



Standard Drawing Report

Date: July 12, 2024

Technical Owner: Scott Cramer
State Traffic Signal Engineer

Standard Drawing Number: TM472

Drawing Title: Junction Boxes/Hand Holes



Original Report Date: *January 10, 2007*

Background Information, Including Reference Material:

Junction boxes are standard pre-cast utility meter style. The materials used are Portland cement concrete, polymer concrete, fiberglass, etc. All boxes and lids are rated for incidental traffic. Incidental traffic is defined as 15,000lbs over a 10"x10" square area applied to the box and lid.

Assumption Made:

These boxes have been used for the last 20+ years and when installed in non-traffic areas they perform very well. I expect the same in the future.

Design Narrative:

The support material for the box is 12" of three quarter minus crushed aggregate. The crushed aggregate is intended to support the box from settlement. There have been concerns raised about drainage and the need for pea gravel, but pea gravel will not support the box adequately.



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For lateral support 12" of Portland cement concrete is used either as part of the sidewalk or as an apron. The depth of concrete will match the sidewalk depth or the apron detail shown.

Three sizes of junction boxes are used as shown.

JB-3 is the largest box and two are used at the controller cabinet.

JB-2 is the mid size box and is used at pole locations.

JB-1 is the smallest box and is used at loop splice locations. The size of the box is determined by the use first and then increased in size if needed based on the number and size of conduits it will contain.

The lids of the boxes are marked SIGNALS and have a skid resistant surface

NOTE: The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

January 1, 2010

Changed the 4" depth at the corner of boxes with aprons to 3 1/2". The intent is to match the width of a finished 2x4 which is 3 1/2". This is to aid forming up the apron with standard lumber.

June 30, 2011

Added hex head bolts as an option to secure the lid to the box.

JUNCTION BOX SIZE GUIDE		
CONDUIT DIAMETER TOTALS, IN INCHES	JUNCTION BOX	REMARKS
PRECAST CONCRETE BOXES		
0-12	JB-1	Preferred
0-18	JB-2	Preferred
0-34	JB-3	Preferred
GALVANIZED CAST IRON BOXES		
0-5	JB-4	End of run only
0-8	JB-5	No loop splices
0-8	JB-6	With loop splices
0-13	JB-7	No loop splices
0-13	JB-8	With loop splices
Use concrete boxes whenever possible.		
Minimum size for the collector box into the Controller Cabinet is a JB-3.		



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December 31, 2012

Added the three common boxes used in communications/interconnect systems:

- HH-1 is a 24x30x24 box
- HH-2 is a 30x48x24 box
- HH-3 is a 30x48x36 box (slightly deeper than the HH-2)
- Added details for coiling fiber, splice enclosure, and framing channel per the requirements of the ITS Unit

July 1, 2014

Added a note to the JB-3T (Tandem) box installation to define what conduit goes in each box. One box will contain signal/illumination wiring and the other will contain detection/interconnect.

July 1, 2018

- Deleted ground wire information. Now specifying all non-metallic materials.
- Revised layout of details. Pure drafting change.
- Added detail for marking junction box installations in unsurfaced areas.
- Added three general notes

January 2, 2020

Added General Note 4: "Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area and Compact Each Six Inch Layer With Sufficient Coverages To Produce A Firm Unyielding Surface." This note was added in response to questions received during a CTSI Training class.

July 2, 2020

- Revised hand hole installation detail based on feedback from ITS unit. Also revised general notes to include hand hole specific information.



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Commentary:

ITS provided a detail they use in their plan sheets for hand holes and desired to have this standard drawing updated so they could use TM472 instead of their detail in the future.

- Revised delineator detail to apply to both junction boxes and hand holes.

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- Revised letter height on delineator from 1.5 inches to 3 inches in "delineator of a junction box & hand hole in unsurfaced area" detail based on feedback from the former state sign engineer and to match ITS detail.

Commentary:

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- Added detail to show 3' minimum softscaping requirement from junction box PCC apron to edge of sidewalk or edge of ramp.

Commentary:

As per the ADA Standards Engineer, softscaping between sidewalk/ramps and flush concrete features (such as aprons for junction boxes and utilities) is required to provide a clear tactile difference for blind/low vision pedestrians so they are not mislead off the sidewalk or ramp. The 3 foot minimum dimension should make the area easily detected when using a cane or underfoot by blind and low vision travelers as the average pedestrian stride length is 2 feet, and will not be construed as an intended walking surface by a pedestrian or guide dog. Softscaping may be bark, rock, grass, etc. and is shown in the roadway or landscape plan sheets/specifications.



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July 1, 2021

- Re-formatted all dimensioning to be consistent

July 8, 2022

- Changed title of drawing from "traffic signal junction boxes/hand holes" to "junction boxes/hand holes".

Commentary: This change was made at the request of the ITS unit. This drawing is used for work other than traffic signals. In the future, a general electrical series of standard drawings will be created so that these types of details can reside outside side of the TM400 traffic signal series of standard drawings.

- Changed cover marking from only "SIGNALS" to "SIGNALS for traffic signal, ILLUMINATION for illumination, or ELECTRICAL for ITS/misc. electrical systems" in the junction box cover detail.

Commentary: This change was made at the request of the ITS unit. This allows the junction boxes labels to be more accurate and should improve identification in the field (especially in urban environments with multiple electrical systems in close proximity).

January 19, 2024

- Changed "3 foot behind box" label to "3 foot max. behind box" in the "delineation of a junction box & hand hole in unsurfaced area" detail.

Commentary: This change reflects a more realistic and acceptable installation.

July 12, 2024

- Added "(See TM471 for cover depth exception)" to PVC conduit note in "Fiber optic cable hand hole installation" detail

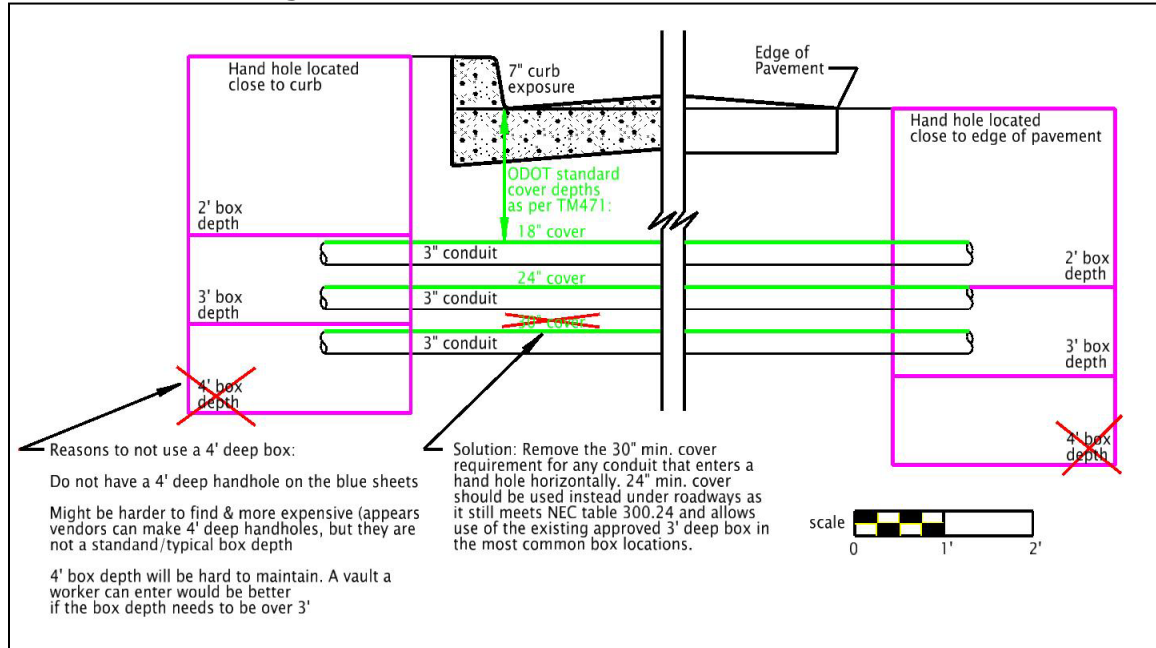
Commentary:

This note was added due to an issue that was brought to our attention when placing a hand hole next to a curb. The elevation difference the curb creates for the horizontal conduit installation



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with 30 inches of cover was a problem. See figure below. A 4 foot deep hand hole box was considered, but due to the issues shown in the figure below it was rejected. Installing the conduit under the box (using elbows) was also considered but due to high potential for damage to the fiber optic cable during installation as per the ITS standards engineer, it was rejected. Instead, reducing the cover from 30" to 24" for the horizontal conduit installation was the best solution as it still meets the minimum NEC table 300.24 requirements for cover and works with existing hand hole box sizes.



- Changed minimum dimension of softscape from the edge of sidewalk or edge of ramp from 3 feet to 2 feet in "Junction box installation in unsurfaced area" detail

Commentary:

This note was changed due to the difficulty in achieving the 3 foot minimum at several locations. Also, the PROWAG R306.4.1.1 only required a 2 foot minimum. See PROWAG clip



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below. The ODOT ADA standards engineer was in agreement with making this change.

R306.4.1.1 Separation [🔗](#)

Where *pedestrian* crossing is not intended, the *pedestrian circulation path* shall be separated from the *curb, crosswalk to crosswalk*, with landscaping or other nonprepared surface 24 inches (610 mm) wide minimum.