

# **MISSOURI HIGHWAYS and TRANSPORTATION COMMISSION**

**JEFFERSON CITY, MISSOURI**

**SUPPLEMENTAL PLANS TO JULY 2017 MISSOURI STANDARD  
PLANS FOR HIGHWAY CONSTRUCTION**

**EFFECTIVE October 1, 2018**

# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

## MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION

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IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

| STANDARD NO. | DRAWING TITLE   | NO. OF SHEETS | EFFECTIVE DATE | STANDARD NO. | DRAWING TITLE  | NO. OF SHEETS | EFFECTIVE DATE |
|--------------|---|---------------|----------------|--------------|--|---------------|----------------|
| 203.00E      | EXCAVATION AND EMBANKMENT - TYPICAL DETAILS                       | 1             | 08/01/1998     | 606.60B      | MIDWEST GUARDRAIL SYSTEM (MGS) - VERTICAL BARRIER TRNSITIONS | 6             | 04/01/2018     |
| 203.02F      | UNDERGRADING - TYPICAL DETAILS                                    | 2             | 01/01/2004     | 606.70B      | MIDWEST GUARDRAIL SYSTEM (MGS) - THRIE BEAM RAIL ON BRIDGE   | 5             | 04/01/2018     |
| 203.10D      | TABULATED EARTHWORK AND SECTION DATA                              | 1             | 02/01/2009     | 606.80C      | MIDWEST GUARDRAIL SYSTEM (MGS) - TERMINAL ANCHOR ENDS        | 7             | 07/01/2017     |
| 203.20G      | SUPERELEVATION, SPIRALS AND WIDENING (UNDIVIDED HIGHWAY)          | 4             | 07/01/2017     | 606.81       | MASH - CRASHWORTHY END TERMINALS - TYPE A - GRADING LIMITS   | 1             | 01/01/2017     |
| 203.21K      | SUPERELEVATION, SPIRALS AND WIDENING (DIVIDED HIGHWAY)            | 3             | 07/01/2017     | 607.10V      | CHAIN-LINK FENCE   | 1             | 02/01/2007     |
| 203.22       | SUPERELEVATION, SPIRALS AND WIDENING                              | 2             | 07/01/2017     | 607.11H      | CHAIN-LINK FENCE FOR RETAINING WALLS                         | 1             | 06/01/2009     |
| 203.35A      | MAILBOX TURNOUTS  | 1             | 08/01/1981     | 607.20G      | WOVEN WIRE FENCE   | 2             | 07/01/2016     |
| 203.40G      | TYPICAL DETAILS ON AND OFF RAMPS                                  | 2             | 10/01/2007     | 608.00H      | PAVED APPROACHES   | 2             | 10/01/2009     |
| 203.41F      | TYPICAL DETAILS ON AND OFF RAMPS (ROADWAY WITH 6:1 FORESLOPE)     | 2             | 01/01/1995     | 608.10P      | CONCRETE SIDEWALK  | 1             | 04/01/2015     |
| 203.50N      | TYPICAL MEDIAN OPENINGS (DIVIDED HIGHWAYS)                        | 2             | 04/01/2016     | 608.20E      | CONCRETE STAIRS  | 2             | 04/01/2015     |
| 203.61A      | DRIVEWAY - TYPE I   | 1             | 07/01/2004     | 608.30A      | CONCRETE MEDIAN STRIP  | 1             | 02/01/2011     |
| 203.62D      | DRIVEWAY - TYPE II  | 2             | 04/01/2017     | 608.40       | HANDRAILING  | 4             | 04/01/2015     |
| 203.63B      | DRIVEWAY - TYPE III   | 2             | 04/01/2017     | 608.50       | CURB RAMPS   | 4             | 04/01/2015     |
| 203.64D      | DRIVEWAY - TYPE IV  | 2             | 04/01/2017     | 609.00P      | CONCRETE CURB, CURB AND GUTTER AND GUTTER                    | 2             | 08/01/2008     |
| 203.65A      | DRIVEWAY - TYPE V   | 1             | 10/01/1998     | 609.15D      | PAVED DITCHES  | 1             | 07/01/2016     |
| 204.00D      | EMBANKMENT CONTROL - MEASURING DEVICES                            | 1             | 04/01/1983     | 609.40S      | DRAIN BASIN, SHOULDER PAVING AND FILL SLOPES AT BRIDGE ENDS  | 3             | 01/01/2017     |
| 204.30       | PORE PRESSURE MEASUREMENT DEVICES                                 | 1             | 03/01/1996     | 609.60C      | ROCK DITCH LINER   | 1             | 03/01/1993     |
| 401.00B      | TYPE A2 AND A3 SHOULDERS, SAFETY EDGE <sup>SM</sup>               | 3             | 04/01/2018     | 609.70C      | ROCK LINING FOR CULVERT OUTLET                               | 1             | 10/01/1981     |
| 413.20       | SCRUB SEAL BROOM CONFIGURATION                                    | 1             | 07/01/2004     | 611.60R      | CONCRETE SLOPE PROTECTION                                    | 1             | 07/01/2015     |
| 502.05N      | CONCRETE PAVEMENT AND BASE APPURTENANCES FOR 15 FT. JOINT SPACING | 4             | 07/01/2015     | 612.20E      | SAND FILLED IMPACT ATTENUATORS *                             | 1             | 10/01/2018     |
| 502.10K      | DOWEL SUPPORTING UNITS  | 2             | 06/01/2010     | 613.00S      | PAVEMENT REPAIR  | 4             | 04/01/2017     |
| 504.00J      | CONCRETE APPROACH PAVEMENT  | 3             | 07/01/2015     | 614.10T      | GRATES AND BEARING PLATES                                    | 1             | 12/01/2005     |
| 602.00D      | RIGHT-OF-WAY AND DRAIN MARKERS                                    | 2             | 01/01/2003     | 614.11C      | CURVED VANE GRATE AND FRAME                                  | 1             | 06/01/2010     |
| 604.05D      | PIPE CULVERT HEADWALLS - TYPE S                                   | 2             | 08/01/2006     | 614.30E      | MANHOLE FRAMES AND COVERS                                    | 2             | 03/01/1996     |
| 604.10E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 18" CONCRETE PIPE   | 1             | 07/01/2001     | 616.10AU     | TEMPORARY TRAFFIC CONTROL DEVICES                            | 9             | 04/01/2018     |
| 604.11E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 24" CONCRETE PIPE   | 1             | 07/01/2001     | 617.10K      | PERMANENT CONCRETE TRAFFIC BARRIER                           | 11            | 01/01/2018     |
| 604.12E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 30" CONCRETE PIPE   | 1             | 07/01/2001     | 617.20D      | TEMPORARY CONCRETE TRAFFIC BARRIER                           | 8             | 10/01/2018     |
| 604.13E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 36" CONCRETE PIPE   | 1             | 07/01/2001     | 619.10J      | PAVEMENT EDGE TREATMENT                                      | 1             | 10/01/2017     |
| 604.14E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 42" CONCRETE PIPE   | 1             | 07/01/2001     | 620.00L      | PAVEMENT MARKING   | 5             | 10/01/2016     |
| 604.15E      | PIPE CULVERT HEADWALL - ENERGY DISSIPATOR FOR 48" CONCRETE PIPE   | 1             | 07/01/2001     | 620.10G      | TEMPORARY PAVEMENT MARKING                                   | 5             | 07/01/2017     |
| 604.29C      | DROP INLET - TYPE X   | 2             | 04/01/2018     | 625.00       | HOLE PATTERN FOR PAVEMENT SLAB STABILIZATION                 | 1             | 10/01/1998     |
| 604.30G      | CONCRETE MANHOLES   | 2             | 02/01/2009     | 626.00H      | RUMBLE STRIPS  | 2             | 04/01/2009     |
| 604.40F      | PIPE COLLARS  | 2             | 10/01/2000     |              |  |               |                |
| 604.70       | SLOTTED DRAIN   | 2             | 03/01/1994     |              |  |               |                |
| 605.10I      | PAVEMENT UNDERDRAINAGE  | 4             | 06/01/2013     |              |  |               |                |
| 606.00AY     | GUARDRAIL   | 7             | 04/01/2018     |              |  |               |                |
| 606.01F      | MEDIAN PIER PROTECTION  | 9             | 08/01/2012     |              |  |               |                |
| 606.22U      | BRIDGE ANCHOR SECTION - SAFETY BARRIER CURB ON BRIDGE             | 6             | 07/01/2016     |              |  |               |                |
| 606.23J      | BRIDGE ANCHOR SECTION (THRIE BEAM RAIL ON BRIDGE)                 | 5             | 07/01/2016     |              |  |               |                |
| 606.30K      | GUARDRAIL - TERMINAL ANCHOR ENDS                                  | 7             | 04/01/2017     |              |  |               |                |
| 606.31       | CRASHWORTHY END TERMINALS - TYPE A - GRADING LIMITS               | 1             | 01/01/2017     |              |  |               |                |
| 606.40D      | ONE-STRAND ACCESS RESTRAINT CABLE                                 | 2             | 07/01/2004     |              |  |               |                |
| 606.41L      | THREE-STRAND GUARD CABLE  | 7             | 10/01/2017     |              |  |               |                |
| 606.50C      | MIDWEST GUARDRAIL SYSTEM (MGS)                                    | 8             | 04/01/2018     |              |  |               |                |
| 606.51       | MIDWEST GUARDRAIL SYSTEM (MGS) - MEDIAN PIER PROTECTION           | 2             | 04/01/2018     |              |  |               |                |

# MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

EFFECTIVE: 10/01/2018

## MISSOURI STANDARD PLANS FOR HIGHWAY CONSTRUCTION TABLE OF CONTENTS

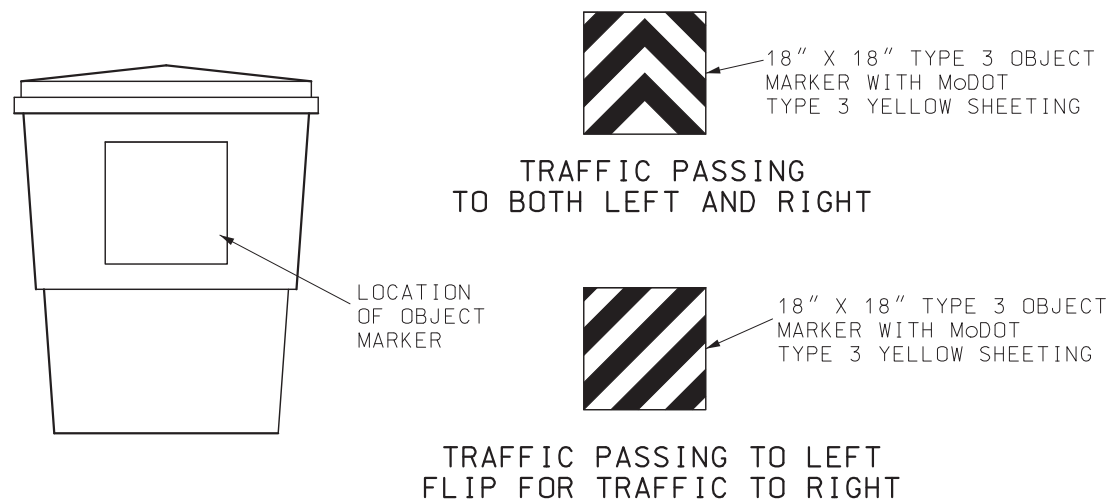
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| 703.10J      | CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (SQUARED)             | 3             | 07/01/2015     | 901.30F      | HIGHWAY LIGHTING - BASE MOUNTED CONTROL STATION                   | 2             | 04/01/2005     |
| 703.11J      | CONCRETE SINGLE BOX CULVERT - FLARED WINGS (SQUARED)               | 3             | 07/01/2015     | 901.80D      | HIGHWAY LIGHTING - POWER SUPPLY ASSEMBLY - SECONDARY SERVICE      | 2             | 04/01/2002     |
| 703.12J      | CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)        | 3             | 07/01/2015     | 901.85B      | HIGHWAY LIGHTING SYMBOLS  | 1             | 04/01/2018     |
| 703.13J      | CONCRETE SINGLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)          | 3             | 07/01/2015     | 902.00P      | TRAFFIC SIGNALS   | 2             | 04/01/2018     |
| 703.14J      | CONCRETE SINGLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)       | 3             | 07/01/2015     | 902.10Q      | TRAFFIC SIGNALS - CONTROLLERS CONDUIT LOCATION                    | 1             | 04/01/2005     |
| 703.15E      | CONCRETE SINGLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)         | 3             | 07/01/2015     | 902.15K      | TRAFFIC SIGNALS - POWER SUPPLY ASSEMBLY                           | 3             | 07/01/2004     |
| 703.16       | CONCRETE SINGLE BOX CULVERT - CUT SECTION                          | 1             | 04/01/2011     | 902.20G      | TRAFFIC SIGNALS - CONCRETE PULL BOXES                             | 3             | 11/01/2010     |
| 703.17       | CONCRETE SINGLE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT       | 14            | 04/01/2011     | 902.21C      | TRAFFIC SIGNALS - TELEPHONE INTERCONNECT                          | 1             | 03/01/1996     |
| 703.37C      | CONCRETE BOX CULVERT - EXTERIOR WING REINFORCEMENT                 | 2             | 04/01/2011     | 902.30P      | TRAFFIC SIGNALS - POST BASES                                      | *             | 10/01/2018     |
| 703.38A      | CONCRETE BOX CULVERT - CUTTING DETAILS                             | 2             | 10/01/2009     | 902.40R      | TRAFFIC SIGNALS - TUBULAR STEEL POSTS                             | 3             | 04/01/2018     |
| 703.40H      | CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (SQUARED)             | 3             | 10/01/2011     | 902.50L      | TRAFFIC SIGNALS - INDUCTION LOOP DETECTORS                        | 2             | 06/01/2009     |
| 703.41H      | CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (SQUARED)               | 3             | 10/01/2011     | 902.70P      | TRAFFIC SIGNALS - RIGID SPAN WIRE DETAILS                         | 2             | 04/01/2018     |
| 703.42H      | CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)        | 3             | 10/01/2011     | 902.80L      | TRAFFIC SIGNALS - TRAFFIC SIGNAL SYMBOLS                          | 1             | 07/01/2017     |
| 703.43H      | CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)          | 3             | 10/01/2011     | 903.01J      | STANDARD ARROW DETAILS  | 2             | 10/01/2016     |
| 703.44H      | CONCRETE DOUBLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)       | 3             | 10/01/2011     | 903.02AN     | HIGHWAY SIGNING   | 8             | 01/01/2017     |
| 703.45C      | CONCRETE DOUBLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)         | 3             | 10/01/2011     | 903.03BL     | POST INSTALLATIONS AND SIGN MOUNTING DETAILS                      | 16            | 01/01/2018     |
| 703.46       | CONCRETE BOX CULVERT - CUT SECTION                                 | 1             | 10/01/2011     | 903.04F      | HIGHWAY SIGNING - WEIGH STATION                                   | 1             | 02/01/2012     |
| 703.47       | CONCRETE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT              | 27            | 10/01/2011     | 903.05J      | HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE S, ONE TUBE        | 2             | 10/01/2016     |
| 703.60E      | CONCRETE BOX STRUCTURE - PIPE INLET                                | 1             | 07/01/2001     | 903.06J      | HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE S, TWO TUBE        | 2             | 10/01/2016     |
| 703.80H      | CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (SQUARED)             | 3             | 12/01/2011     | 903.07J      | HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE C                  | 2             | 10/01/2016     |
| 703.81H      | CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (SQUARED)               | 3             | 12/01/2011     | 903.08H      | HIGHWAY SIGNING - TUBULAR SUPPORT STEEL - TYPE B                  | 2             | 10/01/2016     |
| 703.82H      | CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (LEFT ADVANCE)        | 3             | 12/01/2011     | 903.10BC     | OVERHEAD SIGN TRUSSES - ALUMINUM                                  | 6             | 10/01/2016     |
| 703.83H      | CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (LEFT ADVANCE)          | 3             | 12/01/2011     | 903.12Z      | OVERHEAD SIGN TRUSSES - BUTTERFLY AND CANTILEVER STRUCTURAL STEEL | 7             | 10/01/2016     |
| 703.84H      | CONCRETE TRIPLE BOX CULVERT - STRAIGHT WINGS (RIGHT ADVANCE)       | 3             | 12/01/2011     | 903.60AB     | OVERHEAD SIGN TRUSSES - STRUCTURAL STEEL                          | 5             | 10/01/2016     |
| 703.85C      | CONCRETE TRIPLE BOX CULVERT - FLARED WINGS (RIGHT ADVANCE)         | 3             | 12/01/2011     |              |   |               |                |
| 703.86       | CONCRETE TRIPLE BOX CULVERT - CUT SECTION                          | 1             | 12/01/2011     |              |   |               |                |
| 703.87       | CONCRETE TRIPLE BOX CULVERT - MEMBER SIZES AND REINFORCEMENT       | 27            | 12/01/2011     |              |   |               |                |
| 706.35H      | BAR SUPPORTS FOR CONCRETE REINFORCEMENT                            | 1             | 07/01/2004     |              |   |               |                |
| 712.40K      | STEEL DAMS AT EXPANSION DEVICES                                    | 1             | 04/01/2016     |              |   |               |                |
| 725.00C      | CORRUGATED METAL PIPE INSTALLATION METHODS                         | 5             | 04/01/2011     |              |   |               |                |
| 725.31C      | METAL CURTAIN WALL AND METAL INLETS                                | 1             | 07/01/2004     |              |   |               |                |
| 726.30J      | RIGID CULVERT INSTALLATION METHODS                                 | 2             | 04/01/2015     |              |   |               |                |
| 730.00E      | THERMOPLASTIC PIPE INSTALLATION METHODS                            | 1             | 04/01/2015     |              |   |               |                |
| 731.00U      | PRECAST MANHOLES   | 2             | 07/01/2016     |              |   |               |                |
| 731.10S      | PRECAST DROP INLET   | 8             | 07/01/2016     |              |   |               |                |
| 732.00S      | FLARED END SECTION   | 3             | 04/01/2016     |              |   |               |                |
| 732.05C      | BEVELED PIPE END TREATMENT   | 2             | 07/01/2004     |              |   |               |                |
| 732.10H      | SAFETY SLOPE END SECTION   | 3             | 06/01/2013     |              |   |               |                |
| 733.00       | PRECAST CONCRETE BOX CULVERT TIES                                  | 1             | 04/01/2018     |              |   |               |                |
| 806.10J      | TEMPORARY EROSION CONTROL MEASURES                                 | 6             | 04/01/2015     |              |   |               |                |
| 808.00       | TYPICAL PLANTING ILLUSTRATIONS                                     | 3             | 07/01/2004     |              |   |               |                |
| 901.00AB     | HIGHWAY LIGHTING - POLES, FOUNDATIONS & APPURTENANCES FOR 30' M.H. | 4             | 04/01/2018     |              |   |               |                |
| 901.01AJ     | HIGHWAY LIGHTING - POLES, FOUNDATIONS & APPURTENANCES FOR 45' M.H. | 6             | 04/01/2018     |              |   |               |                |
| 901.02B      | HIGHWAY LIGHTING - CABLE, CONDUIT AND TRENCHING                    | 1             | 04/01/2002     |              |   |               |                |

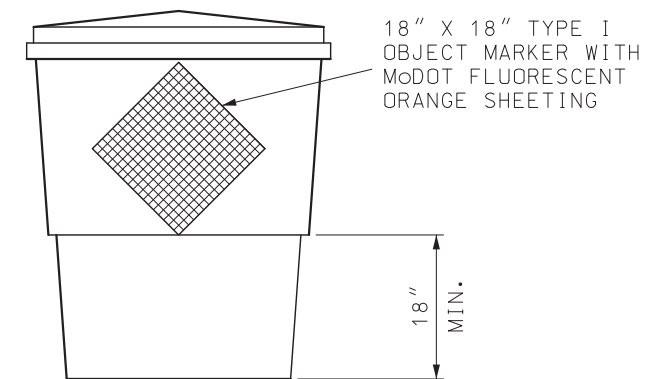
\* REVISED OR ADDED SINCE JULY 2018

**ATTENUATOR LAYOUT:**

**ALL SAND FILLED ATTENUATORS SHOULD MEET MANUFACTURER'S RECOMMENDATIONS FOR THE ARRAY AND SAND WEIGHT.**




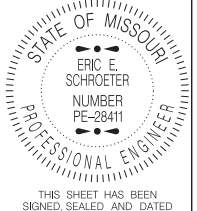
**TYPE 3 OBJECT MARKER PLACEMENT FOR PERMANENT INSTALLATIONS**



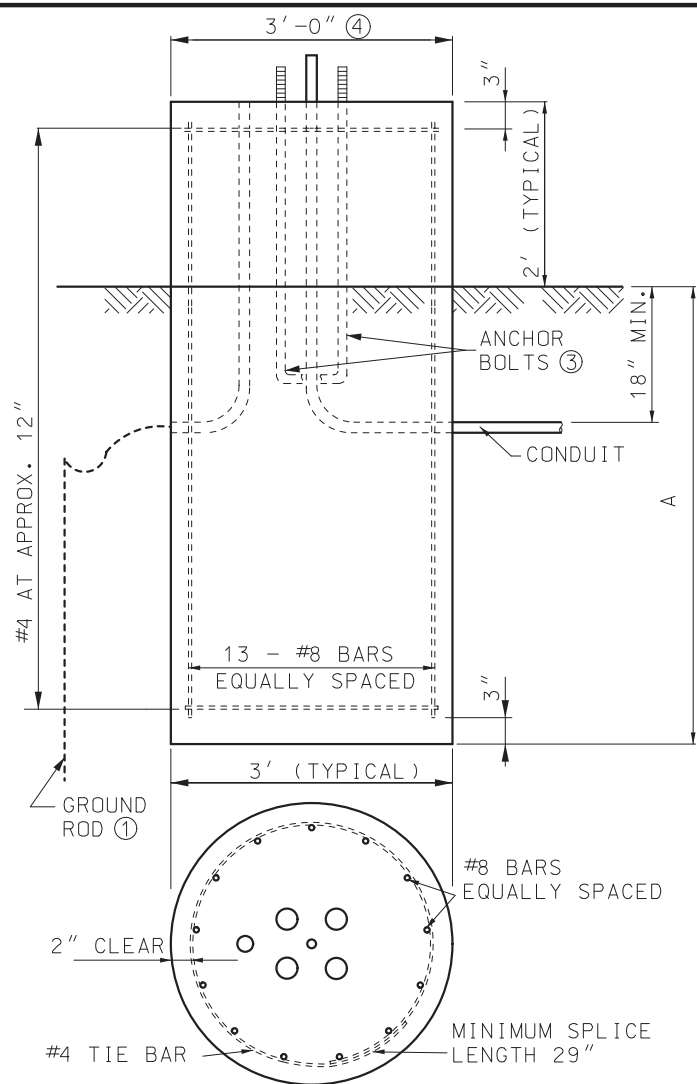
**TYPE I OBJECT MARKER PLACEMENT FOR TEMPORARY INSTALLATIONS**

GENERAL NOTES:

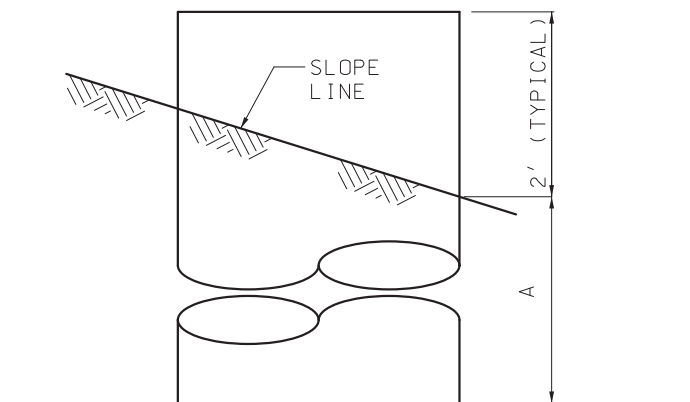
OBJECT MARKERS SHALL BE CENTERED VERTICALLY OR PLACED AS DIRECTED BY THE ENGINEER.

|  |  |
|--|--|
|  <p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b><br/>105 WEST CAPITOL<br/>JEFFERSON CITY, MO 65102<br/>1-888-ASK-MODOT (1-888-275-6636)</p>             |  |
|  <p>STATE OF MISSOURI<br/>ERIC E. SCHROETER<br/>NUMBER PE-28411<br/>PROFESSIONAL ENGINEER</p> <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p> | <p><b>SAND FILLED IMPACT ATTENUATORS</b></p> |
| <p>DATE EFFECTIVE: 10/01/2018<br/>DATE PREPARED: 7/31/2018</p>   | <p><b>612.20E</b></p>                        |
| <p>SHEET NO. 1 OF 1</p>  |  |

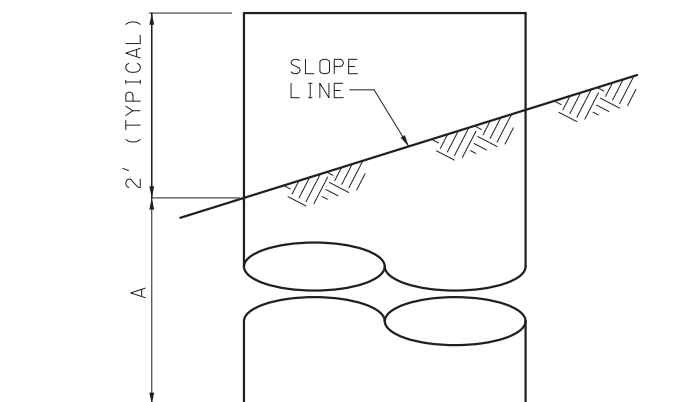
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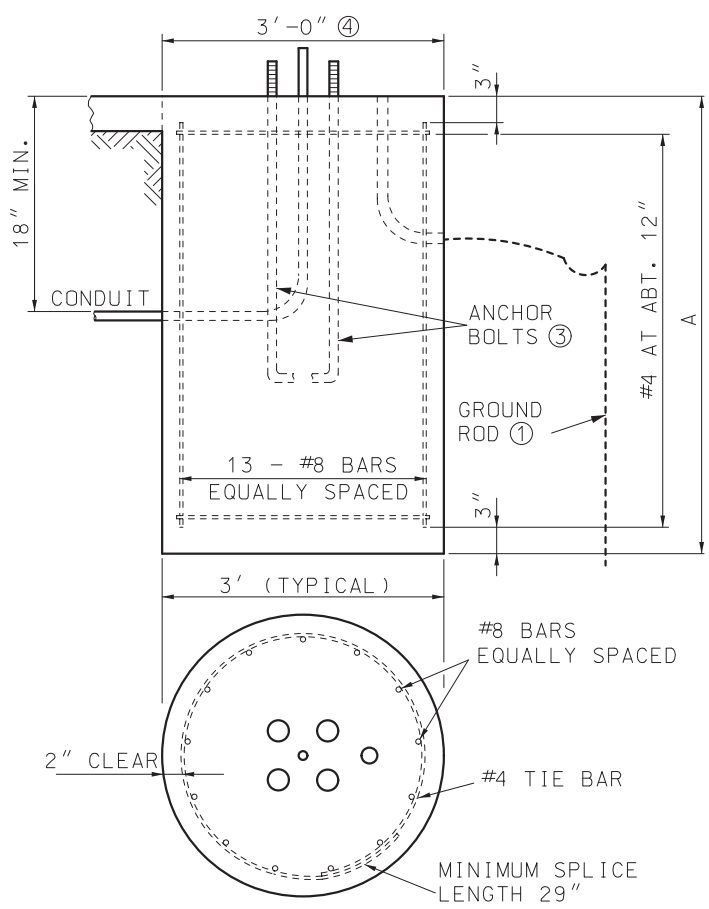
TYPE A (FLAT GROUND)



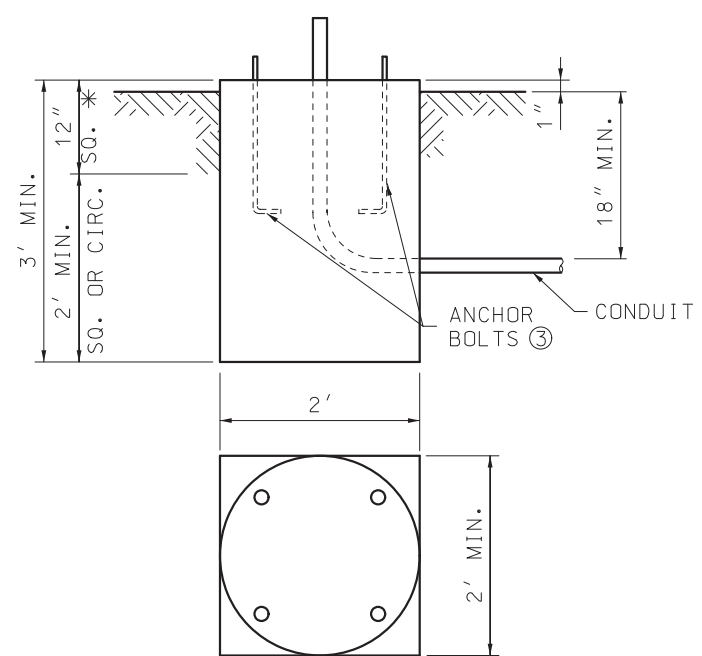
TYPE A (FILL)  
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)



TYPE A (CUT)  
(FOR ADDITIONAL DETAILS SEE TYPE A FLAT GROUND)



TYPE F



\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

TYPE C

- ① APPLICABLE ONLY WHERE CONTROLLER IS MOUNTED TO A SIGNAL POLE.
- ② BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ③ ANCHOR BOLT DIMENSIONS ARE SHOWN ON THE MANUFACTURER'S APPROVED DRAWINGS.
- ④ MAXIMUM BOLT CIRCLE DIAMETER IS 26". BASE PLATE SHALL STAY WITHIN THE TOP OF THE POST BASE DIAMETER.
- ⑤ ARM LENGTH DETERMINED BY LENGTH OF LONGEST ARM FOR TYPE B & BL SIGNAL POSTS.
- ⑥ BASE TYPE A OR F DETERMINED BY LOCATION OF POST BASE.
- ⑦ SOIL DEPTH, NO ROCK.
- ⑧ WEIGHT INCLUDES #4 TIE BARS.
- ⑨ WHEN CONCRETE BASE IS LOCATED WITHIN 8" CONCRETE DIVISIONAL ISLAND, EMBEDMENT LENGTH MAY BE REDUCED BY 1/2 DIAMETER OF THE DRILLED SHAFT.

POST BASES

| STEEL AND CONCRETE REQUIREMENTS FOR POST BASES <sup>⑨</sup> |        |                     |                          |            |
|---|--------|---------------------|--------------------------|------------|
| TYPE  | BASES  | #6 STEEL BAR LENGTH | WEIGHT LBS. <sup>⑧</sup> | CONC. C.Y. |
|   |        |                     |                          |            |
| A-9   | 9'-0"  | 10'-6"              | 300                      | 2.88       |
| A-9.5   | 9'-6"  | 11'-0"              | 310                      | 3.01       |
| A-10  | 10'-0" | 11'-6"              | 320                      | 3.14       |
| A-10.5  | 10'-6" | 12'-0"              | 330                      | 3.27       |
| A-11  | 11'-0" | 12'-6"              | 350                      | 3.40       |
| A-12  | 12'-0" | 13'-6"              | 380                      | 3.67       |
| F-9   | 9'-0"  | 8'-6"               | 240                      | 2.36       |
| F-9.5   | 9'-6"  | 9'-0"               | 250                      | 2.49       |
| F-10  | 10'-0" | 9'-6"               | 270                      | 2.62       |
| F-10.5  | 10'-6" | 10'-0"              | 280                      | 2.75       |
| F-11  | 11'-0" | 10'-6"              | 300                      | 2.88       |
| F-12  | 12'-0" | 11'-6"              | 320                      | 3.14       |
| C*  |        |                     |                          | 0.44       |

\* SURFACE OF BASE TO BE CONSTRUCTED SQUARE FOR A DEPTH OF 12".

BASE EMBEDMENT IN SOLID ROCK

| SOLID ROCK ENCOUNTER POINT    | REQUIRED EMBEDMENT FOR BASE TYPE |
|-------------------------------|----------------------------------|
|                               | A-10<br>F-10                     |
| AT SURFACE                    | 4'-9"                            |
| AT ONE-FOURTH NORMAL DEPTH    | 4'-0"                            |
| AT ONE-HALF NORMAL DEPTH      | 3'-3"                            |
| AT THREE-FOURTHS NORMAL DEPTH | 1'-3"                            |

- REQUIRED EMBEDMENT DEPTHS CAN BE INTERPOLATED BETWEEN ENCOUNTER POINTS FOR OTHER SOLID ROCK ENCOUNTER DEPTHS.
- NORMAL LENGTHS FOR ANCHOR BOLTS AND REINFORCING STEEL WILL BE REQUIRED.
- CORE DRILL HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL IN SOLID ROCK SHALL BE PROVIDED. CORE DRILL HOLES SHALL BE TWICE THE DIAMETER OF THE ANCHOR BOLT AND REINFORCING STEEL DIAMETER AND TO WITHIN 3 INCHES OF THE NORMAL BASE DEPTH.
- IF SOIL, SHALE, GRAVEL, FRACTURED ROCK, OR VOIDS ARE ENCOUNTERED DURING CORE DRILLING, THE ROCK SHALL BE REMOVED TO THE POINT OF ENCOUNTER.
- ANCHOR BOLTS AND REINFORCING STEEL SHALL BE GROUTED IN THE CORE DRILL HOLES WITH NON-SHRINK GROUT HAVING A MINIMUM STRENGTH OF 9,000 POUNDS IN 24 HOURS.
- STRAIGHT ANCHOR BOLTS OF THE LENGTH SHOWN IN THE ANCHOR BOLT TABLE UNDER THE COLUMN "BOLT LENGTH" ARE ADEQUATE FOR USE IN GROUTED CORE DRILLED HOLES.

| POST BASES |                                |                        |
|------------|--------------------------------|------------------------|
| POST TYPE  | ARM LENGTH (FEET) <sup>⑤</sup> | BASE TYPE <sup>⑥</sup> |
| C OR CL    | 15 - 25                        | A-9 OR F-9             |
| C OR CL    | 30 - 35                        | A-9.5 OR F-9.5         |
| C OR CL    | 40 - 55                        | A-10.5 OR F-10.5       |
| B OR BL    | 15 - 25                        | A-10 OR F-10           |
| B OR BL    | 30 - 35                        | A-11 OR F-11           |
| B OR BL    | 40 - 55                        | A-12 OR F-12           |

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 NICOLE A. KOLB HOOD  
 NUMBER PE-2001018754  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

TRAFFIC SIGNALS  
 POST BASES

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.