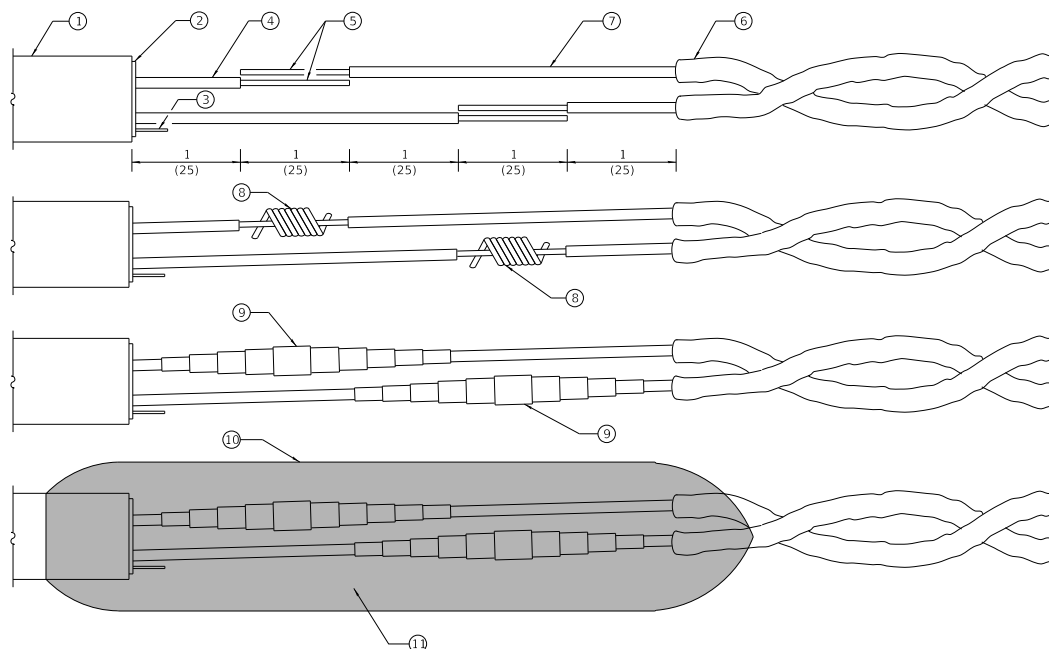
PLAN



SECTION A-A

NOTE
Loop wire shall follow saw cut to bottom, forming slack section at joint.

DETECTOR LOOP AT PAVEMENT JOINT OR PAVEMENT CRACK



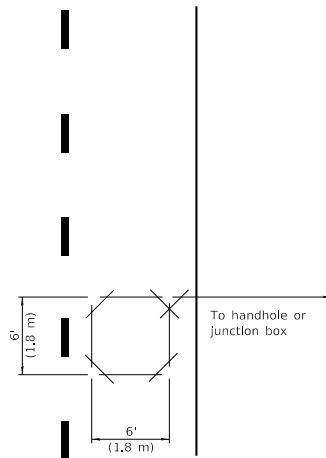
LOOP WIRE AND LEAD-IN CABLE SPLICE

- ① = Lead-in cable (single pair or multipair)
- ② = Lead-in cable shield
- ③ = Lead-in cable shield drain-wire
- ④ = Lead-in cable insulated conductor
- ⑤ = Bare conductor
- ⑥ = Loop wire in tube
- ⑦ = Loop wire Insulated conductor
- ⑧ = Twisted and resin soldered conductor
- ⑨ = Electrical tape insulated splice
- ⑩ = Rlgld mold
- ⑪ = Waterproof and dielectric resin

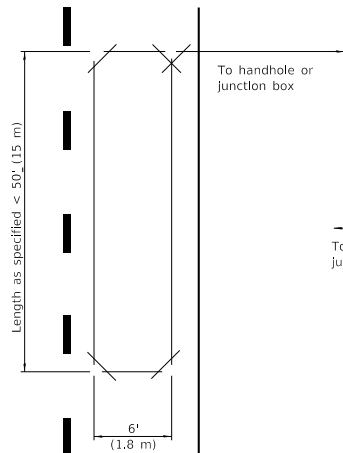
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	
ISSUED 1-1-02	

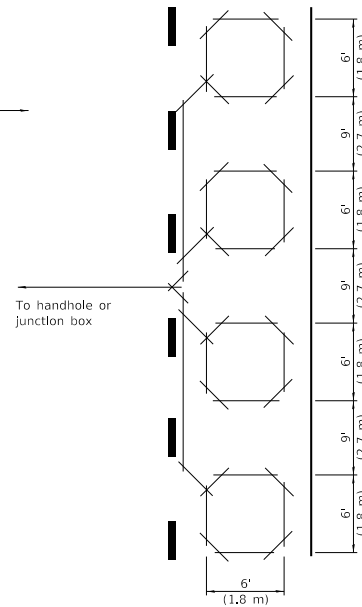
DATE	REVISIONS	DETECTOR LOOP INSTALLATIONS
1-1-09	Switched units to English (metric)	
1-1-02	Renum. Standard 846001.	STANDARD 886001-01



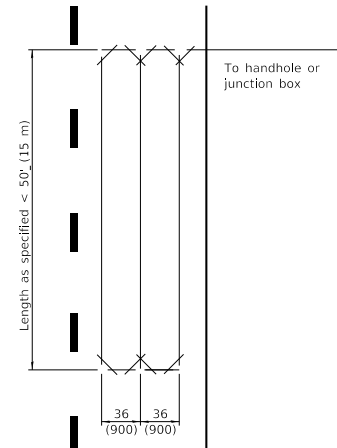
FOR POINT DETECTION
SHORT LOOP



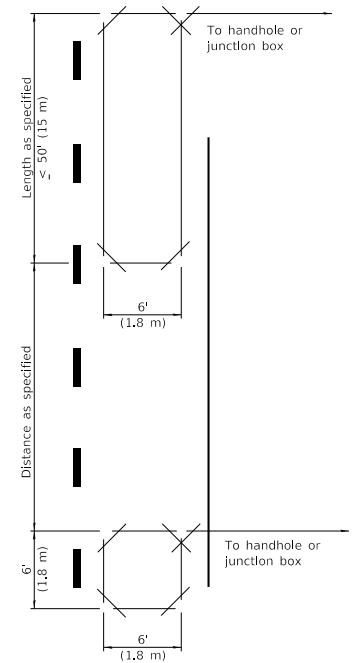
FOR PRESENCE DETECTION
LONG LOOP



FOR PRESENCE DETECTION
MULTIPLE LOOP IN SERIES

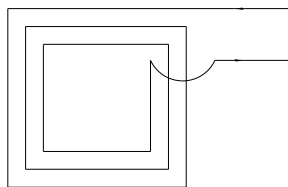


FOR PRESENCE DETECTION
QUADRUPOLE LOOP

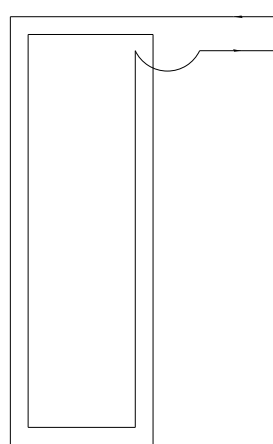


FOR EXTENDED-CALL DETECTION

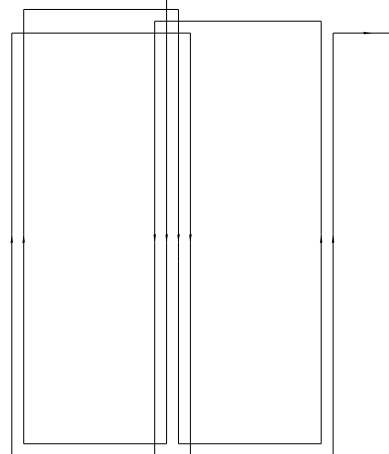
SLOT PLAN



SHORT LOOP



LONG LOOP



QUADRUPOLE LOOP

WIRING DIAGRAM

All dimensions are in inches (millimeters)
unless otherwise shown.

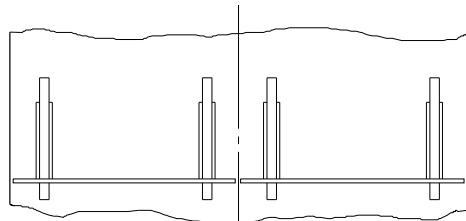
Illinois Department of Transportation	
PASSED	January 1, 2009
ENGINEER OF OPERATIONS	
APPROVED	January 1, 2009
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-02

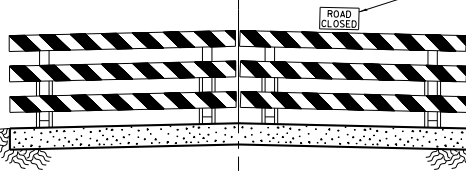
DATE	REVISIONS
1-1-09	Switched units to English (metric)
1-1-02	Renum. Standard 846006.

TYPICAL LAYOUTS FOR DETECTION LOOPS

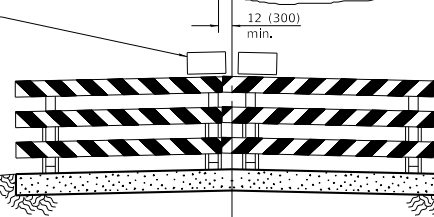
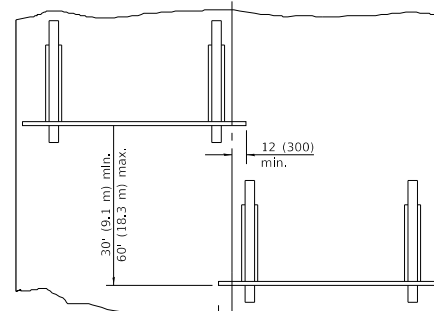
STANDARD 886006-01



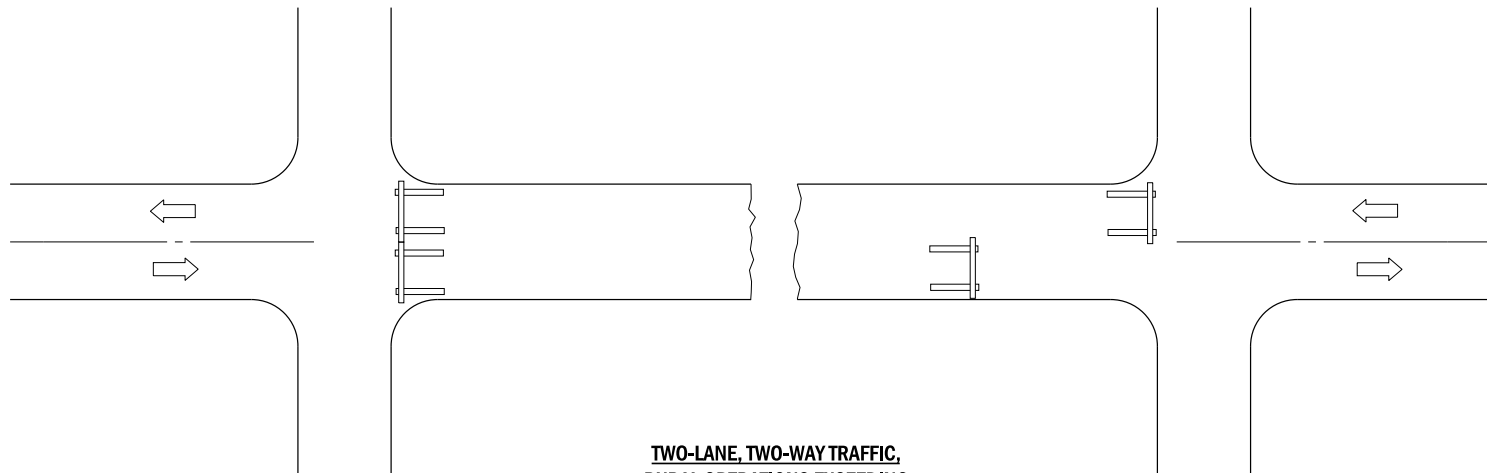
Type III Barricades with Standard
Sign R11-2 or R11-4 mounted as shown.



Resident traffic and day labor force's
equipment to use road shoulder for passing
barricade.



Use when shoulders are too narrow for
passage of traffic.



**TWO-LANE, TWO-WAY TRAFFIC,
RURAL OPERATIONS EXCEEDING
ONE DAYLIGHT PERIOD**

GENERAL NOTES

Type III barricades to be width of pavement only.

Reflectorized striping shall appear on both sides
of barricades. Barricades shall be positioned so
that stripes slope downward toward the side on
which traffic is to pass.

Although not shown, advance warning signs with
minimum dimensions of 36x36 (900x900) and black
legends on orange reflectorized backgrounds shall
be utilized where needed.

This case is for use on rural local roads where
the local authority considers this protection to
be appropriate for the specific job conditions.

All dimensions are in inches (millimeters)
unless otherwise shown.

DATE	REVISIONS
1-1-09	Switched units to English (metric).
1-1-98	Rev. "R11-1" to "R11-4".
	Rev. 4th General Note.

**TRAFFIC CONTROL DEVICES -
DAY LABOR CONSTRUCTION**

STANDARD B.L.R. 17-4

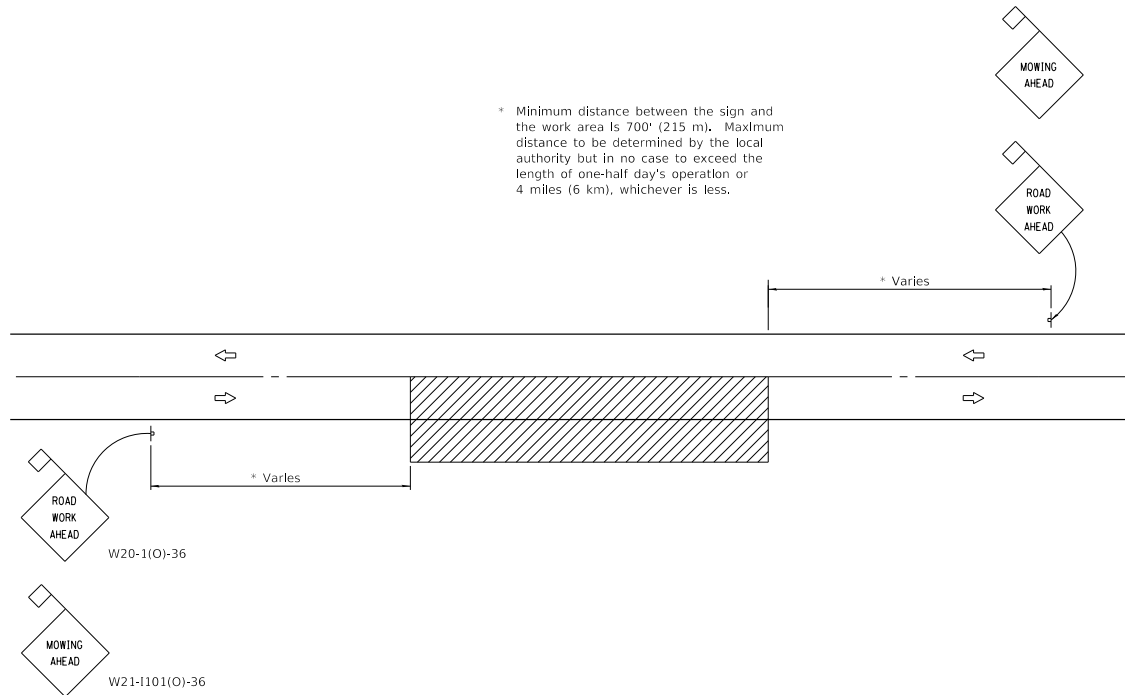
Illinois Department of Transportation

PASSED January 1, 2009
Charles J. Russell
ENGINEER OF LOCAL ROADS AND STREETS

APPROVED January 1, 2009
Lee E. Han
ENGINEER OF DESIGN AND ENVIRONMENT

ISSUED 1-1-97

* Minimum distance between the sign and the work area is 700' (215 m). Maximum distance to be determined by the local authority but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less.



TWO-LANE, TWO-WAY TRAFFIC
RURAL OPERATIONS
DAY OPERATIONS ONLY

SYMBOLS



Work area



Sign with 18x18 (450x450) min. orange flag attached.

TYPICAL APPLICATIONS

MOWING
SPREADING AGGREGATE
WEED SPRAYING
SURFACE MAINTENANCE
BITUMINOUS RESURFACING
CRACK POURING
SHOULDER REPAIR
CLEANING DITCHES

GENERAL NOTES

Maintenance operations shall be confined to one traffic lane, leaving the opposite lane open to traffic. At least 500' (150 m) of both traffic lanes shall be available for traffic movement between work areas at intervals not greater than 1000' (300 m).

When operations are on the pavement and stationary or moving at a speed less than 4 mph (6 kph), a ONE LANE AHEAD, or other appropriate sign, shall be installed in each direction between the ROAD WORK AHEAD sign and the work area. The distance between this sign and the work area shall be a minimum of 400' (120 m) but in no case to exceed the length of one-half day's operation or 4 miles (6 km), whichever is less. The distance between the two signs shall be approximately 400' (120 m).

All signs are to be removed at completion of the day's operation.

Any unattended obstacle, excavation, or pavement drop off greater than 3 (75) in the work area shall be protected by Type I or Type II barricades with flashing lights.

Longitudinal dimensions may be adjusted slightly to fit field conditions.

All vehicles, equipment, men, and their activities are restricted at all times to one side of the pavement.

Flashing lights or rotating beacons are required for all maintenance vehicles while in operation.

Applicable operations illustrated in Standard 701301 may be used when operations do not exceed 15 minutes on the pavement or 60 minutes on the shoulder respectively.

All warning signs shall have minimum dimensions of 36x36 (900x900) and have black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

This case is for use on rural local roads where the local authority considers this protection to be appropriate for the specific job conditions.

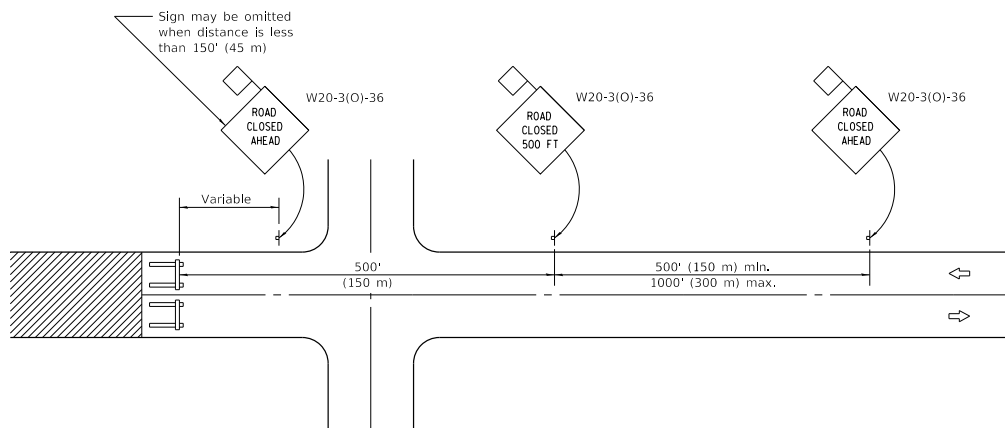
All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED <u>January 1, 2015</u> ENGINEER OF LOCAL ROADS AND STREETS APPROVED <u>January 1, 2015</u> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-17

DATE	REVISIONS
1-1-15	Corrected RWA sign number.
1-1-09	Switched units to
	English (metric). Moved
	one General Note.

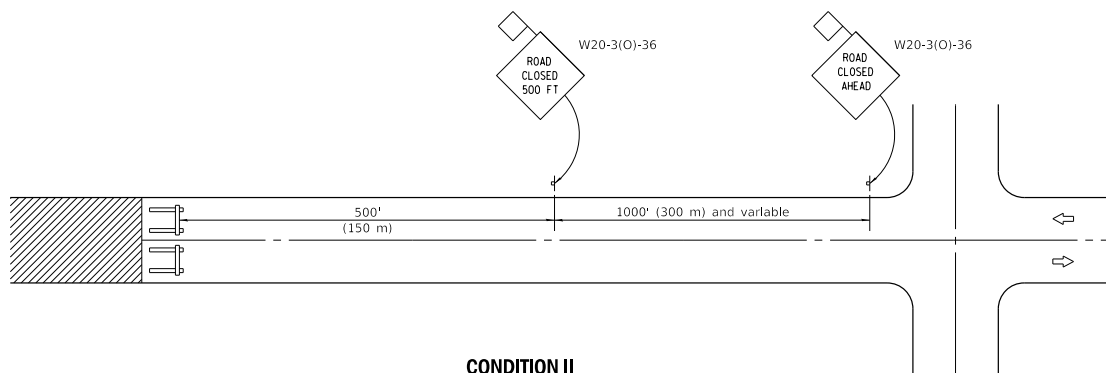
**TRAFFIC CONTROL DEVICES-
DAY LABOR MAINTENANCE**

STANDARD B.L.R. 18-6



CONDITION I

When distance from closure to crossroad is less than 1500' (450 m)



CONDITION II

When distance from closure to crossroad is greater than 1500' (450 m)

SYMBOLS



Work area



Type III Barricade



Sign with 18x18 (450x450) min. orange flag attached

GENERAL NOTES

Type III Barricades and R11-2-4830 signs shall be positioned as shown in "Road Closed To All Traffic" detail on Highway Standard 701901.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area during hours of darkness. One light shall be installed above the barricades and the other above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

When the distance between the barricade and the intersection is between 1500' (450 m) and 2000' (600 m), the advance sign shall be placed at the intersection. When the distance between the barricade and the intersection is over 2000' (600 m), an additional sign shall be placed at the intersection. The additional sign shall give the distance to the barricade in miles or fractions of a mile.

All dimensions are in inches (millimeters) unless otherwise shown.

Illinois Department of Transportation	
PASSED	January 1, 2012
ENGINEER OF LOCAL ROADS AND STREETS	
APPROVED	January 1, 2012
ENGINEER OF DESIGN AND ENVIRONMENT	

ISSUED 1-1-97

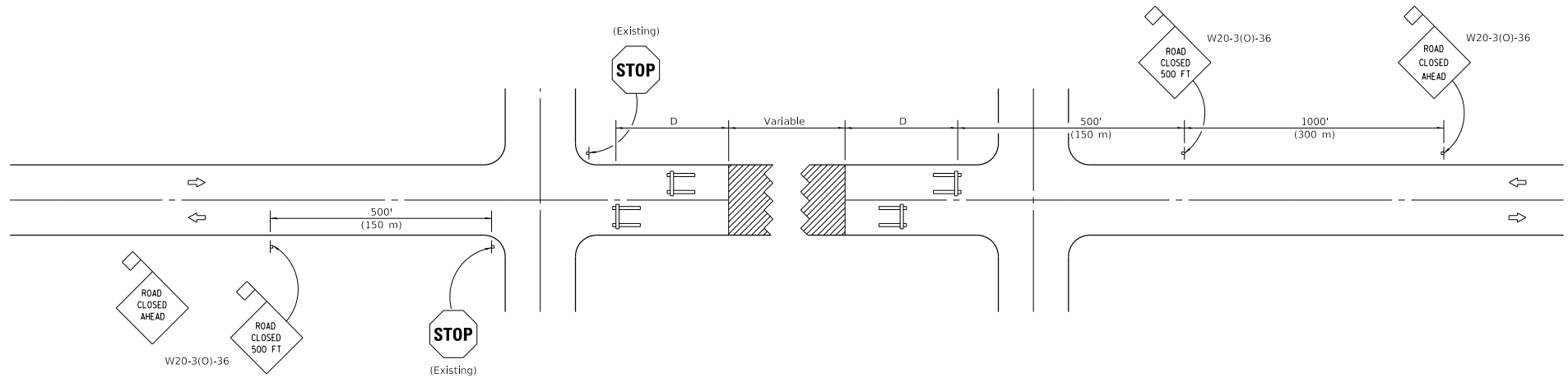
DATE	REVISIONS
1-1-12	Omitted two notes from
	GENERAL NOTES.
1-1-09	Switched units to
	English (metric).

TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS

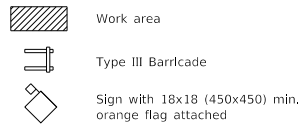
STANDARD B.L.R. 21-9

**CONDITION I
APPROACH TRAFFIC STOPPED**

**CONDITION II
APPROACH TRAFFIC
DOES NOT STOP**



SYMBOLS



GENERAL NOTES

Type III Barricades and R11-4-6030 signs shall be positioned as shown in the "Road Closed To All Traffic" detail on Highway Standard 701901. If the distance "D" exceeds 2000' (600 m), an additional set of barricades and R11-4-6030 shall be placed at each end of the work area.

Two Type A Low Intensity Flashing Lights shall be used on each approach in advance of the work area. One light shall be installed above each barricade. If only one barricade is required, the other light shall be installed above the first advance warning sign.

All warning signs shall have minimum dimensions of 36 x 36 (900 x 900) and have a black legend on an orange reflectorized background.

When fluorescent signs are used, orange flags are not required.

Longitudinal dimensions may be adjusted to fit field conditions.

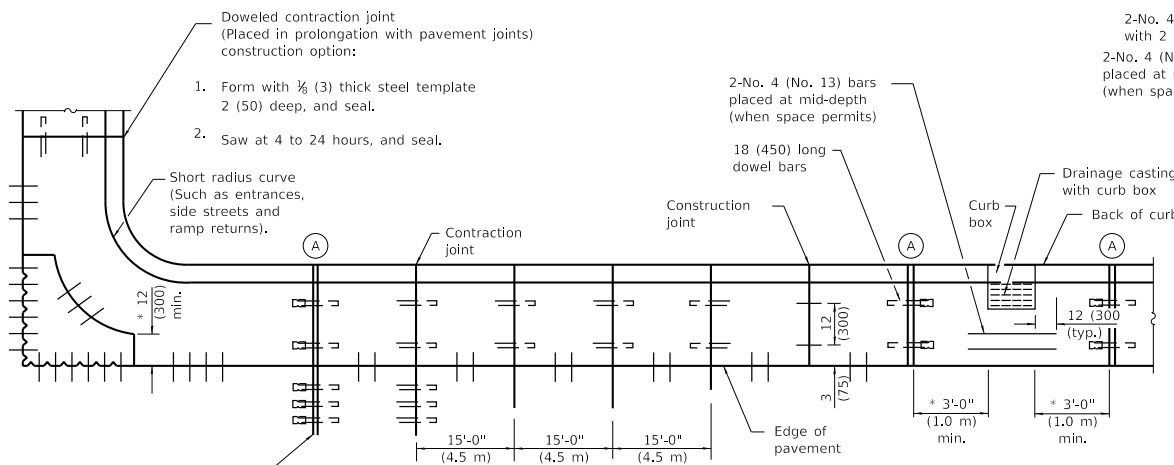
All dimensions are in inches (millimeters) unless otherwise shown.

DATE	REVISIONS
1-1-12	Omitted two notes from GENERAL NOTES.
1-1-09	Revised General Notes and switched units to English (metric).

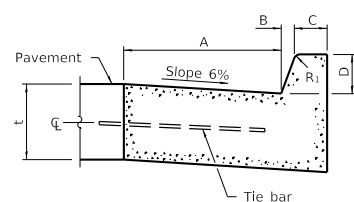
TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS
(TWO-LANE TWO WAY RURAL TRAFFIC)
(ROAD CLOSED TO THRU TRAFFIC)

STANDARD B.L.R. 22-7

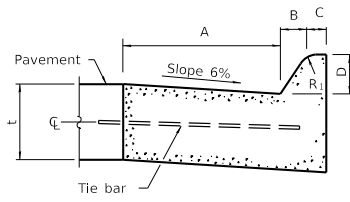
Illinois Department of Transportation	
PASSED <u>January 1, 2012</u> ENGINEER OF LOCAL ROADS AND STREETS APPROVED <u>January 1, 2012</u> ENGINEER OF DESIGN AND ENVIRONMENT	ISSUED 1-1-07



PLAN
ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE



BARRIER CURB



MOUNTABLE CURB

TYPE	A	B	C	D	R ₁
B-6.06 *	6	1	6	6	1
(B-15.15)	(150)	(25)	(150)	(150)	(25)
B-6.12	12	1	6	6	1
(B-15.3)	(300)	(25)	(150)	(150)	(25)
B-6.18	18	1	6	6	1
(B-15.45)	(450)	(25)	(150)	(150)	(25)
B-6.24	24	1	6	6	1
(B-15.60)	(600)	(25)	(150)	(150)	(25)
B-9.12	12	2	5	9	1
(B-15.30)	(300)	(100)	(75)	(100)	(75)
B-9.18	18	2	5	9	1
(B-22.30)	(300)	(50)	(125)	(225)	(25)
B-9.24	24	2	5	9	1
(B-22.45)	(450)	(50)	(125)	(225)	(25)
B-9.24	24	2	5	9	1
(B-22.60)	(600)	(50)	(125)	(225)	(25)

* For corner islands only.

TYPE	A	B	C	D	R ₁	R ₂
M-2.06	6	2	4	2	3	2
(M-5.15)	(150)	(50)	(100)	(50)	(75)	(50)
M-2.12	12	2	4	2	3	2
(M-5.30)	(300)	(50)	(100)	(50)	(75)	(50)
M-4.06	6	4	3	4	3	NA
(M-10.15)	(150)	(100)	(75)	(100)	(75)	NA
M-4.12	12	4	3	4	3	NA
(M-10.30)	(300)	(100)	(75)	(100)	(75)	NA
M-4.18	18	4	3	4	3	NA
(M-10.45)	(450)	(100)	(75)	(100)	(75)	NA
M-4.24	24	4	3	4	3	NA
(M-10.60)	(600)	(100)	(75)	(100)	(75)	NA
M-6.06	6	6	2	6	2	NA
(M-15.15)	(150)	(150)	(50)	(150)	(50)	NA
M-6.12	12	6	2	6	2	NA
(M-15.30)	(300)	(150)	(50)	(150)	(50)	NA
M-6.18	18	6	2	6	2	NA
(M-15.45)	(450)	(150)	(50)	(150)	(50)	NA
M-6.24	24	6	2	6	2	NA
(M-15.60)	(600)	(150)	(50)	(150)	(50)	NA

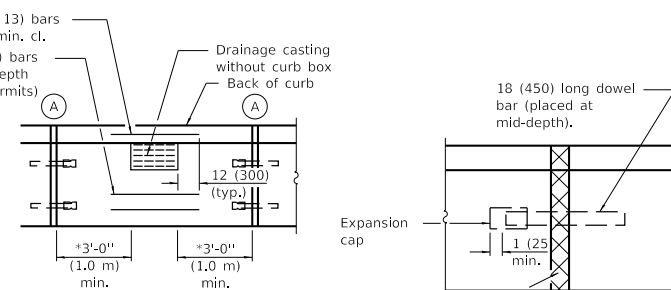
Illinois Department of Transportation

PASSED January 1, 2018

ENGINEER OF LOCAL ROADS AND STREETS

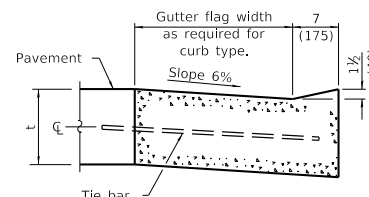
APPROVED January 1, 2018

ENGINEER OF DESIGN AND ENVIRONMENT

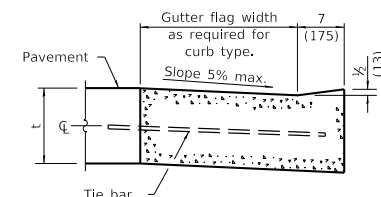


DETAIL A
EXPANSION JOINT

Full depth & width
1 (25) - thick (min.)
prefomed expansion
joint filler.



DEPRESSED CURB (TYPICAL)



**DEPRESSED CURB ADJACENT
TO CURB RAMP ACCESSIBLE
TO THE DISABLED**

GENERAL NOTES

The bottom slope of combination curb and gutter constructed adjacent to pcc pavement shall be the same slope as the subbase or 6% when subbase is omitted.

t = Pavement thickness.

Longitudinal joint tie bars shall be No. 5 (No. 16) at 24 (600) centers in accordance with details for longitudinal construction joint shown on Standard 420001.

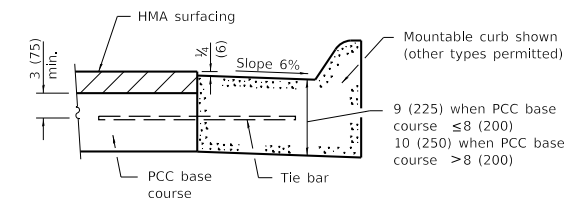
A minimum clearance of 2 (50) between the end of the tie bar and the back of the curb shall be maintained.

The dowel bars shown in contraction joints will only be required for monolithic construction.

See Standard 606301 for details of corner islands except reference to Standard 606001 does not apply.

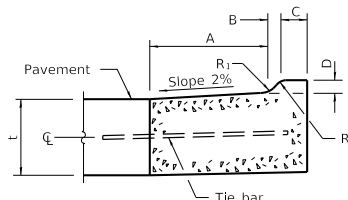
All dimensions are in inches (millimeters) unless otherwise shown.

**ADJACENT TO PCC BASE COURSE
WITH HMA SURFACING**



DOWEL BAR TABLE

PAVEMENT THICKNESS	DOWEL BAR DIAMETER
10 (250) or greater	1 1/2 (38)
8 (200) thru 9.99 (249)	1 1/4 (32)
Less than 8 (200)	1 (25)



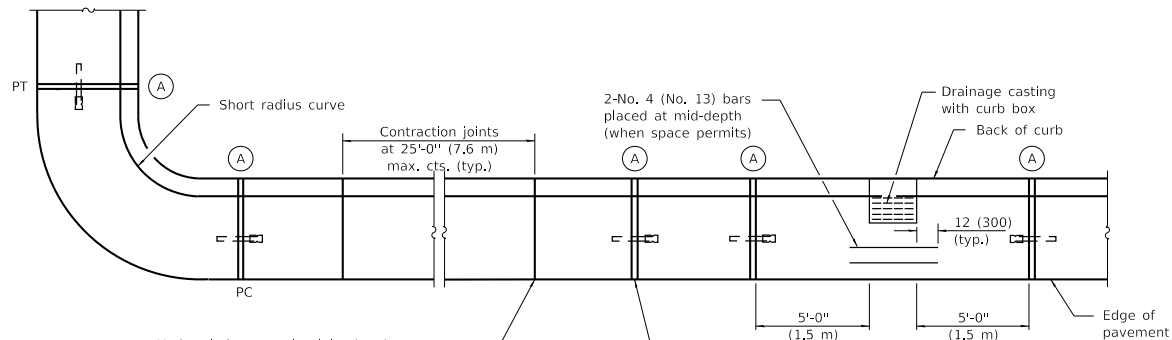
M-2.06 (M-5.15) and M-2.12 (M-5.30)

DATE	REVISIONS
1-1-18	New standard.

**CONCRETE CURB TYPE B
AND COMBINATION
CONCRETE CURB AND GUTTER**

(Sheet 1 of 2)

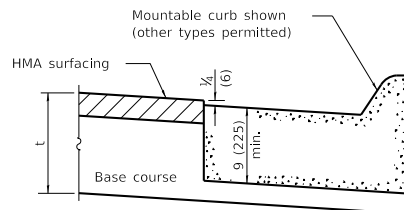
B.L.R. 28



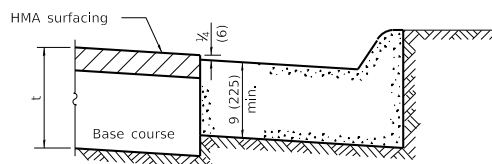
Undoweled contraction joint (typ.) construction options:

1. Form with $\frac{3}{8}$ (3) thick steel template 2 (50) deep, and seal.
2. Saw 2 (50) deep at 4 to 24 hours, and seal.
3. Insert $\frac{3}{4}$ (20) thick preformed joint filler full depth and width.

PLAN

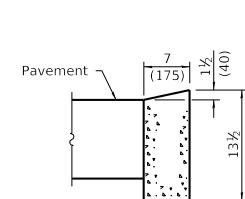


ON DISTURBED SUBGRADE

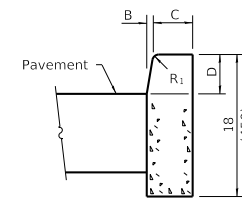


ON UNDISTURBED SUBGRADE

ADJACENT TO FLEXIBLE PAVEMENT

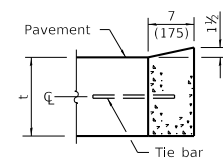


DEPRESSED CURB

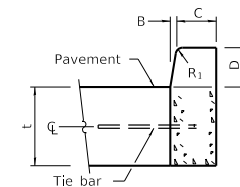


BARRIER CURB

ADJACENT TO FLEXIBLE PAVEMENT



DEPRESSED CURB



BARRIER CURB

ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE

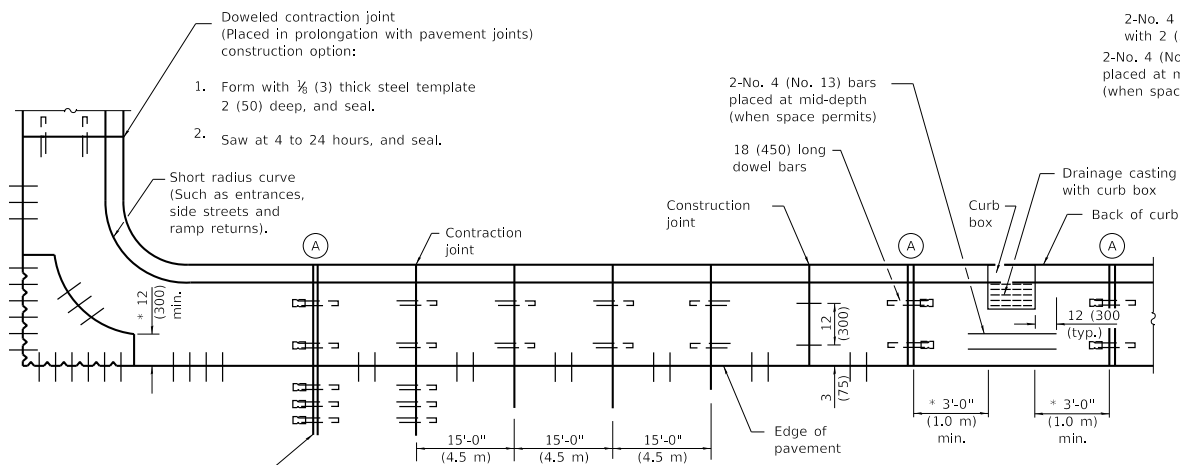
CONCRETE CURB TYPE B

CONCRETE CURB TYPE B AND COMBINATION CONCRETE CURB AND GUTTER

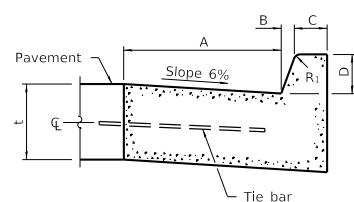
(Sheet 2 of 2)

B.L.R. 28

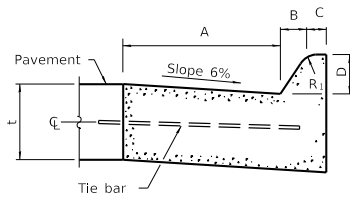
Illinois Department of Transportation	
PASSED	January 1, 2018
ENGINEER OF LOCAL ROADS AND STREETS	
APPROVED	January 1, 2018
ENGINEER OF DESIGN AND ENVIRONMENT	



PLAN
ADJACENT TO PCC PAVEMENT OR PCC BASE COURSE



BARRIER CURB

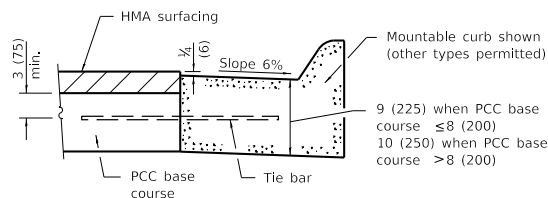


MOUNTABLE CURB

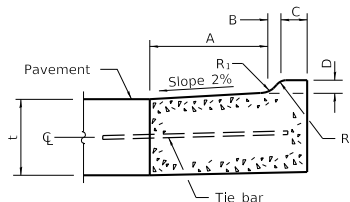
TYPE	A	B	C	D	R ₁
B-6.06 *	6	1	6	6	1
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(B-22.30)	(450)	(50)	(125)	(225)	(25)
B-9.24	24	2	5	9	1
(B-22.60)	(600)	(50)	(125)	(225)	(25)

* For corner islands only.

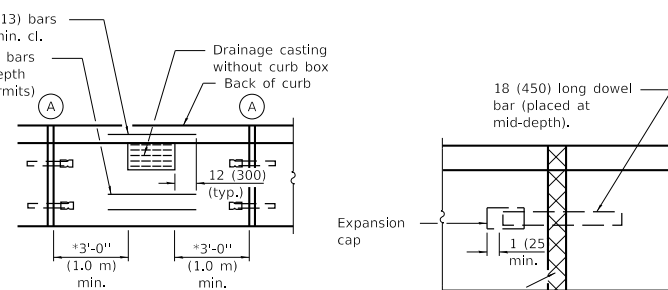
TYPE	A	B	C	D	R ₁	R ₂
M-2.06	6	2	4	2	3	2
(M-5.15)	(150)	(50)	(100)	(50)	(75)	(50)
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(M-10.60)	(600)	(100)	(75)	(100)	(75)	
M-6.06	6	6	2	6	2	NA
(M-15.15)	(150)	(150)	(50)	(150)	(50)	
M-6.12	12	6	2	6	2	NA
(M-15.30)	(300)	(150)	(50)	(150)	(50)	
M-6.18	18	6	2	6	2	NA
(M-15.45)	(450)	(150)	(50)	(150)	(50)	
M-6.24	24	6	2	6	2	NA
(M-15.60)	(600)	(150)	(50)	(150)	(50)	



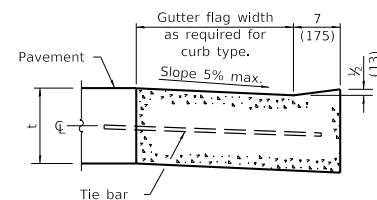
**ADJACENT TO PCC BASE COURSE
WITH HMA SURFACING**



M-2.06 (M-5.15) and M-2.12 (M-5.30)



**DETAIL A
EXPANSION JOINT**



**DEPRESSED CURB ADJACENT
TO CURB RAMP ACCESSIBLE
TO THE DISABLED**

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DATE	REVISIONS
1-1-18	New standard.

CONCRETE CURB TYPE B AND COMBINATION CONCRETE CURB AND GUTTER

(Sheet 1 of 2)

B.L.R. 28

TRAFFIC SIGNAL LEGEND

ITEM	REMOVAL	EXISTING	PROPOSED	ITEM	REMOVAL	EXISTING	PROPOSED	ITEM	REMOVAL	EXISTING	PROPOSED
CONTROLLER CABINET				EMERGENCY VEHICLE LIGHT DETECTOR				ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1/C, UNLESS NOTED OTHERWISE			
RAILROAD CONTROL CABINET				CONFIRMATION BEACON				COAXIAL CABLE			
COMMUNICATIONS CABINET				HANDHOLE				VENDOR CABLE FOR CAMERA			
MASTER CONTROLLER				HEAVY DUTY HANDHOLE				COPPER INTERCONNECT CABLE, NO. 18 3 PAIR TWISTED, SHIELDED			
MASTER MASTER CONTROLLER				DOUBLE HANDHOLE				FIBER OPTIC CABLE NO. 62.5/125, MM12F			
UNINTERRUPTABLE POWER SUPPLY				JUNCTION BOX				FIBER OPTIC CABLE NO. 62.5/125, MM12F SM12F			
SERVICE INSTALLATION, (P) POLE OR (G) GROUND MOUNT				UNDERGROUND CONDUIT, GALVANIZED STEEL (UC)				FIBER OPTIC CABLE NO. 62.5/125, MM12F SM24F			
TELEPHONE CONNECTION (P) POLE OR (G) GROUND MOUNT				TEMPORARY SPAN WIRE, TETHER WIRE, AND CABLE				GROUND ROD AT (C) CONTROLLER, (H) HANDHOLE, (P) POST, (M) MAST ARM, OR (S) SERVICE			
STEEL MAST ARM ASSEMBLY AND POLE				COMMON TRENCH				CONTROLLER CABINET AND FOUNDATION TO BE REMOVED			
ALUMINUM MAST ARM ASSEMBLY AND POLE				COLLABLE NONMETALLIC CONDUIT (EMPTY)				STEEL MAST ARM POLE AND FOUNDATION TO BE REMOVED			
STEEL COMBINATION MAST ARM ASSEMBLY AND POLE WITH LUMINAIRE				SYSTEM ITEM				ALUMINUM MAST ARM POLE AND FOUNDATION TO BE REMOVED			
STEEL COMBINATION MAST ARM ASSEMBLY AND POLE WITH PTZ CAMERA				INTERSECTION ITEM				STEEL COMBINATION MAST ARM ASSEMBLY AND POLE WITH LUMINAIRE AND FOUNDATION TO BE REMOVED			
SIGNAL POST				REMOVE ITEM				SIGNAL POST AND FOUNDATION TO BE REMOVED			
TEMPORARY WOOD POLE (CLASS 5 OR BETTER) 45 FOOT (13.7m) MINIMUM				RELOCATE ITEM				INTERSECTION & SAMPLING (SYSTEM) DETECTOR			
GUY WIRE				ABANDON ITEM				SAMPLING (SYSTEM) DETECTOR			
SIGNAL HEAD				12" (300mm) TRAFFIC SIGNAL SECTION				QUEUE DETECTOR			
SIGNAL HEAD CONSTRUCTION STAGES (NUMBERS INDICATE THE CONSTRUCTION STAGE)				12" (300mm) RED WITH 8" (200mm) YELLOW AND GREEN TRAFFIC SIGNAL FACE				PREFORMED QUEUE DETECTOR			
SIGNAL HEAD WITH BACKPLATE				SIGNAL FACE				PREFORMED INTERSECTION AND SAMPLING (SYSTEM) DETECTOR			
SIGNAL HEAD OPTICALLY PROGRAMMED				SIGNAL FACE WITH BACKPLATE. "P" INDICATES PROGRAMMED HEAD				PREFORMED SAMPLING (SYSTEM) DETECTOR			
FLASHER INSTALLATION (S DENOTES SOLAR POWER)				"RB" INDICATES REFLECTIVE BACKPLATE							
PEDESTRIAN SIGNAL HEAD				12" (300mm) PEDESTRIAN SIGNAL HEAD WALK/DON'T WALK SYMBOL							
PEDESTRIAN PUSHBUTTON DETECTOR				12" (300mm) PEDESTRIAN SIGNAL HEAD INTERNATIONAL SYMBOL, OUTLINED							
ACCESSIBLE PEDESTRIAN PUSHBUTTON DETECTOR				12" (300mm) PEDESTRIAN SIGNAL HEAD INTERNATIONAL SYMBOL, SOLID							
ILLUMINATED SIGN "NO LEFT TURN"				PEDESTRIAN SIGNAL HEAD, INTERNATIONAL SYMBOL, WITH COUNTDOWN TIMER							
ILLUMINATED SIGN "NO RIGHT TURN"				RADIO INTERCONNECT							
DETECTOR LOOP, TYPE I				RADIO REPEATER							
PREFORMED DETECTOR LOOP				DENOTES NUMBER OF CONDUCTORS, ELECTRIC CABLE NO. 14, UNLESS NOTED OTHERWISE, ALL DETECTOR LOOP CABLE TO BE SHIELDED							
MICROWAVE VEHICLE SENSOR				GROUND CABLE IN CONDUIT NO. 6 SOLID COPPER (GREEN)							
VIDEO DETECTION CAMERA											
VIDEO DETECTION ZONE											
PAN, TILT, ZOOM CAMERA											
WIRELESS DETECTOR SENSOR											
WIRELESS ACCESS POINT											

RAILROAD SYMBOLS

	EXISTING	PROPOSED
RAILROAD CONTROL CABINET		
RAILROAD CANTILEVER MAST ARM		
FLASHING SIGNAL		
CROSSING GATE		
CROSSBUCK		

FILE NAME =	USER NAME = footemj	DESIGNED -	DAG/BCK	REVISED -	DAG 1-1-14	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
c:\pw_work\pedest\footemj\d080315\ts05.dgn		DRAWN -	BCK	REVISED -								
PLOT SCALE = 50.0000' / 1" =		CHECKED -	DAD	REVISED -				TS-05		CONTRACT NO.		
PLOT DATE = 1/13/2014		DATE -	10-28-09	REVISED -				FED. ROAD DIST. NO. 1 (ILLINOIS) FED. AID PROJECT				
SCALE: NONE		SHEET NO. 1 OF 7		SHEETS		STA.		TO STA.				

3. EACH PAIR OF LOOP WIRES SHALL BE PLACED IN A SEPARATE EMPTY COILABLE NONMETALLIC CONDUIT FROM THE EDGE OF PAVEMENT TO THE HANDHOLE. SPACING BETWEEN THE HOLES DRILLED IN THE PAVEMENT SHALL NOT BE LESS THAN 6" (150 mm). EMPTY COILABLE NONMETALLIC CONDUIT SHALL BE INCLUDED IN THE COST OF THE LOOP WIRE.
2. THE NUMBER OF LOOP TURNS SHALL BE AS RECOMMENDED BY THE AMPLIFIER MANUFACTURER. ALL ADJACENT SIDES OF THE LOOPS SHALL BE INSTALLED IN SUCH A WAY THAT THE CURRENT FLOW IS IN THE SAME DIRECTION TO REINFORCE ITS MAGNETIC FIELDS FOR SMALL VEHICLE DETECTION.
3. EACH LOOP LEAD-IN SHALL BE IDENTIFIED AND PERMANENTLY TAGGED IN THE HANDHOLE. EACH LEAD-IN CABLE TAG SHALL INDICATE THE LOCATION OF THE LOOP, LOOP ROTATION (CLOCKWISE/COUNTERCLOCKWISE), LOOP LEAD-IN DIRECTION (IN OR OUT), LOOP CABLE NUMBER AND LOCATION IN CABINET, AND NUMBER OF TURNS IN THE DETECTOR LOOPS IN WATER PROOF INK AS INDICATED ON THE DISTRICT 1 STANDARD TRAFFIC SIGNAL DESIGN DETAIL. THE CONTRACTOR SHALL MARK LOOP LOCATIONS ON RECORD DRAWINGS AND PRESENT TO THE ENGINEER AFTER FINAL INSPECTION. LOOPS SHALL BE MARKED BY LANE AND LOOP NUMBER. SEE DETAIL BELOW.
4. ALL LOOP CABLE SHALL BE FASTENED WITH PLASTIC TIE WRAP TO THE HANDHOLE HOOKS.
5. IN ASPHALT PAVEMENT, LOOPS SHOULD BE PLACED IN THE BINDER AND DIVEHOLES MARKED AT THE CURB WITH A SAW-CUT. THE SAW-CUT SHALL BE CUT IN ACCORDANCE WITH LOCAL AND E.P.A. DUST CONTROL REQUIREMENTS. DETECTOR LOOP(S) SHALL NOT BE INSTALLED IN WET CONDITIONS AND THE SAW-CUTS MUST BE FREE OF DEBRIS AND RESIDUE SUCH AS DUST AND WATER WHICH IS TO BE ACHIEVED BY THE USE OF COMPRESSED AIR, WIRE BRUSHING AND HEAT DRYING ACCORDING TO SEALANT MANUFACTURER REQUIREMENTS. THE DETECTOR WIRE SHALL BE HELD IN PLACE BY THE USE OF FORM WEDGES. WEDGES SHALL BE SPACED NO MORE THAN 18" (450 mm) APART.
6. LOOP SPLICES SHALL BE SOLDERED USING A SOLDERING IRON. BLOW TORCHES OR OTHER DEVICES WHICH OXIDIZE COPPER CABLE SHALL NOT BE ALLOWED FOR SOLDERING OPERATIONS. SEE DETAIL BELOW RIGHT.
7. PREFORMED DETECTOR LOOPS SHALL BE USED, AS SHOWN ON THE PLANS, WHERE NEW CONCRETE PAVEMENT IS PROPOSED. THE INSTALLATION OF PREFORMED LOOPS SHALL BE IN ACCORDANCE WITH THE DISTRICT 1 SPECIFICATIONS OR AS DIRECTED BY THE ENGINEER.

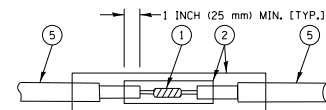
LANE (A) LOOP (B)

LOOP DIRECTION (C)

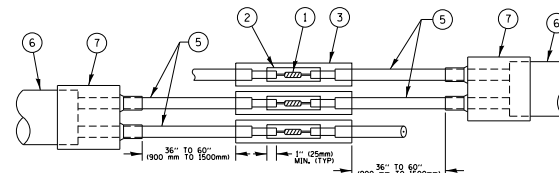
LOOP ROTATION (D)

-
- Diagram illustrating the Loop Detector Splice (See Detail "B") configuration. The diagram shows three loop wires (Loop 1, Loop 2, Loop 3) connected to a central splice box. The splice box is connected to a controller cabinet and an amplifier. The amplifier output is labeled "OUTPUT". The splice box is labeled "LOOP DETECTOR SPLICE (SEE DETAIL 'B')". The controller cabinet is labeled "CONTROLLER CABINET". The amplifier is labeled "AMPLIFIER". The output is labeled "OUTPUT". The splice box is also labeled "LOOP-TO-LOOP SPLICE (SEE DETAIL 'A')". The splice box is connected to a "HANDHOLE OR JUNCTION BOX". The splice box is connected to a "LOOP TAG". The splice box is connected to a "STRANDED LOOP WIRE NO. 14 1/C IN EMPTY COILABLE NONMETALLIC CONDUIT (5 TWISTS/FT(MM))". The splice box is connected to a "VEHICLE MOVEMENT" sensor. The splice box is connected to a "LOOP POLARITY AS SHOWN MUST BE STRICTLY OBSERVED WHEN SPLICING LOOP WIRES TO THE NO. 14 2/C TWISTED, SHIELDED LEAD-IN." label.

- LOOPS SHALL BE SPICED IN SERIES.
- SAW-CUTS SHALL BE A MINIMUM WIDTH OF 5/16" (8 mm).
- SAW-CUT DEPTHS SHALL BE 3" (75 mm), IF IN CONCRETE. THE SAW-CUT DEPTH SHALL BE TO THE TOP OF THE REINFORCEMENT.
- LOOP CORNERS SHALL BE DRILLED WITH A 2" (50 mm) DIAMETER CORE.



TYPE I LOOP

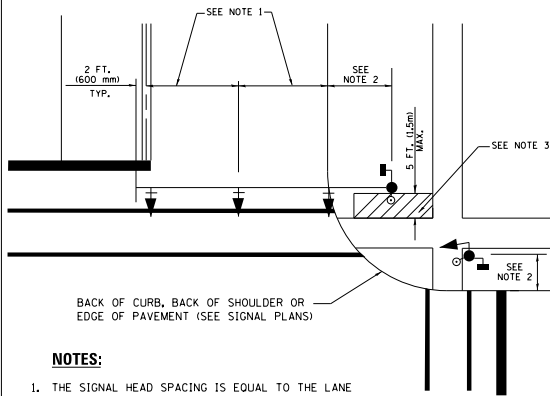


LOOP DETECTOR SPLICE

- | | |
|---|---|
| ① WESTERN UNION SPlice SOLDERED WITH ROSIN CORE FLUX. ALL EXPOSED SURFACES OF THE SOLDER SHALL BE SMOOTH. THE WESTERN UNION SPlices SHALL BE STAGGERED. | ⑤ LOOP CONDUCTOR WITH FLEXIBLE PLASTIC TUBE. |
| ② WCSMW 30/100 HEAT SHRINK TUBE, MINIMUM LENGTH 3" (75 mm), UNDERWATER GRADE. | ⑥ PRE-FORMED LOOP |
| ③ WCS 200/750 HEAT SHRINK TUBE, MINIMUM LENGTH 6" (150 mm), UNDERWATER GRADE. | ⑦ XL POLYOLEFIN 2 CONDUCTOR
BREAKOUT SEALS, TYCO CBR-2 OR APPROVED EQUAL |
| ④ NO. 14 2/C TWISTED, SHIELDED CABLE. | |

FILE NAME =		USER NAME =		DESIGNED - DAD		REVISED - DAG 1-1-14		<div>STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION</div>	DISTRICT ONE						E.A. R.T.E.		SECTION		COUNTY	TOTAL SHEETS	SHEET NO.					
c:\p\work\pdsd\1\form\p\ds351\ts05.p				DRAWN - BCK		REVISED -			STANDARD TRAFFIC SIGNAL DESIGN DETAILS																	
				CHECKED - DAD		REVISED -																				
				PLOT SCALE = 0.68000" / 1" =		REVISED -																				
				PLOT DATE = 1/13/2014		DATE - 10-28-09		REVISED -		SCALE: NONE						SHEET NO. 2		OF 7		SHEETS	STA.	TO STA.	TS-05		CONTRACT NO.	
																							FED. ROAD DIST. NO. 1		ILLINOIS FED. AID PROJECT	

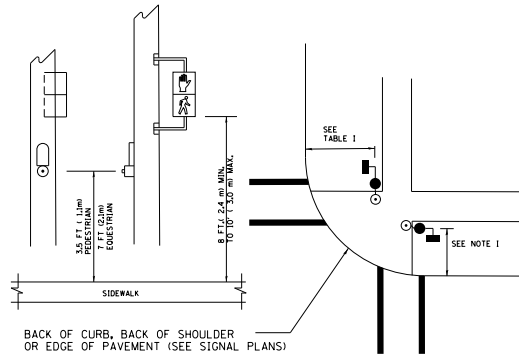
TRAFFIC SIGNAL MAST ARM AND SIGNAL POST
MAST ARM MOUNTED SIGNALS IN EXISTING, PROPOSED OR
FUTURE SIDEWALK/BICYCLE PATH AREA, INTERSECTION SHOWN
WITH PEDESTRIAN SIGNALS AND PEDESTRIAN PUSHBUTTON DETECTORS.



NOTES:

1. THE SIGNAL HEAD SPACING IS EQUAL TO THE LANE WIDTH OR AS SHOWN ON THE TRAFFIC SIGNAL PLAN.
2. REFER TO THE TRAFFIC SIGNAL EQUIPMENT OFFSET TABLE.
3. PROVIDE A LEVEL ALL-WEATHER SURFACE (CONCRETE SIDEWALK, ASPHALT BICYCLE PATH SURFACE OR MATCHING MATERIAL TO THE ADJACENT SURFACE) UP TO THE MAST ARM SHAFT OR THE SIGNAL POST.
4. THE FACE OF THE PEDESTRIAN PUSHBUTTON SHALL BE PARALLEL TO THE CROSSWALK TO BE USED.
5. THE LOCATIONS AND INSTALLATION OF PEDESTRIAN SIGNAL HEADS AND PEDESTRIAN PUSHBUTTONS SHALL MEET THE REQUIREMENTS OF THE MUTCD AND INFORMATION FOUND IN THE "AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES."

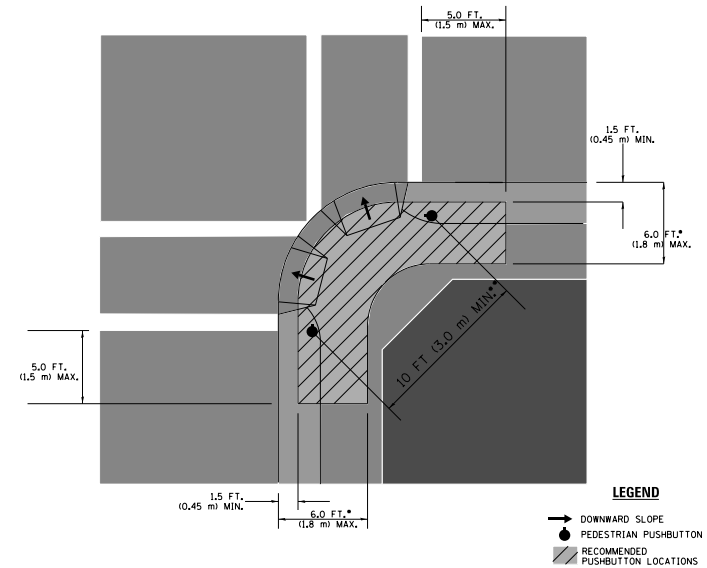
PEDESTRIAN SIGNAL POST
AND
PEDESTRIAN PUSH BUTTON POST



NOTES:

1. REFER TO THE TRAFFIC SIGNAL EQUIPMENT OFFSET TABLE.
2. PROVIDE A LEVEL ALL-WEATHER SURFACE (CONCRETE SIDEWALK, ASPHALT BICYCLE PATH SURFACE OR MATCHING MATERIAL TO THE ADJACENT SURFACE) UP TO THE PEDESTRIAN SIGNAL POST OR THE PEDESTRIAN PUSH BUTTON POST.
3. THE FACE OF THE PEDESTRIAN PUSHBUTTON SHALL BE PARALLEL TO THE CROSSWALK TO BE USED.
4. THE LOCATIONS AND INSTALLATION OF PEDESTRIAN SIGNAL HEADS AND PEDESTRIAN PUSHBUTTONS SHALL MEET THE REQUIREMENTS OF THE MUTCD AND INFORMATION FOUND IN THE "AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES."

RECOMMENDED PUSHBUTTON LOCATIONS



- WHERE THERE ARE CONSTRAINTS THAT MAKE IT IMPRACTICAL TO PLACE THE PEDESTRIAN PUSHBUTTON BETWEEN 1.5 FT (0.45 m) AND 6 FT (1.8 m) FROM THE EDGE OF THE CURB, SHOULDER, OR PAVEMENT, IT SHOULD NOT BE FURTHER THAN 10 FT (3 m) FROM THE EDGE OF CURB, SHOULDER, OR PAVEMENT.
- WHERE THERE ARE CONSTRAINTS ON A PARTICULAR CORNER THAT MAKE IT IMPRACTICAL TO PROVIDE THE 10 FT (3 m) SEPARATION BETWEEN THE TWO PEDESTRIAN PUSHBUTTONS, THE PUSHBUTTONS MAY BE PLACED CLOSER TOGETHER OR ON THE SAME POLE.

NOTES:

1. PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH THE BOTTOM OF THE SIGNAL HOUSING INCLUDING BRACKETS NOT LESS THAN 8 FT (2.4 m) OR MORE THAN 10 FT (3 m) ABOVE SIDEWALK LEVEL, AND SHALL BE POSITIONED AND ADJUSTED TO PROVIDE MAXIMUM VISIBILITY AT THE BEGINNING OF THE CONTROLLED CROSSWALK.
2. THE BOTTOM OF THE SIGNAL HOUSING (INCLUDING BRACKETS) OF A VEHICULAR SIGNAL FACE THAT IS NOT LOCATED OVER A HIGHWAY SHALL BE AT LEAST 8 FT (2.4 m) BUT NOT MORE THAN 19 FT (5.8 m) ABOVE THE SIDEWALK OR, IF THERE IS NO SIDEWALK, ABOVE THE PAVEMENT GRADE AT THE CENTER OF THE ROADWAY.
3. THE BOTTOM OF THE SIGNAL HOUSING AND ANY RELATED ATTACHMENTS TO A SIGNAL FACE LOCATED OVER ANY PORTION OF A HIGHWAY SHALL BE ACCORDING TO CURRENT STATE STANDARDS 877001, 877002, 877006, 877011 AND 877012 WITH A MINIMUM OF 16 FT (5.0 m) AND A MAXIMUM OF 18 FT (5.5 m) FROM THE HIGHEST POINT OF PAVEMENT.
4. THE BOTTOM OF THE TEMPORARY SPAN WIRE MOUNTED SIGNAL HOUSING AND ANY RELATED ATTACHMENTS TO A SIGNAL FACE LOCATED OVER ANY PORTION OF A HIGHWAY SHALL BE ACCORDING TO CURRENT STATE STANDARD 880001 WITH A MINIMUM OF 17 FT (5.18 m) FROM THE HIGHEST POINT OF PAVEMENT.
5. THE TOP OF THE SIGNAL HOUSING OF A SIGNAL FACE LOCATED OVER ANY PORTION OF A HIGHWAY SHALL NOT BE MORE THAN 25.6 FT (7.8 m) ABOVE THE PAVEMENT.

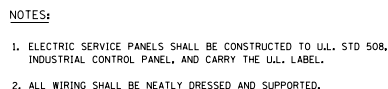
TRAFFIC SIGNAL EQUIPMENT OFFSET

TRAFFIC SIGNAL EQUIPMENT	COMBINATION CONCRETE CURB AND GUTTER (MINIMUM DISTANCE FROM BACK OF CURB TO CENTERLINE OF FOUNDATION)	SHOULDER/NON-CURBED AREA (MINIMUM DISTANCE FROM EDGE OF PAVEMENT TO CENTERLINE OF FOUNDATION)
TRAFFIC SIGNAL MAST ARM POLE	6 FT (1.8m)	SHOULDER WIDTH + 2 FT (0.6m), MINIMUM 10 FT (3.0m)
TRAFFIC SIGNAL POST	4 FT (1.2m)	SHOULDER WIDTH + 2 FT (0.6m), MINIMUM 10 FT (3.0m)
PEDESTRIAN SIGNAL POST	4 FT (1.2m)	SHOULDER WIDTH + 2 FT (0.6m), MINIMUM 10 FT (3.0m)
PEDESTRIAN PUSHBUTTON POST	4 FT (1.2m)	SHOULDER WIDTH + 2 FT (0.6m), MINIMUM 10 FT (3.0m)
TEMPORARY WOOD POLE	6 FT (1.8m)	SHOULDER WIDTH + 2 FT (0.6m), MINIMUM 10 FT (3.0m)
CONTROLLER CABINET	6 FT (1.8m) MINIMUM DISTANCE SEE NOTE 2	SHOULDER WIDTH + 6 FT (1.8m), MINIMUM 16 FT (4.9m) SEE NOTE 3.
SERVICE INSTALLATION, GROUND MOUNT	6 FT (1.8m) MINIMUM DISTANCE SEE NOTE 2	SHOULDER WIDTH + 6 FT (1.8m), MINIMUM 16 FT (4.9m) SEE NOTE 3.

NOTES:

1. CONTACT THE "AREA TRAFFIC SIGNAL MAINTENANCE AND OPERATIONS ENGINEER" FOR ASSISTANCE IN LOCATING THE TRAFFIC SIGNAL EQUIPMENT WHEN THERE ARE CONFLICTS WITH DITCHES OR THE MINIMUM OFFSET DISTANCES CANNOT BE MET.
2. MINIMUM DISTANCE FROM THE BACK OF CURB TO THE ROADWAY SIDE OF THE FOUNDATION.
3. MINIMUM DISTANCE FROM THE EDGE OF PAVEMENT TO THE ROADWAY SIDE OF THE FOUNDATION.
4. ANY CHANGES TO THE OFFSETS OF THE FOUNDATIONS, FROM THE MINIMUM DISTANCES LISTED IN THE "TRAFFIC SIGNAL EQUIPMENT OFFSET" CHART AND THE TRAFFIC SIGNAL INSTALLATION PLAN, COULD EFFECT THE PLACEMENT OF THE SIGNAL HEADS, PEDESTRIAN SIGNAL HEADS AND THE PEDESTRIAN PUSHBUTTONS, THE SIGNAL HEAD PLACEMENT ON THE MAST ARMS SHALL REMAIN AS PER THE TRAFFIC SIGNAL INSTALLATION PLAN AND THE "TRAFFIC SIGNAL MAST ARM AND SIGNAL POST" DETAIL ABOVE. THE PROPOSED MAST ARM LENGTHS MAY NEED TO BE REVISED TO MEET THE ABOVE REQUIREMENTS. THE PEDESTRIAN SIGNAL HEADS AND PEDESTRIAN PUSHBUTTONS MUST MEET THE REQUIREMENTS UNDER THE DETAILS ON THIS SHEET.

FILE NAME =		USER NAME = footemj	DESIGNED - DAD	REVISED - DAG 1-1-14	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS	SCALE: NONE	SHEET NO. 3 OF 7 SHEETS	STA. TO STA.	F.A. RFE.								
cd:\pw_work\pedest\footemj\d0108315\ts05.dgn			DRAWN - BCK	REVISED -						SECTION		COUNTY	TOTAL SHEETS	SHEET NO.				
			CHECKED - DAD	REVISED -														
			DATE - 10-28-09	REVISED -														
										TS-05		CONTRACT NO.						
										FED. ROAD DIST. NO. 1 (ILLINOIS) FED. AID PROJECT								

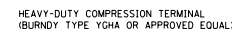


1. THE GROUNDING SYSTEM SHALL CONSIST OF AN INSULATED CONDUCTOR TYPE XLP, NO. 6 A.W.G., STRANDED COPPER TO BE INSTALLED IN RACEWAYS. THE GROUNDING CABLE SHALL BE INSTALLED IN A CONTINUOUS MANNER AS SHOWN ON THE CABLE PLAN PROVIDED. ALL GROUNDING CONDUCTORS SHALL BE BONDED TO METAL ENCLOSURE (HANDHOLE, POST, MAST ARM, CONTROLLER, ETC.). GROUND ROD SHALL BE 3/4" DIA. x 10'-0" (20mm x 3.0m) LONG. COPPER CLAD, ONE GROUND ROD SHALL BE INSTALLED AT ALL POST FOUNDATIONS, POLE FOUNDATIONS, CONTROLLER CABINET FOUNDATION AND ELECTRICAL SERVICE INSTALLATION AS INDICATED ON THE CABLE PLAN. IF THERE ARE ANY SPECIAL CONDITIONS SUCH AS SUB-SURFACE CONDITIONS OR INSTALLATION PROBLEMS, THE RESIDENT ENGINEER SHALL BE NOTIFIED OR CONTACT THE BUREAU OF TRAFFIC, ILLINOIS DEPARTMENT OF TRANSPORTATION DISTRICT ONE AT (847) 705-4139.
2. THE NEUTRAL CONDUCTOR AND THE GROUND CONDUCTOR SHALL BE CONNECTED IN THE SERVICE INSTALLATION. AT NO OTHER POINT IN THE TRAFFIC SIGNAL SYSTEM SHALL THE NEUTRAL AND GROUND CONDUCTORS BE CONNECTED.
3. ALL EQUIPMENT GROUNDING CONDUCTORS SHALL TERMINATE AT THE GROUND BUS IN THE CONTROLLER CABINET.
4. THE CONTRACTOR SHALL PROVIDE A GROUND CABLE WITH CONNECTORS BETWEEN THE HANDHOLE COVER AND HANDHOLE FRAME.

(NOT TO SCALE)

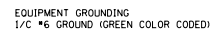


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NOTES:

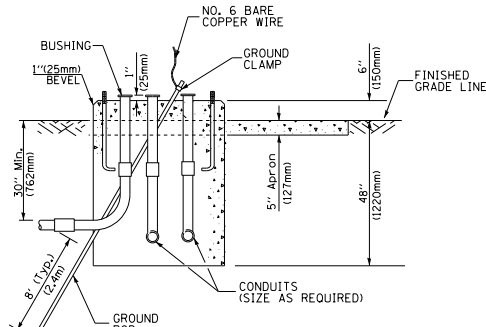
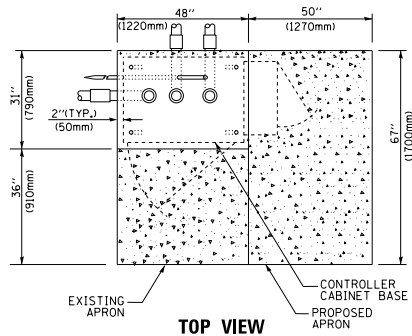
- ALL CLAMPS SHALL BE BRONZE OR COPPER, UL APPROVED.
- GROUND CABLE SHALL BE LOOPED OVER HOOKS IN THE HANDHOLES
6.5' (2.0m) SLACK SHALL BE PROVIDED IN SINGLE HANDHOLES
13' (4.0m) OF SLACK SHALL BE PROVIDED IN DOUBLE HANDHOLES.
5' (1.4m) OF SLACK SHALL BE PROVIDED BETWEEN FRAME AND COVER.



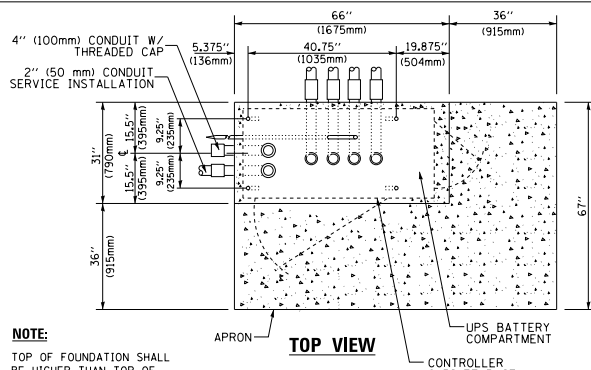
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

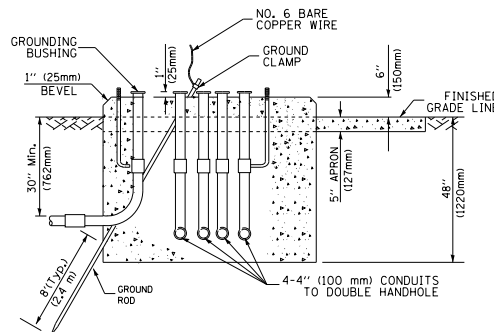
SCALE: NONE	SHEET NO. 4 OF 7 SHEETS	STA. TO STA.	19-03	CONTRACT NO.
			FED. ROAD DIST. NO. 1	ILLINOIS FED. AID PROJECT



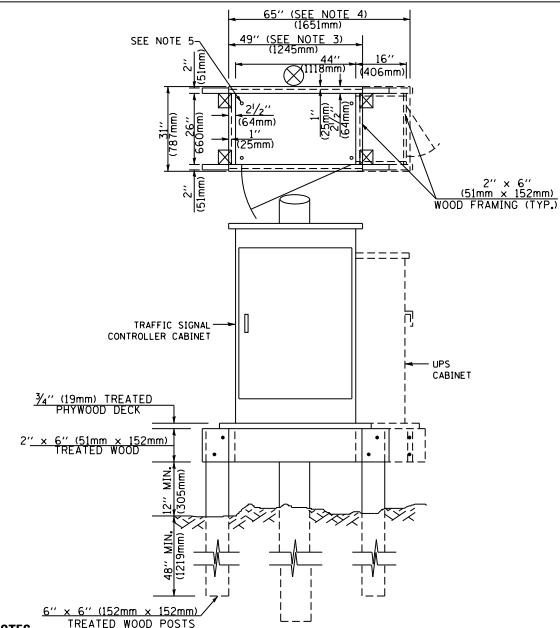
**TYPE D
FOR GROUND MOUNTED
CONTROLLER CABINET
AND UPS BATTERY CABINET**



NOTE:
TOP OF FOUNDATION SHALL
BE HIGHER THAN TOP OF
DOUBLE HANDHOLE



**TYPE C
FOR GROUND MOUNTED
SUPER P (TYPE IV) AND SUPER R (TYPE V)
CONTROLLER CABINETS**



- NOTES:**
1. BASED ON CONTROLLER CABINET TYPE IV WITH BASE DIMENSIONS OF 26" x 44" (660mm x 1118mm). ADJUST PLATFORM SIZE TO FIT CABINET BASE DIMENSIONS BEING SUPPLIED.
 2. BASED ON UNINTERRUPTIBLE POWER SUPPLY CABINET WITH BASE DIMENSIONS OF 16" x 25" (406mm x 635mm). ADJUST PLATFORM SIZE TO FIT CABINET BASE DIMENSIONS BEING SUPPLIED.
 3. PLATFORM SIZE FOR CONTROLLER CABINET TYPE IV.
 4. PLATFORM SIZE FOR CONTROLLER CABINET TYPE IV AND UNINTERRUPTIBLE POWER SUPPLY CABINET.
 5. DRILLED HOLES THROUGH THE PLATFORM BASE TO MATCH THE CONTROLLER CABINET BOLT TEMPLATE. FASTEN THE CONTROLLER CABINET TO THE PLATFORM WITH CARRIAGE BOLTS, WASHERS AND NUTS.
 6. FASTEN ALL SUPPORT WOOD FRAMING TO THE WOOD POSTS WITH 2 LAG SCREWS FOR EACH CONNECTION.

**TEMPORARY SIGNAL CONTROLLER
WOOD SUPPORT PLATFORM**

CABLE SLACK LENGTH	FEET	METER
HANDHOLE	6.5	2.0
DOUBLE HANDHOLE	13.0	4.0
SIGNAL POST	2.0	0.6
MAST ARM	2.0	0.6
CONTROLLER CABINET	1.5	0.5
FIBER OPTIC AT CABINET	13.0	4.0
ELECTRIC SERVICE AT (CABINET OR SERVICE LOCATION)	1.5	0.5
GROUND CABLE (SIGNAL POST, MAST ARM, CABINET)	1.5	0.5
GROUND CABLE (BETWEEN FRAME AND COVER)	5.0	1.6

CABLE SLACK

VERTICAL CABLE LENGTH	FEET	METER
MAST ARM POLE (MAST ARM MOUNTED SIGNAL HEAD) (L = MAST ARM LENGTH - DISTANCE TO SIGNAL HEAD FROM END OF ARM)	20.0+L	6.0+L
BRACKET MOUNTED (MAST ARM POLE OR SIGNAL POLE)	13.0	4.0
PEDESTRIAN PUSH BUTTON	6.0	2.0
SERVICE INSTALLATION POLE MOUNT TO SERVICE DROP	13.5	4.1
SERVICE INSTALLATION POLE MOUNT TO GROUND	13.5	4.1
SERVICE INSTALLATION GROUND MOUNT	6.0	2.0
FOUNDATION (SIGNAL POST, MAST ARM POLE, CONTROLLER CABINET, SERVICE-GROUND MOUNT)	3.0	1.0

VERTICAL CABLE LENGTH

FOUNDATION	DEPTH
TYPE A - Signal Post	4'-0" (1.2m)
TYPE C - CONTROLLER W/ UPS	4'-0" (1.2m)
TYPE D - CONTROLLER	4'-0" (1.2m)
SERVICE INSTALLATION, GROUND MOUNT, TYPE A - SQUARE	4'-0" (1.2m)

DEPTH OF FOUNDATION

MAST ARM LENGTH	① Foundation Depth	Foundation Diameter	Spiral Diameter	Quantity of Rebar's	Size of Rebar's
Less than 30' (9.1 m)	10'-0" (3.0 m)	30" (750mm)	24" (600mm)	8	6119
Greater than or equal to 30' (9.1 m) and less than 40' (12.2 m)	13'-6" (4.1 m)	30" (750mm)	24" (600mm)	8	6119
Greater than or equal to 40' (12.2 m) and less than 50' (15.2 m)	11'-0" (3.4 m)	36" (900mm)	30" (750mm)	12	7122
Greater than or equal to 50' (15.2 m) and up to 55' (16.8 m)	13'-0" (4.0 m)	36" (900mm)	30" (750mm)	12	7122
Greater than or equal to 55' (16.8 m) and up to 65' (19.8 m)	15'-0" (4.6 m)	36" (900mm)	30" (750mm)	12	7122
Greater than or equal to 65' (19.8 m) and less than 75' (22.9 m)	21'-0" (6.4 m)	42" (1060mm)	36" (900mm)	16	8125
Greater than or equal to 75' (22.9 m)	25'-0" (7.6 m)	42" (1060mm)	36" (900mm)	16	8125

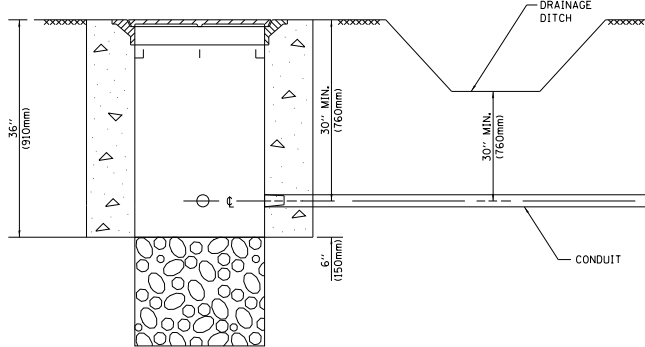
- NOTES:**
1. These foundation depths are for sites which have cohesive soils (clayey silt, sandy clay, etc.) along the length of the shaft, with an overage Unconfined Compressive Strength (qu) > 1.0 tsf (100 kpa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.
 2. Combination mast arm assemblies under 55 feet (16.8 m) shall use 36" (900 mm) diameter foundations.
 3. Combination mast arm assemblies under 56 feet (16.8 m) through 75 feet (22.9 m) shall use 42" (1060 mm) diameter foundations.
 4. For mast arm assemblies with dual arms refer to state standard 87800L.

DEPTH OF MAST ARM FOUNDATIONS, TYPE E

FILE NAME =	USER NAME = footeamj	DESIGNED - DAG	REVISED - DAG 1-1-14
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		CHECKED - DAD	REVISED -
		DATE - 10-28-09	REVISED -

**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

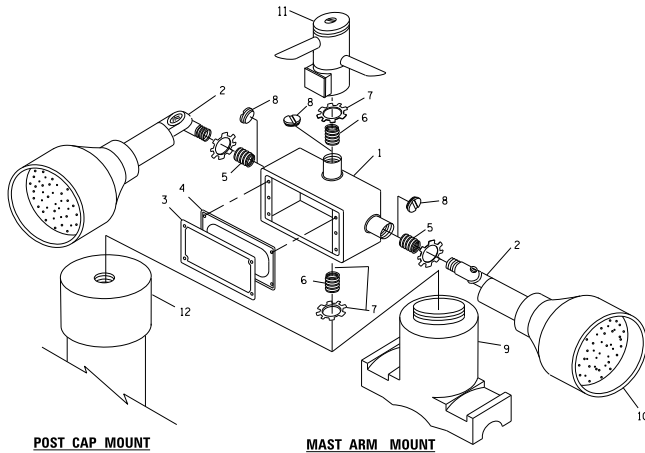
DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS		F.A. SITE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
SCALE: NONE		TS-05		CONTRACT NO.		
SHEET NO. 5 OF 7 SHEETS		STA.		TO STA.		FED. ROAD DIST. NO. 1 ILLINOIS FED. AID PROJECT



NOTES:

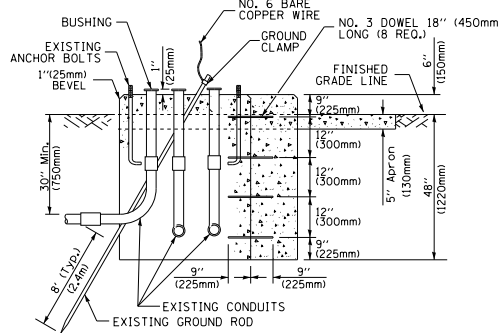
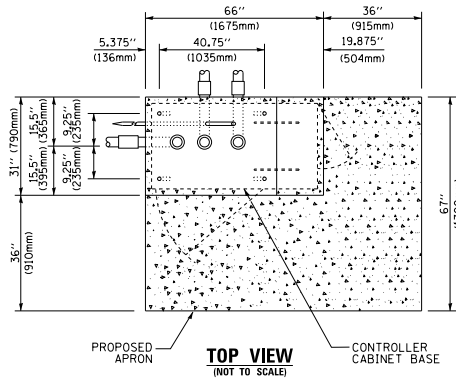
1. CONDUIT DEPTH SHALL BE A MINIMUM OF 30" (760mm) BELOW THE BOTTOM OF THE DRAINAGE DITCH OR ANY SLOPING GROUND
2. THE MINIMUM CONDUIT DEPTH APPLIES TO ALL CONDUIT PLACED UNDER ROADWAY PAVEMENT, MULTI-USE PATHS, SIDEWALKS AND SOIL SURFACES.
3. THE MINIMUM CONDUIT DEPTH APPLIES TO ALL HANDHOLES, HEAVY DUTY HANDHOLES AND DOUBLE HANDHOLES.

HANDHOLE WITH MINIMUM CONDUIT DEPTH (NOT TO SCALE)



EMERGENCY VEHICLE DETECTOR WITH CONFIRMATION BEACON MOUNTING DETAIL

FILE NAME =	USER NAME = footemj	DESIGNED -	DAD	REVISED -	DAG 1-1-14
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		CHECKED -	DAD	REVISED -	
		DATE -	10-28-09	REVISED -	

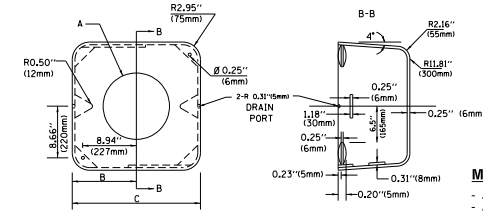


MODIFY EXISTING TYPE "D" FOUNDATION TO TYPE "C" FOUNDATION (NOT TO SCALE)

ITEM NO.	IDENTIFICATION
1	OUTLET BOX - GALV. 21 CU/IN. (0.000344 CU-M)
2	LAMP HOLDER AND COVER
3	OUTLET BOX COVER
4	RUBBER COVER GASKET
5	REDUCING BUSHING
6	1/2" (19 mm) CLOSE NIPPLE
7	1/2" (19 mm) LOCKNUT
8	1/2" (19 mm) HOLE PLUG
9	SADDLE BRACKET - GALV.
10	6 WATT PAR 38 LED FLOOD LAMP
11	DETECTOR UNIT
12	POST CAP (18 FT. (5.4 m) POST MIN.)

NOTES:

1. ALL ELECTRICAL ITEMS, EXCEPT ITEMS *2 AND *11 SHALL BE ALUMINUM OR GALVANIZED
2. ITEM *1- OZ/GEDNEY FSX-1-50 OR EQUIVALENT
ITEM *2- MULBERRY CON-O SHADE LAMP SHIELD OR EQUIVALENT
ITEM *9- "BAND-IT" SADDLE BRACKET OR EQUIVALENT
3. WHEN POST MOUNTING IS SPECIFIED, ITEM *9 SHALL NOT BE REQUIRED. THE DETECTION UNIT SHALL BE MOUNTED DIRECTLY ON TOP OF THE CAP BY DRILLING AND TAPPING A 3/4" (19 mm) HOLE WITH PIPE THREADS. THE POST CAP SHALL EITHER BE SCREWED TO THE TOP OF THE POST OR A MINIMUM OF 3 TIGHTENING SCREWS SHALL BE REQUIRED ON EACH CAP.



A	B	C	HEIGHT	WEIGHT
VARIES	9.5" (241mm)	19" (483mm)	7" (178mm) - 12" (300mm)	53 lbs (24kg)
VARIES	10.75" (273mm)	21.5" (546mm)	7" (178mm) - 12" (300mm)	68 lbs (31 kg)
VARIES	13.0" (330mm)	26" (660mm)	7" (178mm) - 12" (300mm)	81 lbs (37 kg)
VARIES	18.5" (470mm)	37" (940mm)	7" (178mm) - 12" (300mm)	126 lbs (57 kg)

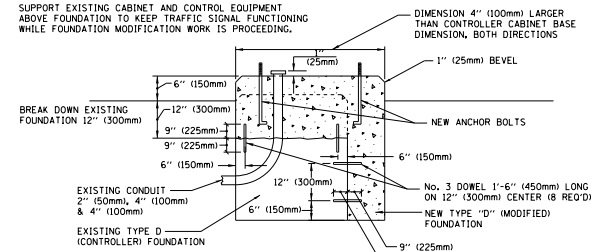
SHROUD

NOTES:

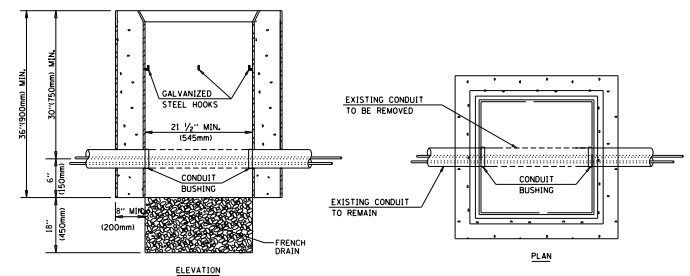
1. DIMENSION "A" IS EQUAL TO THE DIAMETER OF THE MAST ARM POLE AT THE TOP OF THE SHROUD. THE SHROUD SHALL BE TIGHT TO THE MAST ARM POLE.
2. THE SUPPLIER SHALL VERIFIED THE ABOVE DIMENSIONS BASED ON MAST ARM REQUIREMENTS.
3. THE HEIGHT OF THE SHROUD SHALL COVER THE ANCHOR BOLTS, NUTS AND MAST ARM POLE BASE.

NOTE:

SUPPORT EXISTING CABINET AND CONTROL EQUIPMENT ABOVE FOUNDATION TO KEEP TRAFFIC SIGNAL FUNCTIONING WHILE FOUNDATION MODIFICATION WORK IS PROCEEDING.



MODIFY EXISTING TYPE "D" FOUNDATION



NOTES:

1. HANDHOLE CONSTRUCTED PER STATE STANDARD 814001.
2. REMOVAL OF THE EXISTING CONDUIT FROM THE HANDHOLE AND THE INSTALLATION OF THE CONDUIT BUSHINGS SHALL BE INCLUDED WITH THE COST OF THE HANDHOLE.

HANDHOLE TO INTERCEPT EXISTING CONDUIT

STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION

DISTRICT ONE STANDARD TRAFFIC SIGNAL DESIGN DETAILS

SCALE: NONE	SHEET NO. 6 OF 7 SHEETS	STA.	TO STA.	F.A. DATE	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
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TS-05	CONTRACT NO.
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FED. ROAD DIST. NO. 1 (ILLINOIS) FED. AID PROJECT



RETURN WITH BID

Route
County
Local Agency
Section

Various Highways

Kane

Kane County D.O.T.

20-00000-01-GM

1. Proposal of _____
_____ for the improvement of the above section by the construction of _____
Continuous maintenance and repair of various existing traffic signal, ITS and street lighting infrastructure under Kane County maintenance jurisdiction as listed herein.
_____ a total distance of **N/A** feet, of which a distance of _____ feet, (**N/A** miles) are to be improved.
2. The plans for the proposed work are those prepared by **the County Engineer** **41W011 Burlington Road St. Charles, IL. 60175** and approved by the Department of Transportation on _____
3. The specifications referred to herein are those prepared by the Department of Transportation and designated as "Standard Specifications for Road and Bridge Construction" and the "Supplemental Specifications and Recurring Special Provisions" thereto, adopted and in effect on the date of invitation for bids.
4. The undersigned agrees to accept, as part of the contract, the applicable Special Provisions indicated on the "Check Sheet for Recurring Special Provisions" contained in this proposal.
5. The undersigned agrees to complete the work within _____ working days or by **November 30, 2022** unless additional time is granted in accordance with the specifications.
6. A proposal guaranty in the proper amount, as specified in BLRS Special Provision for Bidding Requirements and Conditions for contract Proposals, will be required. Bid Bonds ☒ will ☐ will not be allowed as proposal guaranties. Accompanying this proposal is either a bid bond if allowed, on Department form BLR12230 or a proposal guaranty check, complying with the specifications, made payable to: _____ County _____ Treasurer of **Kane**
the amount of the check is _____ (_____)
7. In the event that one proposal guaranty check is intended to cover two or more proposals, the amount must be equal to the sum of the proposal guaranties, which would be required for each individual proposal. If the proposal guaranty check is placed in another proposal, it will be found in the proposal for: Section Number **20-00000-01-GM**.
8. If this proposal is accepted and the undersigned fails to execute a contract and contract bond as required, it is hereby agreed that the Bid Bond or check shall be forfeited to the Awarding Authority.
9. Each pay item should have a unit price and a total price. If no total price is shown or if there is a discrepancy between the product of the unit price multiplied by the quantity, the unit price shall govern. If a unit price is omitted, the total price will be divided by the quantity in order to establish a unit price.
10. A bid will be declared unacceptable if neither a unit price nor a total price is shown.
11. The undersigned firm certifies that it has not been convicted of bribery or attempting to bribe an officer or employee of the State of Illinois, nor has the firm made an admission of guilt of such conduct which is a matter of record, nor has an official, agent, or employee of the firm committed bribery or attempted bribery on behalf of the firm and pursuant to the direction or authorization of a responsible official of the firm. The undersigned firm further certifies that it is not barred from contracting with any unit of State or local government as a result of a violation of State laws prohibiting bid-rigging or bid-rotating.
12. The undersigned submits herewith the schedule of prices on BLR 12222 covering the work to be performed under this contract.



Route	Various Highways
County	Kane
Local Agency	Kane County D.O.T.
Section	20-00000-01-GM

(For complete information covering these items, see plans and specifications)

Page 1 of 1
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RETURN WITH BID

Route
County
Local Agency
Section

Various Highways
Kane
Kane County
20-00000-01-GM

(If an individual)

Signature of Bidder _____

Business Address _____

(If a partnership)

Firm Name _____

Signed By _____

Business Address _____

Insert
Names and
Addresses of
All Partners



(If a corporation)

Corporate Name _____

Signed By _____

President

Business Address _____

Insert
Names of
Officers



President _____

Secretary _____

Treasurer _____

Attest: _____
Secretary



RETURN WITH BID

Route	Various
County	Kane
Local Agency	Kane Co. Div. of Trans
Section	20-00000-01-GM

PAPER BID BOND

ELECTRONIC BID BOND

Date _____



Return with Bid

Route	<u>Various</u>
County	<u>Kane</u>
Local Agency	<u>Kane DOT</u>
Section	<u>20-00000-01-GM</u>

All contractors are required to complete the following certification:

☒ For this contract proposal or for all groups in this deliver and install proposal.

☐ For the following deliver and install groups in this material proposal:

Illinois Department of Transportation policy, adopted in accordance with the provisions of the Illinois Highway Code, requires this contract to be awarded to the lowest responsive and responsible bidder. The award decision is subject to approval by the Department. In addition to all other responsibility factors, this contract or deliver and install proposal requires all bidders and all bidders' subcontractors to disclose participation in apprenticeship or training programs that are (1) approved by and registered with the United States Department of Labor's Bureau of Apprenticeship and Training, and (2) applicable to the work of the above indicated proposals or groups. Therefore, all bidders are required to complete the following certification:

- I. Except as provided in paragraph IV below, the undersigned bidder certifies that it is a participant, either as an individual or as part of a group program, in an approved apprenticeship or training program applicable to each type of work or craft that the bidder will perform with its own employees.
- II. The undersigned bidder further certifies for work to be performed by subcontract that each of its subcontractors submitted for approval either (A) is, at the time of such bid, participating in an approved, applicable apprenticeship or training program; or (B) will, prior to commencement of performance of work pursuant to this contract, establish participation in an approved apprenticeship or training program applicable to the work of the subcontract.
- III. The undersigned bidder, by inclusion in the list in the space below, certifies the official name of each program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's employees. Types of work or craft that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category for which there is no applicable apprenticeship or training program available.

- IV. Except for any work identified above, any bidder or subcontractor that shall perform all or part of the work of the contract or deliver and install proposal solely by individual owners, partners or members and not by employees to whom the payment of prevailing rates of wages would be required, check the following box, and identify the owner/operator workforce and positions of ownership. ☐

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project is accounted for and listed. The Department at any time before or after award may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. In order to fulfill the participation requirement, it shall not be necessary that any applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract or deliver and install proposal.

Bidder: _____

By: _____
(Signature)

Address: _____

Title: _____



Substance Abuse Prevention Program Certification

Letting Date: 8/9/2019 Item No.: N/A
Contract No.: Non - MFT
Route: Various
Section: 20-00000-01-GM
Job No.: N/A
County: Kane

The Substance Abuse Prevention on Public Works Act, Public Act 95-0635, prohibits the use of drugs and alcohol, as defined in the Act, by employees of the Contractor and by employees of all approved Subcontractors while performing work on a public works project. The Contractor/Subcontractor herewith certifies that it has a superseding collective bargaining agreement or makes the public filing of its written substance abuse prevention program for the prevention of substance abuse among its employees who are not covered by a collective bargaining agreement dealing with the subject as mandated by the Act.

- A. The undersigned representative of the Contractor/Subcontractor certifies that the contracting entity has signed collective bargaining agreements that are in effect for all of its employees, and that deal with the subject matter of Public Act 95-0635.

Contractor/Subcontractor

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized Representative

Date

- B. The undersigned representative of the Contractor/Subcontractor certifies that the contracting entity has in place for all of its employees not covered by a collective bargaining agreement that deals with the subject of the Act, the attached substance abuse prevention program that meets or exceeds the requirements of Public Act 95-0635.

Contractor/Subcontractor

Name of Authorized Representative (type or print)

Title of Authorized Representative (type or print)

Signature of Authorized Representative

Date



Illinois Department of Transportation

Bureau of Construction
2300 South Dirksen Parkway/Room 322
Springfield, Illinois 62764

Affidavit of Availability For the Letting of 8/9/2019

Instructions: Complete this form by either typing or using black ink. "Authorization to Bid" will not be issued unless both sides of this form are completed in detail. Use additional forms as needed to list all work.

Part I. Work Under Contract

List below all work you have under contract as either a prime contractor or a subcontractor. It is required to include all pending low bids not yet awarded or rejected. In a joint venture, list only that portion of the work which is the responsibility of your company. The uncompleted dollar value is to be based upon the most recent engineer's or owners estimate, and must include work subcontracted to others. If no work is contracted, show **NONE**.

	1	2	3	4	Awards Pending	
Contract Number						
Contract With						
Estimated Completion Date						
Total Contract Price						Accumulated Totals
Uncompleted Dollar Value if Firm is the Prime Contractor						
Uncompleted Dollar Value if Firm is the Subcontractor						
Total Value of All Work						

Part II. Awards Pending and Uncompleted Work to be done with your own forces.

List below the uncompleted dollar value of work for each contract and awards pending to be completed with your own forces. All work subcontracted to others will be listed on the reverse of this form. In a joint venture, list only that portion of the work to be done by your company. If no work is contracted, show **NONE**.

						Accumulated Totals
Earthwork						
Portland Cement Concrete Paving						
HMA Plant Mix						
HMA Paving						
Clean & Seal Cracks/Joints						
Aggregate Bases & Surfaces						
Highway, R.R. and Waterway Structures						
Drainage						
Electrical						
Cover and Seal Coats						
Concrete Construction						
Landscaping						
Fencing						
Guardrail						
Painting						
Signing						
Cold Milling, Planning & Rotomilling						
Demolition						
Pavement Markings (Paint)						
Other Construction (List)						
						\$ 0.00
Totals						

Disclosure of this information is **REQUIRED** to accomplish the statutory purpose as outlined in the "Illinois Procurement Code." Failure to comply will result in non-issuance of an "Authorization To Bid." This form has been approved by the State Forms Management Center.

Part III. Work Subcontracted to Others.

For each contract described in Part I, list all the work you have subcontracted to others.

	1	2	3	4	Awards Pending
Subcontractor					
Type of Work					
Subcontract Price					
Amount Uncompleted					
Subcontractor					
Type of Work					
Subcontract Price					
Amount Uncompleted					
Subcontractor					
Type of Work					
Subcontract Price					
Amount Uncompleted					
Subcontractor					
Type of Work					
Subcontract Price					
Amount Uncompleted					
Subcontractor					
Type of Work					
Subcontract Price					
Amount Uncompleted					
Total Uncompleted					

I, being duly sworn, do hereby declare that this affidavit is a true and correct statement relating to ALL uncompleted contracts of the undersigned for Federal, State, County, City and private work, including ALL subcontract work, ALL pending low bids not yet awarded or rejected and ALL estimated completion dates.

Subscribed and sworn to before me
this _____ day of _____, _____ Type or Print Name _____
Officer or Director Title

Signed _____

Notary Public

My commission expires _____

(Notary Seal)

Company _____

Address _____

QUESTIONNAIRE (PAGE 1 OF 2)

FOR PROSPECTIVE KANE COUNTY TRAFFIC SIGNAL AND ROADWAY LIGHTING MAINTENANCE CONTRACTORS

1. Company: _____
2. Address: _____
3. Does this Company provide electrical maintenance service for traffic signal and roadway lighting systems twenty-four (24) hour per day, seven (7) days per week, fifty-two (52) weeks per year CIRCLE ONE: yes no
4. What are the distances of Company's Service Shop(s) from St. Charles, Illinois?
 1. _____ miles
 2. _____ miles
 3. _____ miles
5. List the public agencies in NE Illinois for which the company has active contracts for Traffic Signal and Street Lighting Maintenance. List each agency, type of equipment maintained, annual dollar amount of contract/maintenance service provided and contact information.

Public Agency _____
Agency Contact and Phone: _____
Number of Traffic Signals maintained: _____
Number street lights maintained: _____
Annual dollar amount of contract/service: _____

Public Agency _____
Agency Contact and Phone: _____
Number of Traffic Signals maintained: _____
Number street lights maintained: _____
Annual dollar amount of contract/service: _____

Public Agency _____
Agency Contact and Phone: _____
Number of Traffic Signals maintained: _____
Number street lights maintained: _____
Annual dollar amount of contract/service: _____

Public Agency _____
Agency Contact and Phone: _____
Number of Traffic Signals maintained: _____
Number street lights maintained: _____
Annual dollar amount of contract/service: _____

Use additional sheets as required and attach them to this questionnaire.

QUESTIONNAIRE (PAGE 2 OF 2)

6. Provide statements detailing your company's experience maintaining public agency electrical infrastructures. List all specialized equipment owned by your company. List specialized training your company provides for personnel and explain the expertise your company will supply while maintaining Kane County's electrical infrastructure. Provide statements for each of the following categories: (Please attach as many sheets as necessary describing your company's expertise and attach the sheets to this questionnaire).

CATEGORIES

1. Traffic signal installations and systems including video detection, microwave detection, inductive loop detection, wireless vehicle detection, thermal detection, UPS, PTZ video monitoring, Accessible pedestrian detection, Malfunction Management Unit testing.
2. ATMS centrally controlled traffic signal systems
- 3 Installing, monitoring and maintaining Ethernet based communication systems, programming Ethernet managed switches, addressing Ethernet devices, terminating fiber optic cable, splicing fiber optic cable, trouble shooting Ethernet networks.
4. Solar powered flashing beacon installations with passive pedestrian detection.
5. ITS information and communication technologies for installing and maintaining traffic signal installations.
6. ITS information and communication technologies for installing and maintaining roadway lighting installations.
7. ITS information and communication technologies for installing and maintaining roadway weather information systems (RWIS).
8. ITS information and communication technologies for installing and maintaining Wayside Horn Systems (WHS).
9. ITS information and communication technologies for installing and maintaining Dynamic Message Signs (DMS).

CONTRACTOR DISCLOSURE
KANE COUNTY CODE, ARTICLE II, DIVISION 3, SECTION 2-211

1. Prior to award, every contractor or vendor who is seeking or who has obtained contracts or change orders to contracts or two (2) or more individual contracts with Kane County resulting in an amount greater than Fifteen Thousand Dollars (\$15,000) shall disclose to the Kane County Purchasing Department, in writing all cumulative campaign contributions, (which includes multiple candidates) made within the previous twelve (12) months of awarding of the contract made by that contractor, union, or vendor to any current officer or countywide elected officer whose office the contract to be awarded will benefit. Disclosure shall be updated annually during the term of a multi-year contract and prior to any change order or renewal requiring Board level approval. For purposes of this disclosure requirement, "contractor or vendor" shall include owners, officers, managers, insurance brokers, lobbyists, agents, consultants, bond counsel and underwriters counsel, subcontractors corporations, partnerships, associations, business trusts, estates, trustees, and/or beneficiaries under the control of the contracting person, and political action committees to which the contracting person has made contributions.
2. All contractors and vendors who have obtained or are seeking contracts with Kane County must disclose the following information which shall be certified and attached to the application or document. Penalties for knowingly violating disclosure requirements will potentially result in immediate cancellation of the contract, and possible disbarment from future County contracts:
 - A. Name, address and percentage of ownership interest of each individual or entity having a legal or a beneficial interest of more than five percent (5%) in the applicant. Any entity required by law to file a statement providing substantially the information required by this paragraph with any other government agency may file a duplicate of such statement;
 - B. Names and contact information of their lobbyists, agents and representatives and all individuals who are or will be having contact with County employees or officials in relation to the contract or bid. This information disclosure must be updated when any changes to the information occurs.
 - C. Whenever any interest required to be disclosed in paragraph (a) above is held by an agent or agents, or a nominee or nominees, the principals for whom such agents or nominees hold such interest shall also be disclosed. The application of a spouse or any other party, if constructively controlled by another person, or legal entity as set forth above, shall state the name and address and percentage of beneficial interest of such person or entity possessing such constructive control and the relationship under which such control is being or may be exercised. Whenever a stock or beneficial interest is held by a corporation or other legal entity, such shareholder or beneficiary shall also make disclosure as required by paragraph (a) above.

- D. A statement under oath that the applicant has withheld no disclosures as to economic interests in the undertaking nor reserved any information, data or plan as to the intended use or purpose for which it seeks County Board or other county agency action.
3. All disclosures and information shall be current as of the date upon which the application is presented and shall be maintained current until such time as Kane County shall take action on the application. Furthermore, this information shall be maintained in a database by the Purchasing Department, and made available for public viewing.
 4. Notwithstanding any of the above provisions, the County Purchasing Department with respect to contracts awarded may require any such additional information from any applicant which is reasonably intended to achieve full disclosure relevant to the application for action by the County Board or any other County agency.
 5. Any failure to comply with the provisions of this section shall render any ordinance, ordinance amendment, County Board approval or other County action in behalf of the applicant failing to comply voidable at the option of the County Board or other County agency involved upon the recommendation of the County Board Chairman or the majority of the County Board.
 6. Information shall be sent directly to the Kane County Purchasing Department at the following address:

Kane County Government Center
Purchasing Department, Bldg A
719 S. Batavia Ave. Geneva, IL 60134

Company Name

Signature of Officer of Company

Title: President

Date