

Kane County Traffic Design Guidance

Effective: 12/1/2023

Foreword

In general, designers should follow the latest version of the IDOT District 1 Traffic Signal Design Guidelines ([IDOT D1 Traffic Signal Design Guidelines](#)), currently the October 2009 version, and other IDOT District 1 design requirements, except as noted below. Designers should be aware that certain project specific requirements may dictate deviations from the IDOT guidelines or this guidance. This document also covers information on Pavement Marking and Signage specific to Kane County.

Plan Format

In general KDOT traffic staff will review PDF copies of entire plan sets. Designers shall coordinate with their designated County project manager or permit administrator with specific hard copy submittal requirements but a PDF copy should be provided and be internally distributed for review. The following plan sheets shall also be created on any design project involving relevant scope of work:

1.4.6.2 Geometric Plan – ADA Crosswalk details

- Plan shall include point elevations, cross slopes, and running slopes of each quadrant containing a crosswalk or ramp.
- Detail plan view typically scaled at 1"=10'
- Demonstrate proposed signal equipment, sidewalk pavement, driving pavement, pavement markings, and button locations. Show Existing/Proposed Storm/Water lids or structures to verify no conflicts.
- See Example in [Appendix A](#)

1.4.8.3 System Interconnect – Cabinet & Fiber Termination Details.

- Schematic Detail shall be provided for each signal or I.T.S. Cabinet or Splice enclosure on a project.
- Each Detail shall demonstrate the schematic connections between a fiber optic network switch and every network connectable piece of signal cabinet hardware or I.T.S. Hardware. These connections typically labeled with "CAT 6" connections.
- Each Detail shall demonstrate each fiber cable entering cabinet. Listing the type and number of fibers and shall demonstrate if each fiber is terminated, spliced through, or Tied and Bundled (T&B). A schematic connection demonstrating a jumper cable shall be made between the fiber termination panel and the Fiber switch.
- Each Detail shall provide sufficient detail to accurately depict the usage of splice trays, and pre-connectorized fiber optic pig-tails if called for in project specification.
- Fiber optic switch shall be labeled as either: Type 1 or Type 2 depending on number of fiber cables being terminated at location. (Type 1 if only 1 or 2 fiber cables enter cabinet, Type 2 if 3 or more fiber cables enter the cabinet)
- See Example in [Appendix B](#)

Traffic Signals - Signal Heads and Signal Head Placement

All signal heads shall have backplates. Location and number of signal heads shall conform to one signal head per travel lane located at the center of each travel lane. Where there is only one travel lane at a signal approach, follow MUTCD guidance (placing one signal head on either edge line of the travel lane). Nearside right signal heads shall be over the lane line (if overhead mounted). Farside left, left turn signals shall be within 20 degree cone of vision (constructed from the center of the left turn bay/bays). Every signal indication used shall have a 2nd signal head for that same signal indication for redundancy. KDOT specifications shall be used to indicate our preference for extended warranty LEDs (currently rated at 15 years at time of publication of this document).

Traffic Signals – Retroreflective Backplates

Retroreflective backplates may be used where added conspicuity is desired such as in the following conditions:

1. Higher travel speed, rural traffic signal location (isolated signal greater than 1 mile spacing to nearest 2nd signal)
2. Limited or comparatively less intersection sight distance (See MUTCD 4D.12)
3. Documented high crash rate or high crash severity location, compared with its safety tier peer group
4. Is adjacent to a corridor utilizing a specified thickness of retroreflective backplate material
5. When a project or corridor is specifically targeting safety enhancements, or as KDOT staff recommends

When specified, all signal heads for a given roadway (both directions of travel) shall have Retroreflective backplates installed. For listed conditions 1 through 3, a standard 3 inch retroreflective material backplate shall be used, where conditions 4 or 5 are met, KDOT staff may instead recommend use of the 1 inch retroreflective material backplate. Project designer shall ensure inclusion of the special provision where a 1 inch retroreflective material backplate is required. IDOT standard specifications specifies 3 inch retroreflective material if no special provision is included.

Traffic Signals - Vehicle Detection

Allowable vehicle detection technologies for use in traffic signal design are Induction loops, Video Detection, and Microwave Detection. Magnetometers may be allowed upon special request for system detection purposes only (not used to call or extend vehicle phases).

Typical detector layout is to have stop bar presence detection on all left turn lanes. Minor volume street should have stop bar presence detection for all through lanes and right turn lanes. Major volume street shall have only “far back” detection for all through lanes (and right turn lanes if directed by KDOT staff). “Far Back” detection shall assume to be 5 seconds of travel time (design speed) from the stop bar, example at 45 MPH, 330 feet back. Every lane shall have a dedicated detector channel, in the case for loops, this means a separate loop cable per lane. When loops are used for stop bar detection, typically at least 3 loops or more is desired, sometimes elongated in the direction of travel to get adequate coverage in front of and behind the stopbar. Where stop bar presence detection is required, a minimum of 21 feet of detection coverage is required on the approach side of the stop bar; or explained in another way, two full detector loops laid out to IDOT standards behind the stop bar.

County preference is full non-intrusive Detection (Video and/or Microwave) for stop bar and far back detection on interconnected traffic signals with Pan, Tilt, Zoom cameras and interconnected detector unit user interface. Where there is no interconnect, County preference is to install loops. Where loops are installed, they shall be installed in the asphalt binder course, not the surface course. Consult with County’s traffic engineer on a project by project basis to confirm this intent and always incorporate latest county specifications on non-intrusive detection based projects.

Traffic Signals - Control Equipment

Controllers installed within Kane County must be NTCIP compliant and compatible with KDOT's installation of Transcore's TranSuite system (KDOT's Advanced Traffic Management System, ATMS). Some existing controllers can be integrated into TranSuite with a software upgrade. Contact KDOT Traffic to determine the scope of work required for each location. In General, the following NTCIP note is required on the plans where controller equipment is proposed, a KDOT specification will target latest software/firmware support, designers to ensure this specification is included before Final submittal:

THE TRAFFIC SIGNAL CONTROL EQUIPMENT FOR THIS PROJECT SHALL BE NTCIP (LATEST VERSION).

Traffic Signals - Controller Cabinets and Uninterruptible Power Supply (UPS)

KDOT generally matches IDOT guidelines with the use of "Super P" and "Super R" cabinets (Type IV, Type V respectively for compartmentalized single shell cabinet for Traffic Signal Control and UPS). Any proposed traffic signal or ITS cabinet shall also be installed with back-up/UPS power. Designer shall ensure cabinet is not installed in or near areas designed to hold water such as an elevation low spot, drainage ditch, or wetland. When possible, controller cabinets shall be located as close to the right-of-way line as possible. A Type IV or "Super P" cabinet shall be proposed if there is no current or future plan to install fiber optic cable OR to contain a street lighting control system; a Type V or "Super R" shall be proposed if either a fiber optic cable or a street lighting control system is proposed or desired in the future or current design.

Traffic Signals - Mast Arms Assemblies and Foundations

All new mast arms should be designed with combination lighting arms and LED lighting Luminaires utilizing 25 foot long luminaire arms unless photometric calculations determine alternate lengths or if other constraints make combination lighting impractical. Combination arms are desired even when lighting is not proposed to accommodate ITS equipment, such as for PTZ cameras. **Mast arm lengths, Luminaire arm length, foundation diameter, and foundation depth shall be called out for each plan location.** Where possible, mast arms shall be offset at greater lengths from the edge of traveled way to accommodate future roadway widening.

Traffic Signals – LED Luminaires (for Combination lighting)

Kane County began deploying a countywide retrofit of HPS luminaires to LED luminaires beginning in 2023. All new permanent luminaires shall be LED type. The focus performance metrics of these luminaires was to target LED equivalents to the former HPS technology. The performance target was a fixture with 25,000 to 28,000 Lumens at Type III distribution and 3K color temperature unless otherwise designed as part of a larger photometric design. All new or major modified traffic signals shall assume that combination street lighting to be included in the project. Mounted height may range between 40.0 to 47.5 feet unless differs due to a larger photometric design or site constraint.

Pay item shall be included for a COMBINATION LIGHTING CONTROLLER, when combination lighting is proposed with no larger system. A Photocell sensor shall be integrated into the underside of the front eave of the traffic signal cabinet. The Controller panel shall be contained within the traffic signal cabinet and contain a hand switch for ON, OFF, & AUTO. Corresponding Luminaire's shall have shortening caps to ensure proper operation of lighting controller. When Combination luminaries are specified as part of a larger street lighting system, the combination street lighting conduits/cables/control/photocontrol shall remain a separate system with lighting plans to demonstrate this.

Traffic Signals – Temporary Traffic Signal Design

The design typically follows IDOT D1 Design guidelines. Where temporary signals are installed near existing Kane County Fiber optic cable, the signal controller shall be compatible with and be interconnected to communicate with KDOT's TransSuite system. This design involving interconnect will typically require NTCIP compliant controllers, fiber optic switches, and a PTZ camera to be specified. A working PTZ may either be a pre-existing IP based PTZ camera relocated from an existing project location, or a permanent PTZ camera procured early in the project to be used for both the temporary signal and then relocated to the permanent traffic signal or ITS pole. Temporary Traffic signals, when used, should not be paired with the use of STOP or YIELD signs at the turning islands unless specifically allowed by KDOT traffic. Temporary traffic signals should be installed with at least two 400W HPS photo controlled luminaire arms (or LED Equivalent) and EVP equipment. When 5 section, protected-permissive left turn heads are used there shall be at least 2 signal indications per movement and be directly across from the left turn lane or straddle the inner and outside lane lines. Where a temporary traffic signal is proposed where an existing traffic signal is operating: signal indications for left turn control, signal sequence and phasing shall be as kept as close to existing operations as possible. Designer shall specify inclusion of TEMP SIGNAL TIMINGS for each signal location (existing or Temp) that is impacted by project MOT.

Maintenance of Existing Traffic Signals (& Lighting Systems)

In general, the pay item for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION should be included for all signal installations in project limits that are not being removed and replaced with a temporary or permanent signal as well as at intersections where fiber work is proposed. This need to maintain signals includes upstream and downstream locations where fiber is being removed and reinstalled between intersections. Designers should pay special attention to the existing configuration of any roadway lighting systems adjacent to, or integrated as part of, the traffic signal. In cases where a traffic signal's combination luminaire is powered off of a lighting controller (not part of the signal control cabinet) the plans shall include provisions for MAINTENANCE OF EXISTING LIGHTING SYSTEM. Where lighting system maintenance is specified, only entire system maintenance is allowed, no partial circuit based maintenance shall be allowed in the plans or specifications. Work at traffic signals limited to typical roadway pavement resurfacing, resulting in the need for detector loop removal and replacement, a Maintenance transfer is not typically required.

Traffic Signal Coordination and Timing (SCAT) & Optimization

Most traffic signal modification projects should include re-optimization or optimization pay items following the guidance in the IDOT D1 Design Guide. The designer should coordinate with KDOT Traffic to determine the actual pay item and scope of timing changes that will be needed. Designers should be aware that due to the nature of the Transcore's TransSuite system, there are no longer defined "systems" throughout most of Kane County as you may expect with a closed loop, "Master Controller" type system. To avoid confusion in construction, designers should include a list of the traffic signals that will be optimized or re-optimized on the interconnect schematic plan sheets and/or within the specifications which define the pay item related to signal re-timing, the unit of measure shall be per EACH. Scope of SCAT work may be considerate beyond the limits of signals physically being modified, designers should consider inclusion of traffic signals which may function as a localized section or be better optimized into an existing system by modeling 1 or 2 signals beyond where a signal was modified.

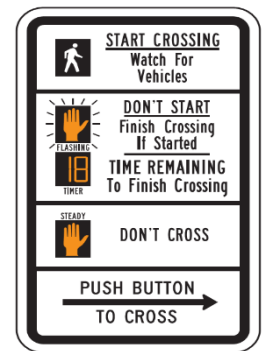
Service Installations (Signal, Lighting, ITS, Etc.), Excluding Solar power

All new service connections shall be metered and called out as such on the signal plans and cable plans. Ground Mount shall be used unless otherwise directed by KDOT staff (Utility power Service providers do not typically allow pole mount equipment on their poles). Ground mounted services shall be visible by the roadway but be as close to the utility power transformer as feasible. KDOT is traditionally responsible for the conduit/cable between the service and the transformer, minimizing this distance reduces risk in future excavator damage.

Pedestrian Push Button and Ramp Design

Kane County desires specific design attention with respect to push button placement and button orientation with respect to the sidewalk or multi-use path and the alignment of the sidewalk ramp and crosswalk striping the button is designed for. Crosswalk striping shall not have any kinks and be aligned with the direct projections of the orientation of the curb ramps they connect. Typical design will include the detailed design of point elevations, cross-slopes, running slopes, and level landings around each curb ramp to ensure ADA requirements are being satisfied. Generally project curb ramp designs shall endeavor to use Perpendicular Curb Ramps per IDOT standard 424001 wherever possible with layout of crossings considerate of a full build of crosswalks for each leg of an intersections. Diagonal and Corner curb ramp designs shall be avoided whenever possible (IDOT Highway standards, 424006 and 424011/424021 respectively). Diagonal and Corner designs can promote heavy vehicle wider turns and is less intuitive in orienting a handicapped user to crossing properly.

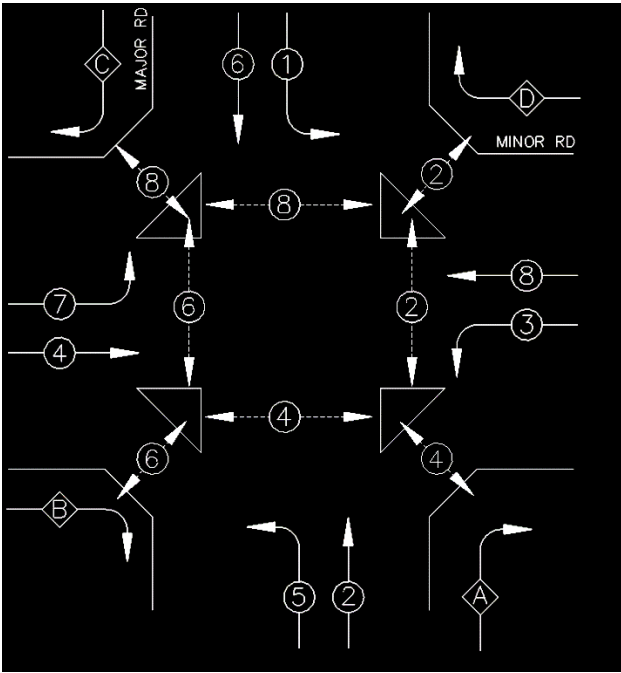
Push buttons shall be positioned directly above at least a 4 foot by 4 foot pad of sidewalk or path. The push button assembly is typically installed with a descriptive sign (R10-3e, for example) which includes the message “PUSH BUTTON → TO CROSS”, the intent of design is for every button to be oriented with this sign panel/button assembly to be properly oriented with the crosswalk ramp and striping. Additional sidewalk or path pavement may be required to meet these requirements. A pedestrian should be able to press the button, turn 90 degrees in the direction of the “PUSH BUTTON → TO CROSS” arrow and be properly aligned to cross the crosswalk ramp, crosswalk striping, and land at the far-side crosswalk ramp without a kink in the walking path or striping.



R10-3e

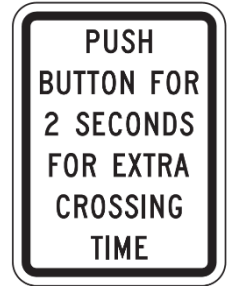
Any signal post or pole involving the installation of multiple buttons should consider the feasibility of meeting the orientation requirements. Separate push button posts may be required to ensure proper implementation of design. Only Pedestrian Push button Post, Type A shall be installed when required (see District One standard, TS-05). Do not use IDOT Highway standard 876001 for signal hardware guidance. Where push buttons are mounted to a mast arm assembly pole, it is recommended that notes be added to the signal plan on the need to install button with push button extension mounting hardware to maintain 10 inches or less side reach, included in the cost of the button being installed.

Pedestrian Crosswalk phases shall typically be “Single stage” meaning a single signal cycle can allow the pedestrians to cross all travel lanes and get to the other side. This design shall not be intercepted by any median or change in direction until it hits the far side curb ramp. When Intersections become large, “two-stage” crossings or “extended press” designs should be considered:



Two Stage: Through use of “Pedestrian Refuge” areas, typically geometrically created corner/right turn islands or concrete center medians of 8 foot or wider, a pedestrian crossing phase can be broken up into multiple stages in order to cumulatively allow a pedestrian safe passage across the intersection. The phase diagram to the left demonstrates one approach.

Extended Press: Is not to be specified unless directed by KDOT. Since adoption of PROWAG regulations an extended press no longer allows for reduced walk time calculations under momentary press activation and thus future design is limited to special requests or considerations. Install of an R10-32P sign, “APS” push buttons, and modern signal controllers are required for this feature.

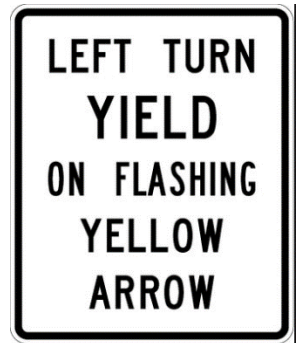


R10-32P

Flashing Yellow Arrow Design

Generally, use of flashing yellow arrow (FYA) signalization is being implemented on a corridor based improvement or extension of an existing corridor of FYA. FYA signalization is generally in reference to the 4 section protected-permissive signal head but the permissive only 3 section FYA head is also allowed where optimal signal phasing and intersection geometrics allow. Seek county staff recommendation on if a project location is a candidate for FYA signalization. Use 7C cables for 4 section heads and for 3 section heads involving FYA (for easy retrofit to 4 section in future).

Where FYA signal heads are installed, each signal head shall be installed adjacent to a “LEFT TURN YIELD ON FLASHING YELLOW ARROW” SIGN. See [Appendix C](#) for the Sign detail. Use of Illinois Standard R10-I109 is NOT to be used unless directed by KDOT staff.



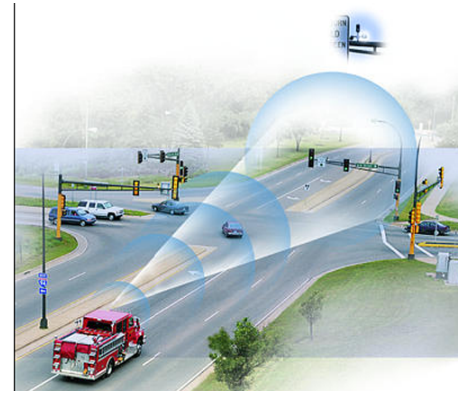
In Retrofit projects, where FYA is installed on an existing traffic signal location, ensure there are provisions in the contract documents to update the controller, and CMU/MMU to a FYA compatible system. Due to EVP design’s incorporation of confirmation beacons, the contract documents may also need to mention the modification of additional load switches in the signal control cabinet.

Pre-emption design for FYA shall be a “2 channel” approach, whereby a pre-emption phase provides bidirectional circular green indications alongside a FYA indication on one street, with the same function provided for the side street under the 2nd channel. Should design dictate a desire for alternate pre-emption design, additional contract provisions will be required to avoid pre-emption induced “yellow traps” and County staff should provide approvals on any design differing from the “2 channel” approach. Light Detectors and confirmation beacons shall be designed to have a mono-directional confirmation beacon and light detector installed for each signal approach such that the hardware is capable of 4 channel operation but the EVP operation functions like 2 channel operation. This design intent allows for retrofit to protected only left turns if operations and study recommend future changes.

Emergency Vehicle Pre-emption (EVP) Design

In general, all proposed permanent and temporary traffic signals should be designed with EVP unless otherwise directed by KDOT.

If there are any line of sight obstructions or significant horizontal or vertical curves in advance of the stopbars of a traffic signal approach within a quarter mile, it is advised that the signal designer consider the need for an additional emergency vehicle pre-emption detector (no need for additional confirmation beacon). A common visual aid associated with Infrared (IR) based EVP design is that emergency vehicle emitters are typically rigidly/statically mounted on the front of the vehicle and any integrated IR emitter sends out a conical beam of IR light towards our Traffic signal EVP detector (the black tunnel visor).



Designers should consider any such project/location specific concern which might suggest the need for additional EVP detectors. Other such considerations could be anticipated back of queues during peak hours or special event traffic. Designs incorporating a detector which can pick up emergency signals under such conditions is a desirable feature. An additional traffic signal post, 18 Foot, shall be installed with corresponding cable/conduit back to the controller cabinet when conditions merit.



Wattage Chart (as shown on cable plans)

See **Appendix D** for preferred values to use in this table, not all line items for wattage chart need to be shown in plans if design does not include said device. Designer is required to perform electric utility company coordination to ensure the proper agency responsible for energy is listed on the wattage chart, the proper utility company contact is listed, and that a service installation/connection is detailed in such a way that a connection is most feasible in the quadrant chosen for the control cabinet and service installation. New Installations shall include pay items for ELECTRIC UTILITY SERVICE CONNECTION, and the appropriate SERVICE INSTALLATION pay item.

Conduits and Raceways (Street Lighting ducts) - Minimal Cover

Designers should include notes on traffic signal plan sheets and roadway lighting plan sheets where conduits or raceways are specified. These notes shall indicate: ALL PROPOSED CONDUIT SHALL BE PLACED AT A MINIMUM DEPTH OF 42 INCHES WHERE POSSIBLE. Include KDOT's special provision on this. Conduit crossings under roadways shall be 60 inch depth below grade, where possible. Resident engineer to determine transition to normal Handhole/foundation entry points targeting 30 to 36 inches of depth penetrating a handhole.

Traffic Signals – Skewed intersecting roadways

Where traffic signals are being designed at intersecting roadways having a skewed intersecting angel of greater than 14 degrees away from 90 degrees. Designer should begin to consider explicitly calling out 24 inch long full round visors, angel cut visors, or optically programmed signal heads. Discuss with KDOT staff those project locations which may meet this criteria.

Traffic Signals – LED Signal Face, Lens Cover or Visor Heater

Inclusion of either a Lens Cover or Visor heater is recommended on any RED signal indication (Circular or Arrow) on New traffic signal installations or as directed. Where 24 inch full round visors or optically programmed signal LEDs are specified signal lens covers shall not be used. Follow IDOT specifications, pay items, and policy unless otherwise directed.

Interconnect and Intelligent Transportation System (ITS) Design

General

Where interconnection is being considered, Kane County prefers to interconnect when two traffic signals are within one mile or less of one another. Interconnected traffic signals does not imply those traffic signals are to operate under coordinated operations, only that a data link to the signal control cabinet hardware will be provided.

Conduit / Handholes

All new Interconnect conduits shall be 4 inch coilable nonmetallic Conduit, as defined under IDOT's standard specifications. The specific material is defined as a continuous high density polyethylene (HDPE) conduit and is ideal for interconnect applications. Minimum cover depth of these conduits shall be 42 inches with a maximum handhole spacing of 600 feet. This cover depth shall be noted on each sheet of the interconnect plans. Handholes containing Fiber Optic Slack shall be double handholes.

Designer shall either call out Schedule 40 sections as typical with schedule 80 sections called out as is required for under pavement and sidewalk sections; alternatively, having handholes on either end of a pavement crossing and use rigid steel conduit, 4 Inch, for just pavement crossings are an approved option.

All new interconnect conduits shall also be designed with inclusion of a 3-cell fabric innerduct. The innerduct length shall be slacked in each handhole to the same standard slack lengths as cables and wires. A detail shall be included to demonstrate that the innerduct shall be installed with cells left vacant so that they may be available for future servicing needs. An example innerduct is shown to the right.



Plan Preparation Notes and Details

A typical interconnect design will involve the expansion of one of KDOT's existing Ethernet based layer 2 networks which lead back to our central servers which house our advanced traffic management software (ATMS), TransSuite. New traffic signals attempting to interconnect into KDOT's networks should incorporate the following items: Layer 2 Switch (Type 1 or 2), Fiber optic cable (36SM or higher), Tracer cable, Network Configuration, and 3-cell fabric innerduct. In most cases, items related to Outdoor Rated Network cable, and PTZ camera will also be included. Designer shall inquire to KDOT traffic for every project to request the latest specifications, prior to final submittal, and plan sheets detailing the fiber optic cable terminations, and cabinet device cable connections shall be provided. Typical terminations should demonstrate fibers 1-12 being terminated for local use, while fibers 13-36 shown as either tied and bundled, or spliced through if directed by KDOT Traffic. Typical cabinet devices being interconnected to Ethernet switch include: Controller, MMU, UPS, PTZ, Detection unit, and in many cases, an Ethernet enabled power strip. Plan Notes regarding NTCIP required firmware or compatibility for the controller shall also be present on the signal plan and cable plan sheets.

Kane County Information Technology Department Considerations

Kane County Division of Transportation (KDOT) interconnect conduits used for traffic signal communication is often shared for use with Kane County's Information Technology (Kane IT) department in also containing separate fiber optic cable for Kane IT uses. 144 Single mode fiber is installed for Kane County's I.T. department and 36 single mode fiber cable for KDOT system use is most typical of the existing Kane County Interconnect system. Any roadway right-of-way work which may impact conduits on or near existing interconnected locations may require more extensive levels of staging the interconnect communication or in proving a temporary hard-wired interconnect throughout the duration of the project as impacts to both KDOT and Kane IT communications must be managed to a higher level of service than what may have previously been acceptable for signal control only temporary interconnects.

In the typical "impact to interconnect" scenario involving Kane I.T. Fiber, design will incorporate wood poles and above ground (aerial spans), weather rated fiber cable to span the length of the limits of the project and splice into special oversized handholes at the limits of the project. A coordinated review between KDOT, Kane IT, and the design team will review for logical break points of the existing Kane IT fiber and a determination on the sizing of the oversized handholes (sized to store all slack) will be provided for each leg of the interconnect being impacted. Within these oversized handholes, filled with slacked cable, a temporary outdoor rated fiber cable will be spliced into both Kane IT and KDOT fiber cables to span the length of the project and establish necessary KDOT system and Kane IT system communication. Typical project implementation as the construction contractor building the wood pole interconnect, installing the aerial fiber cable as designed, and bringing the cable to the designated termination points throughout the project. "Work done by others", meaning Kane IT's designated fiber contractor, will perform the necessary fiber terminations and splices to satisfy the desired communication needs for both signal and Kane IT systems, typically done during overnight and weekend hours. Special plan notes detailing the need for this staged and coordinated effort will be required. All costs of Kane IT's fiber contractor are to be paid directly by the construction contractor and noted on the plans. An alternative to wood pole interconnect would be the ability to build the proposed interconnect conduit system and have the "crossover" be done to the permanent conduit system instead of requiring a temporary system in the interim.

Work with County staff early and often throughout the design of any project or improvement which may impact an existing interconnect. Avoiding any such impacts to existing interconnect conduits is always preferred.

Wireless Interconnect and Communication Design

In general, wireless communication or interconnect should not be proposed for permanent signal installations unless directed by KDOT. For Temporary interconnect applications, wireless communications are not recommended and often require extensive study for reasonable reassurances on the feasibility of performance and reliability of the communication link. If impacts to Kane IT fiber, wireless will not be an option; if only KDOT fiber is impacted, considerations such as length of temporary interconnect and bandwidth characteristics of the section of the network which will be designed to go over the wireless link such as controller only data or data plus video will be considered.

Light Pole and Lighting Controller Identification Stickers

All proposed light poles and lighting controllers shall be labeled with identification stickers, following KDOT Details. See **Appendix F**. All proposed Luminaires shall be installed with a safety cable assembly matching IDOT D1 Standard BE-701. Check with KDOT Traffic what Power Center Code should be used for each new system.

Pan Tilt Zoom Video Cameras (PTZ, Remote Controlled Video System)

KDOT requires installation of PanTilt-Zoom (PTZ) cameras at many intersections throughout the County. The camera shall be installed in the intersection quadrant that has the most visibility. The designer should check the lines-of-sight to determine the best location for the PTZ camera. New installations call for IP addressable cameras, which use Outdoor Rated Network Cable (Category 6a) to operate the camera, use latest KDOT Specification. Any older PTZ camera, not IP addressable, should not be relocated and instead be designed to be replaced with a new IP based PTZ camera. PTZ cameras should be mounted on the luminaire arm, if present, or on the vertical shaft of the combination mast arm assembly if no luminaire arm is available. If combination mast arms are not provided, a camera (20 foot riser) mounting assembly should be provided, unless there is a utility conflict. In some instances, such as at interchanges, a separate light pole is installed, with or without a cabinet, to mount the camera. Designers should always check to ensure cable lengths are less than 100 meters (328 feet) for network cable to ensure reliable performance of the IP/Ethernet equipment between PTZ camera and network switch location.

Specification of PTZ cameras should only be considered where a communication solution (Fiber, Cellular, wireless radio) is planned to be in operational and integrated into our KDOT traffic network. Where the Traffic Signal or ITS cabinet location is further than 0.5 miles to the nearest functional PTZ camera, KDOT will desire a PTZ to be specified.

Street Name Signs & other Signal mounted signs

KDOT typically uses IDOT standard sign panels for street name signs. The one exception is in the design of the Letter heights of 12" capitol letters with 9" lowercase letters, FHWA Gothic Series "D" font (Clearview font not allowed per FHWA). Designer should reference IDOT District one detail TS-02 as a primary guide with IDOT highway standard 720016 (Style e) as an option to best fit the names of streets on a sign. Design of signs are limited to IDOT highway standard 877001 and 877002 limitations on overall square footage of sign. Maxed at 20 square feet. The design methodology is spelled out in TS-02's general note number 4.

Plan notes should be added to the signal plan outlining the need for supporting stiffening channels to be included on every sign mounted to a signal pole, post, or arm. These supporting channels are further detailed on IDOT's Highway standard 72001. Supporting channels are designed to be installed perpendicular to the direction of the support the sign is being mounted to. Note that the cost of these supports are to be included in the cost of the Sign panel being installed.

Foldable STOP (R1-1) signs

Design shall include specification of STOP SIGNS (R1-1, 30 Inch by 30 inch) Vertically Tri-fold and these shall be specifically detailed and called out on the traffic signal plan sheet. Design shall consider the potential for signal pole, post, or mast arm assembly foundation locating for optimal mounting locations for one of these signs in each approach to the traffic signal at or near the stop bar for a given approach. It is recommended that plan sheet notes indicate the requirement for these signs to be installed prior to the scheduled turn on for the traffic signal. **These signs are not to be specified on any IDOT jurisdiction traffic signal location, for any approach to that IDOT signal.**

Pavement Marking and Recessed Markers

KDOT prefers to use Modified Urethane pavement marking materials and Recessed Reflective markers, See detail in **Appendix E**. IDOT Raised reflective markers shall not be used without KDOT approval. KDOT prefers to also stripe crosswalks using "bars" at 12 Inch stripe, 24 Inch gaps (36" center to center). Outside white edge lines should not be used when curb and gutter is present at the outside edge of traveled way. For Federally funded projects, use of this specific detail may require an IDOT BLRS approval in the form a proprietary items letter to the Bureau Chief of LRS – District 1. See **Appendix H** for example letter language.

Pavement Marking Grooves and Preformed Plastic Pavement Markings

KDOT prefers to specify grooves for any longitudinal pavement markings following IDOT specifications at a groove equal to 1 inch wider than the marking material width. Longitudinal pavement markings shall include solid edge lines, lane lines, skip dashes. Pavement markings generally excluded from grooving include transverse markings (Stop Bars, Median/Shoulder diagonals), word/symbol/arrow markings, Crosswalk markings and dotted line extensions which extend through an intersection. Dotted line extensions typical of turn lane tapers are generally to be grooved.

Designer shall take special consideration on projects incorporating Preformed Marking tape, in a groove, on Concrete pavement sections. Due to the potential for white lines to be of poor contrast to a concrete pavement groove, contrast markings shall be explicitly called out in the plans and appropriate pay items used. For Example, a 6 inch white edge line for a turn lane and taper extension line would require 6inch white plus 1.5 inch of black on the left and right side for a total marking width of 9 inches installed in a 10 inch groove. See IDOT specification 1095.03. When used, Preformed Plastic Pavement Markings shall utilize, Type D specifications for wet and dry reflective performance.

Other County Equipment - Adaptive

KDOT has Miovision Surtrac adaptive control equipment installed at several signalized intersections. If adaptive equipment is in use, the designer should coordinate with KDOT to ensure the intersection operation is properly accounted for throughout all design stages. In general, adaptive equipment will not be used when a temporary traffic signal is installed at an intersection. *(At time of publication, Randall Road between Big Timber Road to Huntley Road include Surtrac adaptive control equipment)*

Other County Equipment

KDOT has deployed Dynamic message Signs (DMS), Roadway Weather Information Stations (RWIS), Driver Feedback Speed limit (Your speed is) signs, side-fire radar system detectors, Bluetooth travel time sensors, among other technologies. If directed to install any of the above technologies by KDOT Traffic, the designer should request and review the current specification to determine the mounting and cabling requirements. The designer should discuss the proposed placement with KDOT Traffic. License Plate Readers (LPR) or small cell facilities, if present in the Right-of-way, are owned and operated by a 3rd party and operate off of an approved permit. Impacts or information on such facilities can be coordinated by designers through the design project's designated KDOT project manager.

Roadway Signage – Kane County System Requirements

KDOT has modified system wide policy, design guidance, and details that require special attention on any project incorporating use of sign panels or sign posts. Additionally, a roadway signage asset tracking tool is actively managed and updated by a group of KDOT staff who need to be explicitly called out on project plans. Below are a list of items designers should be aware of when designing/modifying signage on any project involving KDOT highways:

1. Sign posts shall use square TELESCOPING STEEL SIGN SUPPORTS
 - a. Use of Metal Post (A or B) or Wood Posts shall be approved by KDOT Traffic
 - b. Sign posts shall use two sign supports when the cumulative sign panel area 12 Sq. Ft.
2. TELESCOPING STEEL SIGN SUPPORT bases shall be as follows:
 - a. Ground Mount: Per IDOT Highway standard 728001
 - b. Pavement Mount: Per KDOT Specification/Details, modification of IDOT highway standard 728001. Pavement must be 8" diameter cored to 10" depth, Telescoping Steel Base Installed, Backfilled with CA-6. Contractor may optionally use 8 inch diameter PVC when pouring new medians instead of coring
3. Signage Hardware: Bolts/Bolt Qty/Washers/Material: Use KDOT Specification and details
4. General Notes: include relevant notes for sign inspection/coordination/approval, See KDOT's Example Notes.
5. Roadway Signage Size shall generally follow Conventional Road, Multilane criteria for single lane roads and Expressway criteria for roadway cross sections 4 cumulative travel lanes or more.
6. Advanced Street Name signs (W16-8aP) shall be used to accompany any Advanced Traffic Control Sign (W3-1,2,3), Intersection Warning (W2-1,2,3,4,5,6,7,8) or related sign. Where a Signal Ahead sign (W3-3) is not warranted and the signal approach is not cluttered with signs, an Informational D3-2(M, modified) may be proposed (18"x Variable) inclusive of a W3-3 sign "decal" leading the name of the street name ahead (8" Letters on Road name, 5" letters on Road designation, Decal 10.5"x10.5")



Designs are encouraged to check in with their Project Manager or Permit Administrator on the inclusion of details shown in [Appendix G](#). For Federally funded projects, this may require an IDOT BLRS approval in the form a proprietary items letter to the Bureau Chief of LRS – District 1. See [Appendix H](#) for example letter language.

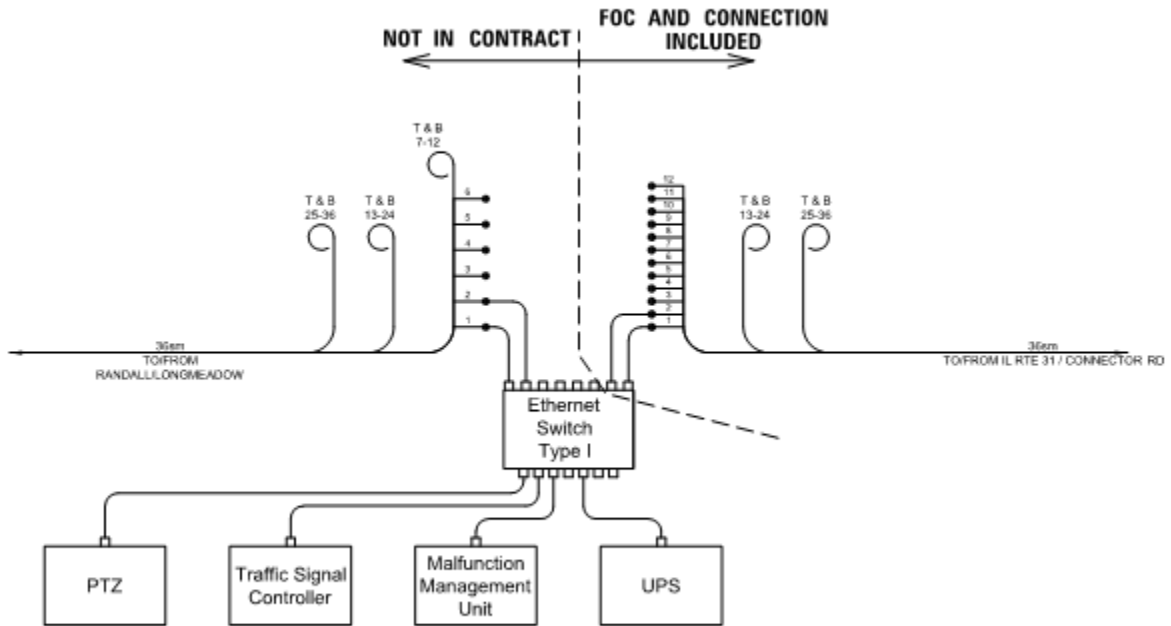
Appendix A

ADA Crosswalk Details

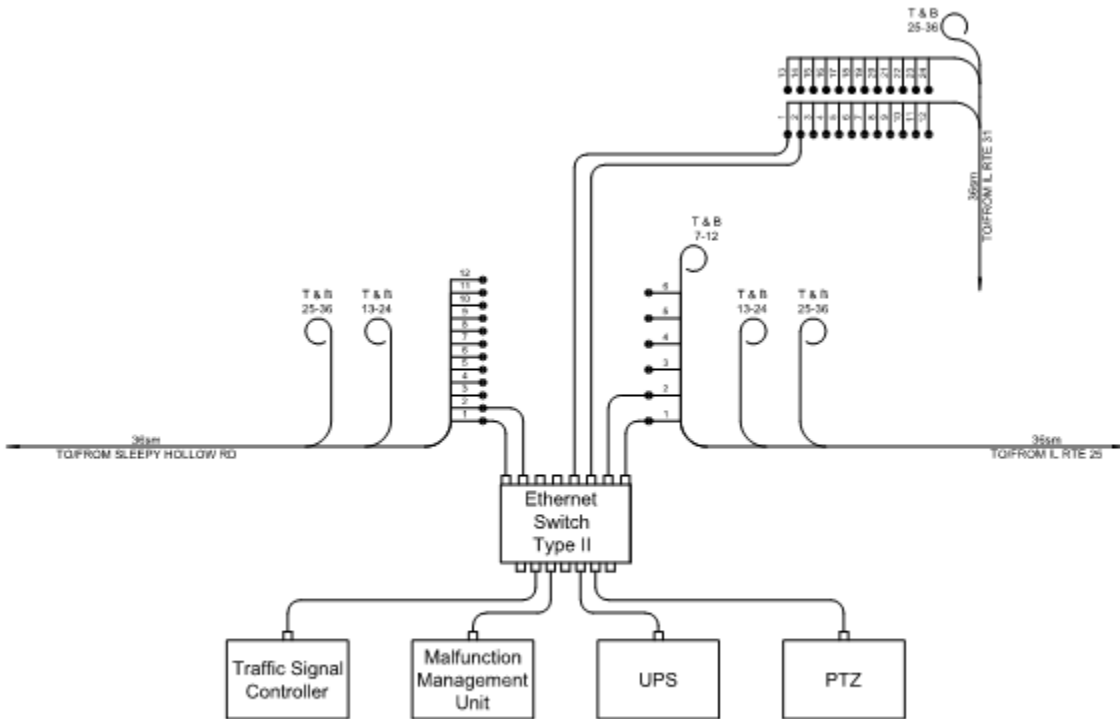
(Intentionally left blank, see next page)

Appendix B

Cabinet and Fiber Termination Details

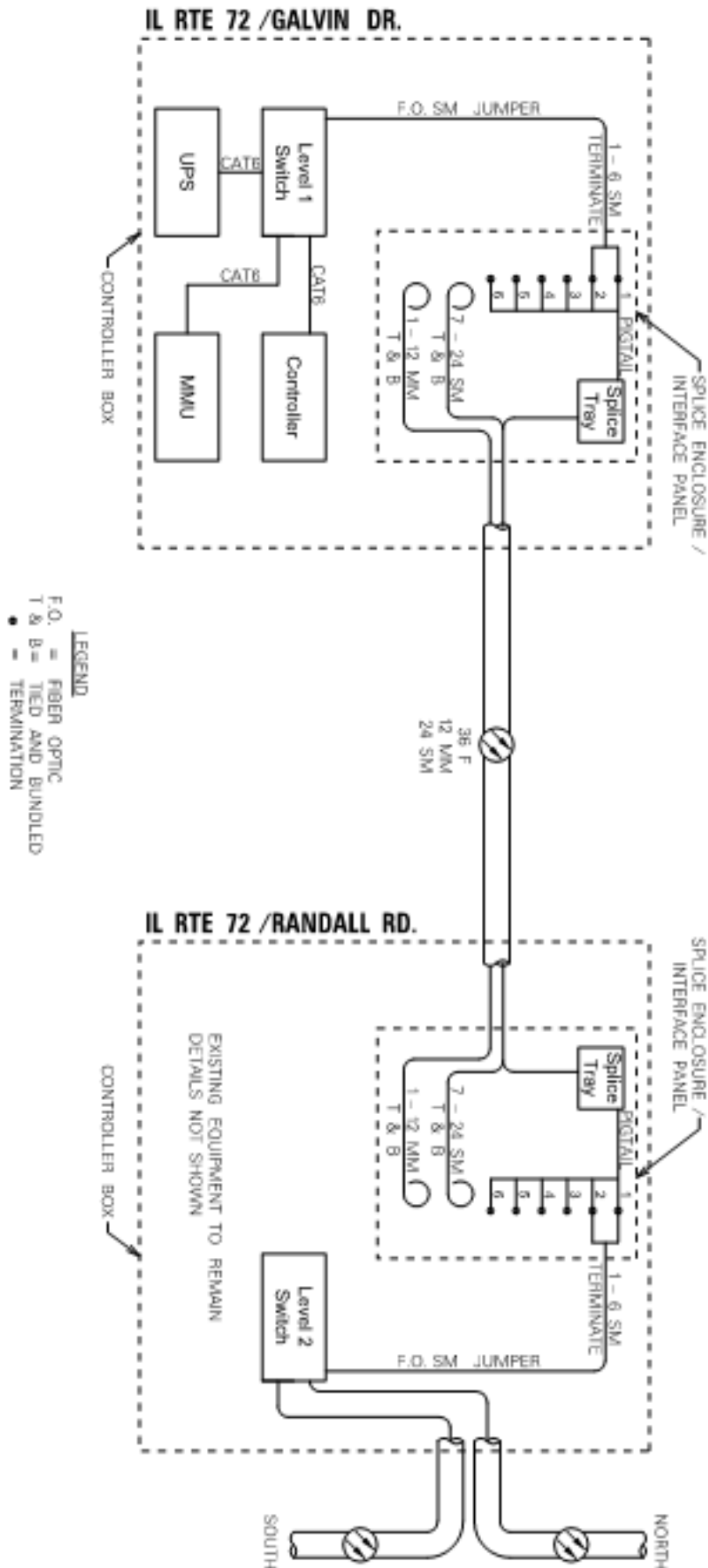


LONGMEADOW PARKWAY AT SLEEPY HOLLOW ROAD



LONGMEADOW PARKWAY AT CONNECTOR ROAD

FIBER OPTIC SPLICING DIAGRAMS



Appendix C

Flashing Yellow Arrow Sign Detail

https://countyofkane-my.sharepoint.com/:u/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EfwjnUIIT_VGoSVd90AvKh4Bp_WLEVgmIOBABxETVfgZLRg?e=W8zQH_y (Download .dgn)



NOTES:

1. COLOR:
BACKGROUND: WHITE
MESSAGE: BLACK
2. LINE 1 IS SERIES C
LINE 2, 4 AND 5 ARE SERIES D
LINE 3 IS SERIES B
3. ALL DIMENSIONS SHOWN ARE IN INCHES

Appendix D

Standard Wattage Table

I.D.O.T / KANE COUNTY TRAFFIC SIGNAL INSTALLATION ELECTRICAL SERVICE REQUIREMENTS					TOTAL WATTAGE
TYPE	NO. LAMPS	WATTAGE		PERCENT (%) OPERATION	
		INCAND.	LED		
SIGNAL (RED)			10	50	
(YELLOW)			13	5	
(GREEN)			10	45	
ARROW (EXCEPT FOR FYA)			10	10	
FLASHING YELLOW ARROW (FYA)			12	30	
PEDESTRIAN SIGNAL			20	100	
CONTROLLER			100	100	
UPS			25	100	
ILLUM. SIGN (BLANK OUT)			25	5	
VIDEO DETECTION SYSTEM			150	100	
ILLUM. STREET NAME SIGN			120	50	
LUMINAIRE (COMBO POLE)				50	
PTZ / SURVEILLANCE CAMERA			60	100	
FLASHING BEACON (SIGNAL)				50	
ENERGY COSTS TO:					TOTAL =
ENERGY SUPPLY CONTACT: <u>CONTACT PERSON</u>					
PHONE: <u>(###) ###-####</u>					
COMPANY: <u>COMPANY NAME</u>					

ENGINEER NOTES REGARDING ABOVE REQUIREMENTS:

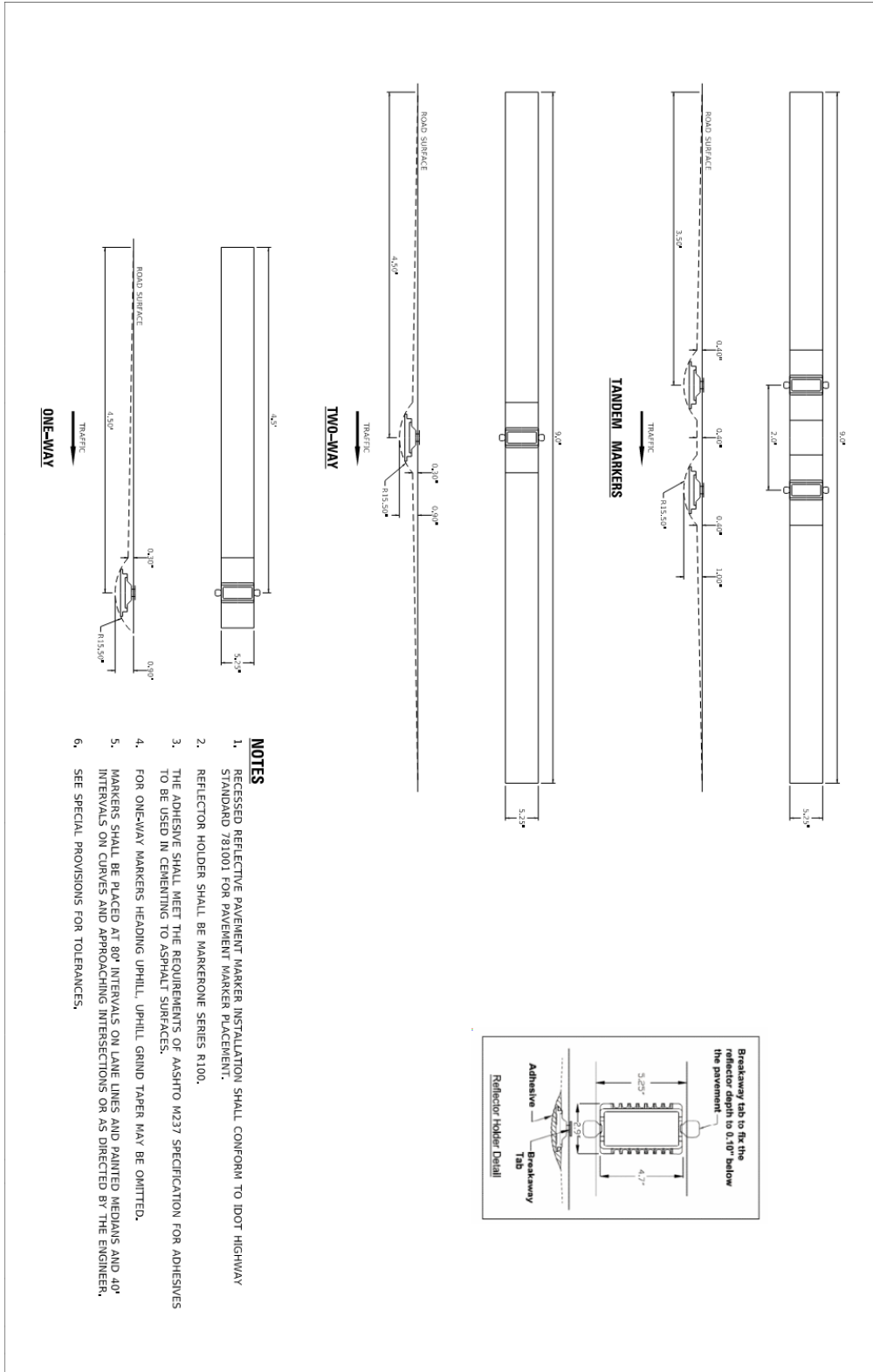
1. LUMINAIRE WATTAGE DETERMINED BY ROADWAY LIGHTING DESIGN, ONLY INCLUDE IF LIGHTING IS POWERED BY SIGNAL.
2. FLASHING BEACON WATTAGE DETERMINED BY BEACON COLOR, USE WATTAGE SHOWN IN "SIGNAL" TYPE ENTRIES.
3. IF SIGNAL DESIGN CONTAINS RED COLORED "ARROWS", DISCUSS WITH TRAFFIC ENGINEER IF SEPARATE PERCENT OPERATION IS NEEDED FOR THESE ARROWS.
4. TOTAL WATTAGE AND TOTAL WATTAGE SUMMATION SHOULD ALWAYS DISPLAY CALCULATION TO FIRST DECIMAL (TENTHS) PLACE.

(Note: do not include ENGINEER NOTES in plans)

Appendix E

Recessed Pavement Marker (notes to be modified for Federally funded projects or see Appendix H for IDOT proprietary letter)

https://countyofkane-my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EYo7_IToLIdFq-ZT5HWUKPsBSKj4Jhi5I2BJOll0NbQzfw?e=VjJCSp (Download .pdf)

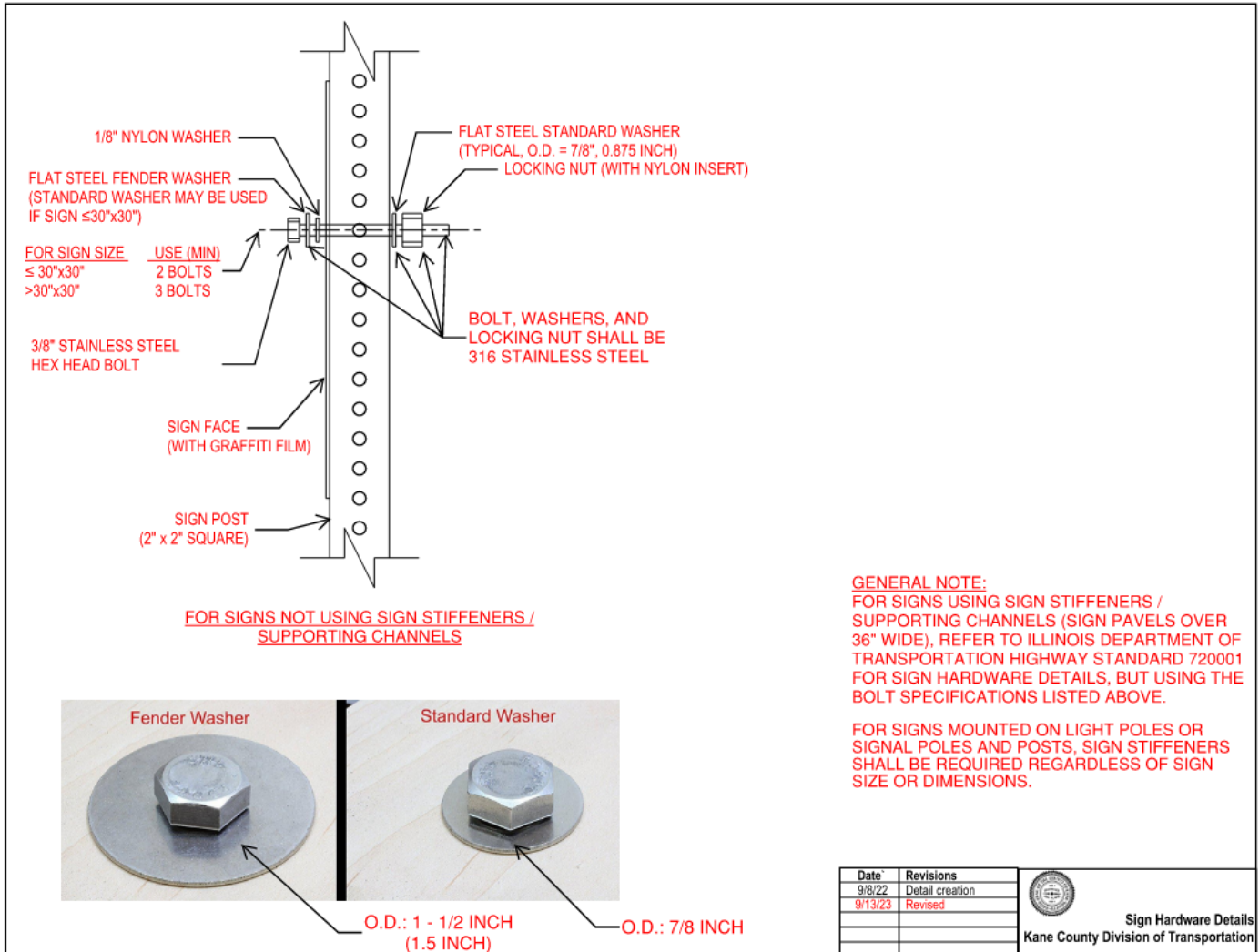


Appendix G

Sign Hardware

<https://countyofkane->

my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EWdVOtDBPaVGnxCnNUM9r61BCO-i34eGaLr-PhsWhpsU4g?e=RoBjZW **(Download .pdf)**



Appendix G (1 of 2)

Sign Post for Soil bases

<https://countyofkane->

[my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EWdVotDBPaVGnxCnNUM9r6IBCO-i34eGaLr-PhsWhpsU4g?e=RoBjZW](https://countyofkane-my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EWdVotDBPaVGnxCnNUM9r6IBCO-i34eGaLr-PhsWhpsU4g?e=RoBjZW) (Download .pdf)


Telescoping Sign Post

The post shall be a square tube formed of 12 gauge steel according to the standard specification for cold rolled carbon steel sheets commercial quality ASTM A 1008 (A 1008M). The post shall be formed to size and, if necessary, shall be welded in such a manner that weld or flash shall not interfere with telescoping. Holes 7/16 ± 1/64 in. (11 ± 0.4 mm) will be spaced on 1 in. (25 mm) centers on at least two opposite sides. The holes shall align to accept a 3/8 in. (10 mm) bolt through the post at any location. The post shall have a smooth galvanized finish applied either before or after forming. For all other regulations refer to Section 1093 of the latest version of Illinois Standard Specifications for Bridge and Road Construction.

Sign Bases (Soil / Ground Mount)

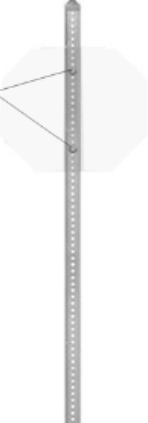
Shall follow IDOT Standard specifications for 728.04(b) for ground mount bases for telescoping steel sign supports. Base shall be embedded 5 feet into ground with no more than 4 inches exposed above ground level. Telescoping Steel Sign support shall extend a minimum of 8 inches into the base but no further than 12 inches into the base. Dimensions of Sign base shall be as detailed below and shall use 3/8 inch stainless steel hex head bolts and lock nut with flat standard washers on either end. Details provided on page for reference only, detail may follow updates to IDOT Highway standard 728001. Contractor to verify with Engineer if differences are identified. Contractor shall seek approval from KDOT before signs become responsibility of KDOT.


12 Gauge Telescoping Galvanized Square Post,
2"W x 2"D x min. 10'

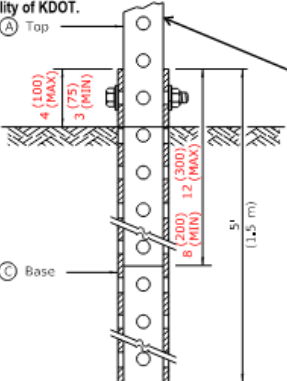


1" Spacings

Stainless steel bolts and washers used for fastening extruded aluminum sign panels to supports, shall be according to ASTM A 276, Type 316. Stainless steel nuts shall be according to ASTM A 240 (A 240M), Type 316.







TOP SECTION SHALL EXTEND A MINIMUM OF 8 INCHES INTO BASE BUT NO MORE THAN 12 INCHES


(A)	2 x 2 x var. (51 x 51 var.)
(C)	2 1/2 x 2 1/2 x 60 (57 x 57 x 1500)

Kane County Division of Transportation

Specifications
Telescoping Sign Post
&
Soil Bases

GROUND MOUNT DETAIL

Date	Revisions
07/17	Sign Post Base Hardware



Specifications
Telescoping Sign Post
&
Soil Bases

Appendix G (2 of 2)

Sign Post for Pavement bases

<https://countyofkane->

[my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EWdVotDBPaVGnxCnNUM9r6BCO-i34eGaLr-PhsWhpsU4g?e=RoBjZW](https://countyofkane-my.sharepoint.com/:b/g/person/kdotpermitting_traffic_securemail_countyofkane_org/EWdVotDBPaVGnxCnNUM9r6BCO-i34eGaLr-PhsWhpsU4g?e=RoBjZW) (Download .pdf)

Sign Bases for Concrete & Asphalt Installation:

This detail closely follows Illinois Department of Transportation (IDOT) standard 728001 but with some modifications. Unless otherwise noted, this detail shall be followed on any Kane County Division of Transportation (KDOT) project where signs are installed along a County highway.

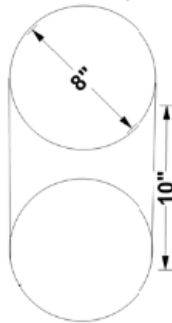
The key differences is in the serviceability of pavement mounts through establishing a void in the pavement and installing a channel / conduit that better allows for a sign base to be replaced in the future. The sign base has been lengthened to that similar to a ground / dirt mounted sign to make up for the loss of strength a monolithic pavement mount might traditionally have.

All materials, equipment, labor, or other associated costs required with delivering the work detailed shall be considered included the the unit price of the BASE FOR TELESCOPING STEEL SIGN SUPPORT being installed.

Installation Instructions:

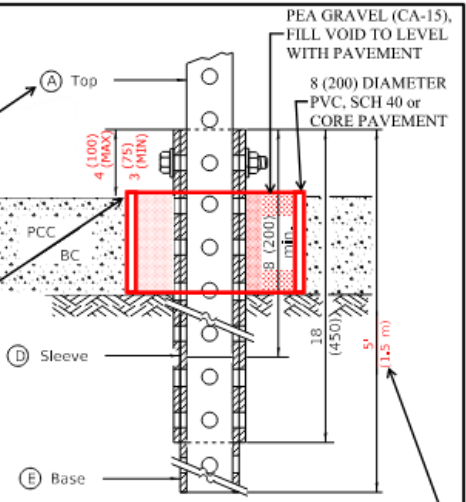
1. Pavement core or install SCH 40 PVC at 8" diameter providing a minimal 10 inch depth or as deeper to meet bottom of pavement (meeting aggregate base or dirt base)
2. "Sleeve" and "Base" shall be installed with proper orientation and be level to support optimal mounting of sign post "Top".
3. CA-15 or as KDOT approved aggregate shall be installed around the "Sleeve" and "Base" but inside core / PVC cavity. Aggregate to be level with surrounding pavement grade.
4. "TOP" shall be inserted a minimum of 8 inches but no more than 12 inches into the "Sleeve" and "Base". 3/8 inch stainless steel hex head bolts and lock nut with flat washers shall be used on either end. Contractor shall seek approval from KDOT before signs become responsibility of KDOT.

Core Diameter/ Depth



TOP SECTION SHALL EXTEND A MINIMUM OF 8 INCHES INTO SLEEVE AND BASE BUT NO MORE THAN 12 INCHES

PVC IS LEVEL WITH SURROUNDING PAVEMENT OR LESS THAN 1/4 INCH ABOVE (CORE / PVC, 10 INCH MINIMUM DEPTH)



PAVEMENT MOUNT DETAIL

(A)	2 x 2 x var. (51 x 51 var.)
(D)	2 1/2 x 2 1/2 x 18 (64 x 64 x 450)
(E)	2 1/4 x 2 1/4 x 60 (57 x 57 x 1500)

NOTE LONGER BASE

MINIMAL DEPTH OF CORE OR PVC INSERT. CORE / PVC DEPTH MUST BE AS DEEP PAVEMENT SECTION

NOTE LONGER BASE

Kane County Division of Transportation
Specifications
Concrete
&
Asphalt Bases

Date	Revisions	Specifications Concrete & Asphalt Bases
07/17	Sign Bases Concrete & Asphalt	

Appendix H

Example Proprietary Items Letter to IDOT Bureau of Local Roads and Streets (For Federally Funded Projects)

KANE COUNTY

DIVISION of TRANSPORTATION

Carl Schoedel, P.E.
Director of Transportation
County Engineer



41W011 Burlington Road
St. Charles, IL 60175
Phone: (630) 584-1170
Fax: (630) 584-5265

February 14, 2018

Mr. Christopher Holt, P.E.

Bureau Chief of LRS – D1
Illinois Department of Transportation
201 West Center Court
Schaumburg, IL 60196-1096

Re: **FAU 4066 (Huntley Road-County Hwy 30) at Galligan Road (County Hwy 6)**
Kane County
Section #: **08-00112-00-CH**
Job No.: **C-91-261-09**
Project: **6CDC(016)**
Proprietary Items

Dear Mr. Holt,

The Kane County Division of Transportation (KDOT) is currently working with **CONSULTANT FIRM ABC** to design for auxiliary lanes and traffic signal modifications at the intersection of **Huntley Road and Galligan Road**. As part of this project, there are items of work that require proprietary products. As required by policy changes regarding use of proprietary products on federally funded projects, we are submitting the following products for your review and consideration to be included in this project.

Recessed Reflective Pavement Markers

As part of the intersection improvement project it is necessary to remove the existing and install new Recessed Reflective Pavement Markers. Recessing reflective pavement markers are required as part of Kane County design policy.

Proprietary Item: The reflective pavement marker shall be a 3M 190 Series pavement marker reflector and the reflector holder shall be a Marker One Series R100.

Manufacturer: Reflector – 3M Corporation (IDOT Approved Product)

Reflector Holder – Marker One, 1030 Seaview Court, Schaumburg, IL 60193

Appendix H (Continued)

Reason for Waiver: The entire roadway has previously been marked using recessed reflective pavement markers to enhance visibility designation. Because the subject portion of roadway is being widened, milled and overlaid, the new surface will be remarked with new pavement marking lines and reflective pavement markers. Kane County's current design policy requires that all reflective pavement markers be "recessed". The Illinois Department of Transportation, District 1 currently does not have design standards for recessed pavement marker reflectors. Since the County uses this marker exclusively throughout their roadway system and they have worked with regional installers to customize a specific groove design to accommodate this marker, for consistency, in stock replacement parts and the knowledge needed to install, repair or replace the markers, the County would prefer not to incorporate a different marker into this project. *This product was previously approved for use on Kane County's projects for Allen Road, Bliss Road and Jericho Road.*

The 23 CFR 635.411(a)(2) exception applies because this specified proprietary item is "necessary for synchronization with the existing facilities; or unique product for which there is no equally suitable alternative". As Kane County relies on the recessed marker system to prevent damage from vehicles and snow plows, continued use of this proprietary item will assure the best possible performance of the product while minimizing their maintenance and replacement costs.

Base For Telescoping Sign Support, Special

As part of the pavement widening and incorporation of auxiliary lanes, it will be necessary to install new information signing to designate the new traffic patterns. Special telescoping sign supports bases are required as part of Kane County design policy.

Proprietary Items: Sign Base = Model 200-VS1 for 2" x 2" square post (concrete and asphalt installation); Sign Base = Model 200-VS3B V-Loc for 2" x 2" square post (soil installation);

Sign Base Wedge = Galvanized Steel Wedge SWI for V-Loc post bases.

Manufacturer: Tapco, 5100 W Brown Deer Road, Brown Deer, WI 53223

Reason for Waiver: To match current telescoping steel sign support bases by KDOT and to provide uniformity throughout the County Highway System. The reason the County specifies these particular bases is that they provides greater sign stability reducing "tipping" due to settlement and wind conditions, and the bases allows for easier post removal when the sign post requires replacing due to maintenance or vehicular damage. *These products were previously approved for use on Kane County projects for Jericho Road, French Road, Allen Road and Walker Road.*

The 23 CFR 635.411(a)(2) exception applies because this specified proprietary item is "necessary for synchronization with the existing facilities; or unique product for which there is no equally suitable alternative".

Appendix H (Continued)

As the Kane County Division of Transportation will maintain these signs, continued use of this proprietary item will aid in minimizing their maintenance and replacement costs.

The County appreciates your consideration for these items to be incorporated into the project. The project is funded and scheduled for IDOT's April 27, 2018 letting. If you have any questions or require additional information, please feel free to contact myself or CONSULTANT PROJECT MANAGER NAME of CONSULTING FIRM ABC at [CONSULTANT PHONE NUMBER].

Sincerely,

KANE COUNTY PROJECT MANAGER

TITLE

Kane County Division of Transportation

Direct: [CONTACT NUMBER]

cc: CONSULTANT PROJECT MANAGER – CONSULTING FIRM ABC

File