# 2019 Traffic Signal Standards

## Stan Dwg No

<table>
<thead>
<tr>
<th>Sheet Name</th>
<th>Std Dwg No</th>
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<tbody>
<tr>
<td>2019 Traffic Signal Standard Drawings Index</td>
<td>16.1.0.1</td>
</tr>
<tr>
<td>2019 Traffic Signs of Pavement Markings Index</td>
<td>16.1.0.2</td>
</tr>
<tr>
<td>Traffic Signal Notes</td>
<td>16.1.1</td>
</tr>
<tr>
<td>Legend</td>
<td>16.1.2.1</td>
</tr>
<tr>
<td>Key Notes</td>
<td>16.1.2.2</td>
</tr>
<tr>
<td>Span Wire Signal Design</td>
<td>16.1.3</td>
</tr>
<tr>
<td>Mounting Hardware</td>
<td>16.1.4</td>
</tr>
<tr>
<td>Loop Detection Sheet 1</td>
<td>16.1.5.1</td>
</tr>
<tr>
<td>Loop Detection Sheet 2</td>
<td>16.1.5.2</td>
</tr>
<tr>
<td>Conduit Details</td>
<td>16.1.6</td>
</tr>
<tr>
<td>Pull Boxes</td>
<td>16.1.7</td>
</tr>
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<td>16.1.8</td>
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<td>16.1.9.1</td>
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<td>16.1.12.1</td>
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<td>16.1.14</td>
</tr>
<tr>
<td>Foundation for Xcel Facilites</td>
<td>16.1.15</td>
</tr>
<tr>
<td>Foundation for Cast-In-Place Traffic Signal Pole</td>
<td>16.1.16</td>
</tr>
<tr>
<td>&quot;P&quot; Cabinet &amp; Base Sheet 1</td>
<td>16.1.17.1</td>
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<td>16.1.17.2</td>
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<td>&quot;M&quot; Cabinet Base</td>
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<td>16.1.21</td>
</tr>
<tr>
<td>Driver's Feedback Sign Details</td>
<td>16.1.22</td>
</tr>
<tr>
<td>Flashing Beacon &amp; Sign Sheet 1</td>
<td>16.1.23</td>
</tr>
<tr>
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<td>16.1.24</td>
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<td>16.1.25.1</td>
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<td>16.1.25.2</td>
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<td>16.1.26</td>
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<td>Control Cabinet &amp; Pull Box Detail</td>
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<td>16.1.3</td>
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<td>16.1.4</td>
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<td>16.1.5.1</td>
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</tr>
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<td>16.1.19</td>
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# 2019 Sign and Pavement Marking Standards

## DENVER PUBLIC WORKS
CITY AND COUNTY OF DENVER
TRANSPORTATION DESIGN

<table>
<thead>
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<th>SHEET NAME</th>
<th>STD DWG NO</th>
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<tr>
<td>TYPICAL CROSSWALK LAYOUT DETAIL</td>
<td>16.2.1</td>
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<tr>
<td>PAVEMENT MARKING DETAILS SHEET 1</td>
<td>16.2.2.1</td>
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<tr>
<td>PAVEMENT MARKING DETAILS SHEET 2</td>
<td>16.2.2.2</td>
</tr>
<tr>
<td>BIKE LANE TYPICAL MARKING DETAILS</td>
<td>16.2.3</td>
</tr>
<tr>
<td>CENTRAL BUSINESS DISTRICT PAVEMENT MARKING DETAILS</td>
<td>16.2.4</td>
</tr>
<tr>
<td>SINGLE SIGN POST MOUNTING DETAILS</td>
<td>16.2.5</td>
</tr>
<tr>
<td>MULTIPLE SIGN POST MOUNTING DETAILS</td>
<td>16.2.6</td>
</tr>
<tr>
<td>ONE-WAY SIGN PLACEMENT DETAILS</td>
<td>16.2.7</td>
</tr>
<tr>
<td>TRAFFIC SIGN UTILITY POLE MOUNTING DETAIL</td>
<td>16.2.8</td>
</tr>
<tr>
<td>GROUND MOUNT STREET NAME SIGN INSTALLATION DETAIL</td>
<td>16.2.9</td>
</tr>
<tr>
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<td>16.2.10</td>
</tr>
<tr>
<td>OVERHEAD STREET NAME SIGN &amp; DETAILS</td>
<td>16.2.11</td>
</tr>
<tr>
<td>NEIGHBORHOOD BIKEWAY BRANDING SIGN</td>
<td>16.2.12</td>
</tr>
<tr>
<td>PARKING METER POST INSTALLATION</td>
<td>16.2.13</td>
</tr>
<tr>
<td>BARRICADE DETAILS</td>
<td>16.2.14</td>
</tr>
<tr>
<td>BIKE RACK DETAILS</td>
<td>16.2.15</td>
</tr>
<tr>
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<td>16.2.16</td>
</tr>
</tbody>
</table>

## 2019 Traffic Signal Standards

**APPROVED:**
LESLEY HOMAS, CITY ENGINEER  
EMILY GLOCKER, CITY ENGINEER

3/27/19

Sheets: 1 of 37
TRAFFIC SIGNAL NOTES

GENERAL


2. FOR WORK INVOLVING XCEL ENERGY, THE CONTRACTOR SHALL COMPLY WITH THE FRANCHISE AGREEMENT IN PLACE BETWEEN THE CITY & COUNTY OF DENVER AND XCEL ENERGY. XCEL ENERGY SHALL PROVIDE POWER SOURCE WITHIN 111' OF TRAFFIC SIGNAL CABINET. THEREFORE ALL SUBMITTALS FOR TRAFFIC SIGNAL POLES SHALL BE MAILED TO THE CITY & COUNTY OF DENVER PUBLIC WORKS TRANSPORTATION OPERATIONS (OTHER THAN AS DESIGNATED) BY THE CONTRACTOR. NO TRAFFIC SIGNAL POLES OR STREET LIGHT POLES SHALL BE ORDERED UNTIL A SUBMITTAL HAS BEEN ACCEPTED FROM CITY & COUNTY OF DENVER PUBLIC WORKS TRANSPORTATION OPERATIONS. ALL TRAFFIC SIGNAL AND STREET LIGHTS SHALL BE WIRED INTO THE ELECTRIC METER.

3. XCEL ENERGY TO REMOVE ONLY XCEL OWNED POLES AND EXISTING STREET LIGHTING. THE CONTRACTOR SHALL REMOVE ALL OTHER SIGNAL EQUIPMENT INCLUDING ALL CITY OWNED SIGNAL POLES WITH OR WITHOUT STREET LIGHTING, MAST ARMS, SPAN WIRE POLES, PEDESTRIAN POLES, SIGNAL HEADS, SPAN WIRE, PUSH BUTTONS, PUSH BOXES, CONTROLLER CABINETS AND ALL FOUNDATIONS AS SHOWN ON THE PLANS. CONTRACTOR SHALL REPAIR ALL SIDEWALKS AND OTHER CONCRETE AFTER REMOVALS OR AS DIRECTED AND APPROVED BY DENVER PUBLIC WORKS TRANSPORTATION OPERATIONS.

4. ALL SALVAGED SIGNAL EQUIPMENT REMOVED REMAINS THE PROPERTY OF THE CITY & COUNTY OF DENVER AND MUST BE DELIVERED TO DENVER PUBLIC WORKS TRANSPORTATION OPERATIONS AT 5440 ROSLYN STREET, COORDINATED WITH PUBLIC WORKS TRANSPORTATION PROJECT INSPECTOR AT (720) 865-9000 PRIOR TO DELIVERY.

5. NO TRAFFIC SIGNAL SHALL BE TURNED ON OR TURNED OFF ON A FRIDAY OR SATURDAY WITHOUT PRIOR AUTHORIZATION FROM DENVER PUBLIC WORKS TRANSPORTATION (720) 865-9000. NO TRAFFIC SIGNAL SHALL BE TURNED ON WITHOUT PERMANENT SEDIMENT AND STRIPING.

HARDWARE

6. ALL SIGNAL HEADS (NOT ORGULLY SUPPORTED TOP AND BOTTOM) SHALL BE CONSTRUCTED OF DIE CAST ALUMINUM AND PAINTED DARK OLIVE GREEN IN CONFORMANCE WITH FEDERAL SPECIFICATION 14056 (1½" DIAMETER ONLY).

7. POLYCARBONATE SIGNAL HEADS ARE REQUIRED FOR ALL TRAFFIC SIGNALS AND PEDESTRIAN SIGNALS. ALL POLYCARBONATE HEADS SHALL BE DARK OLIVE GREEN IN CONFORMANCE WITH FEDERAL SPECIFICATION 14056.

8. ALL HARDWARE INCLUDING SPACERS, ELBOWS, AND POLE PLATES SHALL BE PAINTED DARK OLIVE GREEN IN CONFORMANCE WITH FEDERAL SPECIFICATION 14056.

9. LIGHT EMITTING DODE (LED) SIGNAL LENSES SHALL BE INSTALLED IN ALL SIGNAL INDICATIONS (RED, YELLOW, GREEN, AND WALK, DON'T WALK, AND COUNTDOWN PEDESTRIAN SIGNAL HEAD INDICATIONS).

10. CONTRACTOR SHALL INSTALL THE SIGNAL POLES AND PEDESTRIAN AT THE EXACT LOCATION AS SHOWN ON THE PLAN UNLESS AUTHORIZED BY THE ENGINEER. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS WITH THE CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER PRIOR TO START OF WORK.

HARDWARE (CONT.)

11. PEDESTRIAN PUSH BUTTONS SHALL BE IN COMPLIANCE WITH MUTCD SECTION H58. PUSH BUTTONS SHOULD BE LOCATED BETWEEN 1½ AND 6½ FT FROM THE EDGE OF THE CURB, SHOULDER, OR PAVEMENT.

CONSTRUCTION

12. ALL CONDUIT SHALL BE SCHEDULE 80 PVC OR COPPER. TWO 3 INCH CONDUITS SHALL BE BURIED INTO THE POLE BASE FOR ALL MAST ARM POLES. TWO 2 INCH CONDUITS SHALL BE BURIED INTO THE POLE BASE FOR ALL SIGNAL POLES WITHOUT MAST ARM.

13. ONE FULL BOX TO BE INSTALLED AT LOCATIONS SHOWN AS "x" , DESIGNATE ON "TRAFFIC" FOR SIGNAL CABLES BY PHYSICALLY EMBROIDERING, NOT PAINTING. FULL BOX FOR COMMUNICATION CONDUITS SHALL BE THE "x" CABLES ON THE PLAN AS "x" SPECIAL COMMUNICATION FULL BOX (x) DESIGNATE "TRAFFIC" CABLES BY PHYSICALLY EMBROIDERING, NOT PAINTING. SEE STD. DWG. NO. 16.1.7 FOR FULL BOX DIMENSIONS.

14. A SINGLE 3 INCH CONDUIT SHALL BE REQUIRED AND INSTALLED FROM THE TRAFFIC CABLE FULL BOX TO THE TRAFFIC SIGNAL CONTROLLER CABINET. CONDUIT SHALL BE SCHEDULE 80 PVC CONDUIT.

15. INTERCONNECT FULL BOXES SHALL BE PLACED AT 500 FOOT MAXIMUM SPACING, OR OTHERWISE DIRECTED BY THE CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER.

16. INSTALL WATER VALVE FULL BOX (x) AND 2 INCH SCHEDULE 80 PVC CONDUIT FOR LOOP DETECTION INTERCEPTS SHOWN ON THE PLAN. SEE STD. DWG. NO. 16.1.5.

17. ALL HOLES IN TRAFFIC SIGNAL POLES TO BE DRILLED OR SAWED. INSTALLING HOLES BY BURNING WITH A TORCH IS NOT APPROVED.

18. FOR MAST ARM MOUNTED SIGNAL HEADS, THE BOTTOM OF ALL OVERHEAD MOUNTED SIGNAL HEADS SHALL BE ON THE SAME HORIZONTAL PLANE AND HAVE A MINIMUM CLEARANCE OF 18" AND A MAXIMUM CLEARANCE OF 30" ABOVE THE CROWN OF PAVEMENT SURFACE, UNLESS OTHERWISE SPECIFIED BY THE CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER.

19. FOR SPAN WIRE MOUNTED SIGNAL HEADS, THE BOTTOM OF ALL OVERHEAD MOUNTED SIGNAL HEADS SHALL BE ON THE SAME HORIZONTAL PLANE AND HAVE A MINIMUM CLEARANCE OF 18" ABOVE THE CROWN OF PAVEMENT SURFACE, UNLESS OTHERWISE SPECIFIED BY THE CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER. ALL SPAN WIRE SHALL INCLUDE A BOTTOM WIRE OR WIRE TETHER.

20. EXISTING SIGNAL TAPES SHALL REMAIN VISIBLE AND ILLUMINATED UNTIL NEW SIGNALS ARE TURNED ON. BLOCKING OF EXISTING FACE BY NEW FACE WILL REQUIRE NEW FACE TO BE TEMPORARY WIRED FOR ILLUMINATION.

21. ANCHOR BOLTS SHALL NOT BE TRIMMED UNTIL SIGNAL POLE BASE ELEVATION IS APPROVED BY THE CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER.

MATERIALS

22. ALL TRAFFIC SIGNAL WIRE CONNECTORS SHALL BE OF THE SUCESION COMPRESSION TYPE WITH COPPER NONTERMINAL CONNECTORS AND REAL WRAP-CAPS OR APPROVED EQUIVALENT.

23. WIRE SPLICE IN THE FULL BOXES ARE NOT ALLOWED EXCEPT FOR THE LOOP WIRES. ALL LOOP WIRES SHALL BE SPLAED IN THE WATER VALVE TRAFFIC FULL BOXES.

24. THREE (3) SPARE CONDUITS SHALL BE PROVIDED TO EACH PAVEMENT HOLE AND TO THE END OF EACH MAST ARM.

25. ALL SOLDERLESS CONNECTORS SHALL BE USED.

NOTING

26. OVERHEAD STREET NAME SIGNS TO BE FURNISHED AND INSTALLED ON EACH MAST ARM AS SHOWN ON STD. DWG. NO. 16.12.2. SIGN TO BE BOLTED ON 18 INCH TELEGRAPH EXTENSION WHICH CONNECTS TO MAST ARM BY USE OF ADAPTER SCREWED INTO HINGING.

27. CONTRACTOR SHALL NOT REMOVE ANY REGULAR TRAFFIC SIGNS UNLESS SPECIFIED ON PLANS. CITY & COUNTY OF DENVER PUBLIC WORKS ENGINEER TO BE NOTIFIED 24 HOURS PRIOR TO ANY SIGNING CHANGES AT (720) 865-4000.

28. ALL ENSIGN SIGNS AND MARKINGS MUST BE IN PLACE AT THE TIME A TRAFFIC SIGNAL CHANGE IS MADE SUCH AS A NEW SIGNAL TURN ON AND OR CHANGES MADE TO EXISTING SIGNAL OPERATION.
REMOVALS
1. REMOVE SIGNAL HEAD
2. REMOVE SIGNAL POLE
3. REMOVE SIGNAL CABINET, CONTROLLER, PULL BOXES & WATER VALVE PULL BOXES
4. REMOVE MAST ARM
5. REMOVE SPAN WIRE, CABLE AND ALL ATTACHED SIGNAL HEADS AND EQUIPMENT
6. REMOVE PUSH BUTTON
7. ELECTRIC UTILITY COMPANY TO REMOVE EXISTING POLE
8. ELECTRIC UTILITY COMPANY TO REMOVE, RELOCATE OR RAISE EXISTING OVERHEAD POWERLINE
9. REMOVE AND REPLACE COMMUNICATIONS PULL BOX SUCH THAT NEW LID IS SEATED FLUSH WITH PROPOSED SIDEWALK OR CURB RAMP SURFACE
10. REMOVE AND SALVAGE DETECTION CAMERA
11. REMOVE EXISTING POLE FOUNDATION TO MINIMUM DEPTH OF 1' BELOW FINISHED GRADE
12. REMOVE EXISTING PULL BOX (SPECIAL) FOR SIGNAL SYSTEM COMMUNICATIONS

INSTALLATIONS
21. INSTALL SIGNAL HEAD OR HEAD
22. INSTALL SIGNAL CABINET, CONTROLLER AND ASSOCIATED EQUIPMENT
23. INSTALL PUSH BUTTON
24. INSTALL MAST ARM
25. INSTALL TWO 3-INCH CONDUITS
26. INSTALL SIGNAL POLE
27. INSTALL MAST ARM - (LENGTH AS SHOWN)
28. INSTALL SPAN WIRE
29. COMML/SPECIAL INSTALL PULL BOX MARKED "TRAFFIC COMM" ON UP
30. INSTALL ONE PULL BOX ON MARKED "TRAFFIC" ON UP
31. INSTALL LOOP DETECTOR
32. INSTALL CLOSED CIRCUIT CAMERA
33. ELECTRIC UTILITY COMPANY TO INSTALL POWER FEED, CONTRACTOR TO EXTEND TO CONTROLLER
34. INSTALL LUMINAIRE
35. INSTALL WATER VALVE PULL BOX
36. NO CHANGE
37. INSTALL STREET LIGHT STANDARD
38. INSTALL EMERGENCY VEHICLE PRECEDENCE DETECTOR
39. INSTALL INTERCONNECT (SIZE & TYPE AS SHOWN)
40. INSTALL VIDEO DETECTION CAMERA (FLX OR VIDEO)
41. INSTALL ELECTRIC METER

RESETS
1. RESET SIGNAL HEAD
2. RESET SIGNAL POLE
3. RESET SIGNAL CONTROLLER, CABINET AND ASSOCIATED EQUIPMENT
4. RESET PUSH BUTTON
5. RESET SPAN WIRE
6. RESET SPAN WIRE AND ALL ATTACHED SIGNAL EQUIPMENT
7. RESET DETECTOR
8. ELECTRIC UTILITY COMPANY TO RESET EXISTING POLE
GENERAL NOTES:

1. LOOP DETECTIONS SHALL BE INSTALLED WITH THE NUMBER OF TURNS OF WIRES AND IN THE CONFIGURATION SHOWN ON THE SCHEMATIC. A COMPLETE INSTALLATION CONSISTS OF A LOOP OR GROUP OF LOOPS INSTALLED IN THE ROADWAY, LEAD-IN CABLE, AND A DETECTOR UNIT INSTALLED IN A TRAFFIC SIGNAL CONTROLLER CABINET.

2. LOOP WIRES SHALL BE Brought OUT TO THE NEAREST SIGNAL POLE OR POLE BOX AND EXISTING UNDERGROUND CONSULT OR UNDERGROUND MESSAGING WIRE USED FOR LEAD-IN CABLE TO CONTROL CABINET.

3. THE LOOP DETECTOR WIRES SHALL BE PLACED TO THE LEAD-IN CABLE USING WATER PROOF SPLICER DEVICES.

4. ALL LOOP WIRES SHALL BE CLEARLY IDENTIFIED AT THE CONNECTION POINT FOR LETTERING FROM THE ROADWAY CENTER.

5. NO BACKER ROOFS OR FILLER MATERIAL SHALL BE USED IN THE SAW CUT.

6. THE SAW CUT SHALL BE MADE 3-INCHES WIDE AND A MINIMUM OF 5 INCHES DEEP. THE SLAB SHALL BE AS STRAIGHT AS POSSIBLE AND SHALL NOT DROP MORE THAN 3-INCH WHEN CHECKED WITH A 10 FOOT STRAIGHTEDGE.

7. SAW CUTS SHALL BE WASHED AND BLOWN DRY AND CLEANED PRIOR TO PLACEMENT OF WIRE. CORNERS OF LOOP SLOTS SHALL BE CHIPPED 3-INCH DEEP WITH 2-INCH DIAMETER. SEE CHIPPED CORNER DETAIL.

GENERAL NOTES (CONT.)

8. AFTER SAW CUT IS CLEANED OF DEBRIS THE WIRES SHALL BE PLACED BY PUSHING IT INTO THE SLOT WITH A BLUNT NON-METALLIC OBJECT. A SCREWDRIVER OR OTHER SHARP TOOL SHALL NOT BE USED.

9. BEFORE THE LOOP SYSTEM IS SEATED THE LOOP SHALL BE CHECKED FOR ELECTRICAL CONTINUITY BY TESTING FOR INCREASED AC VOLTAGE, INDUCTANCE, AND RESISTANCE.

10. LOOPs SHALL BE SIZED USING SIZED AS DESCRIBED IN THE MATERIAL REQUIREMENTS AND SHOWN IN THE DETAILS.

11. WHEN INSTALL LOOP UNDER CONCRETE PAVING BY STABILIZING WITH PLASTIC TIE STAKES OR REBAR CHIPS AT THE DIRECTION OF THE ENGINEER.

12. LOOPs SHALL BE INSTALLED PRIOR TO FINAL LIFT OF ASPHALT.

13. REFORGED LOOPS MAY BE USED AT THE DIRECTION OF THE ENGINEER.

14. BICYCLE DETECTION LOOPS SHALL BE Laid OUT AND INSTALLED IN THE SAME MANNER AS VEHICLE LOOPS.

MATERIAL REQUIREMENTS:

1. THE LOOP WIRE SHALL BE NO. 14 AWG. STRANDED SINGLE CONDUCTOR, CROSS-SERATED POLYETHYLENE INSULATION WHICH IS PROTECTED BY A CONTINUOUS FLEXIBLE VINYL OR POLYETHYLENE PLASTIC TUBING.

2. LOOP LEAD-IN CABLE SHALL BE 6/0 ANGLED STRANDED COPPER WIRE SHIELDED WITH POLYETHYLENE JACKET AND INSULATED IN ACCORDANCE WITH 5A SPECIFICATION NO. 500038.

3. ROADWAY LOOP ENCAPSULATING MATERIAL SHALL BE USED TO ENCAPSULATE THE LOOP WIRES. THE SEALER SHALL BE ONE R Tubular Compound Which Is Applied Under Pressure Using A CONVENTIONAL CARTRIDGE GUN OR BULK MOUNTING PLANT EQUIPMENT. SEALER SHALL HAVE A VISCOSITY WHICH WILL COMPLETELY ENCAPSULATE THE WIRES AND WILL REMAIN PERMANENTLY FLEXIBLE WITH AGE. SEALER SHALL BE APPLIED BY THE ENGINEER PRIOR TO BEGINNING WORK.

[Diagram showing typical video camera location detail and typical loop location detail]

COMPUTER FILE INFORMATION

DEPARTMENT OF PUBLIC WORKS

DRAWING FILE NAME: [Redacted]

DRAWING SIZE: [Redacted]

STANDARD DRAWING NO.

[Diagram showing typical vehicle loop应当是2 FEET wide and 40 FEET long and typical loop location detail]

[Diagram showing left turn loop quadruple-2-2 turns centered in lane]

[Diagram showing side street loops placed 2 FEET back from flow line and 1 FOOT minimum, 3 FEET maximum from centerline or as shown on plans.]

[Diagram showing lead-in splice pole box or full box]

[Diagram showing sidewalk located loops to be installed on lane line or centered between loops.]

[Diagram showing typical vehicle loop quadruple-2-2 turns centered in lane]
SECTION A-A

ONE PART SEALER (NO FILLED)

SECTION B-B

SAWED SLOT DETAILS

TYPICAL LOOP WIRING SCHEMATIC

LEAD-IN WIRE
FULL BOX
WATERPROOF STUCCO OR CONNECT AT TERMINAL AT STRIP
REPLACE PAVEMENT PER SPECIFICATIONS
CURE & GLITTER

WATER VALVE PULL BOX

2" PLASTIC CONDUIT

CONDUIT TO NEXT FULL BOX

DETECTOR WIRES IN SAW CUT

EACH PAIL OF LOOP LEAD-IN DETECTOR WIRES SHALL BE TWISTED 3Turns PER FOOT THROUGH CONDUIT.

LOOP DETECTOR LEAD-IN FOR WATER VALVE PULL BOX

DIRVEL DETECTOR LOOP CORNERS 3' DEEP THEN SAW PAVEMENT SLOTS TO FORM LOOP

OVERLAP THE SAWED SLITS TO INSURE EQUAL DEPTH AT DRILLED CORNERS

2" DA

DRILLED CORNER DETAIL
NOTES:

ANCHOR BOLTS

1. (4) 2.5" DIAMETER ANCHOR BOLTS PER CASSETTE WITH (2) 2.5" HEX AND (2) 2.5" WASHERS PER BOLT WITH threaded ends galvanized to at least 1/2" from end.

2. LENGTH, THREAD LENGTH, HOOK LENGTH, AND DIAMETER OF EACH ANCHOR BOLT SHALL BE AS NOTED ABOVE IN DETAIL.

3. ANCHOR BOLTS SHALL BE MEDIUM STRENGTH, MILD STEEL OR ALLOY STEEL WITH MINIMUM DESIGN YIELD STRENGTH OF ASTM A355 GRADE 65, OR 80 KSI ALLOY BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A577 GRADE 87. MEDIUM STRENGTH, MILD STEEL ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF A MODIFIED ASTM A36 (WITH 50 KSI YIELD STRENGTH), OR ASTM A577 GRADE 55.

4. WELDED SPLICES OF A ROD MATERIAL FOR ANCHOR BOLTS WILL NOT BE PERMITTED.

5. THREADED BOLTS FOR ANCHOR BOLTS SHALL BE ROLLED OR CUT THREADS OF UNIFIED COARSE THREAD DEGREE IN ACCORDANCE WITH ANSI B1.1. FOR ROLLED THREADS, THE DIAMETER OF THE UNTHREADED PORTION SHALL NOT BE LESS THAN THE MINIMUM PITCH DIAMETER NOT MORE THAN THE MAXIMUM DIAMETER OF THE THREADS.

NUTS AND WASHERS

6. ALL THREADS FOR BOLTS AND NUTS SHALL HAVE CLASS 2 FIT TOLERANCES IN ACCORDANCE WITH ANSI B1.1.

7. NUTS FOR ALLOY STEEL ANCHOR BOLTS SHALL CONFORM TO ASTM A194 GRADE 2H OR ASTM ASSY. MILD STEEL OR ALLOY STEEL CASSETTES WITH MEDIUM STRENGTH, MILD STEEL ANCHOR BOLTS SHALL CONFORM TO ASTM A355 GRADE 65, OR 80 KSI ALLOY BOLTS SHALL CONFORM TO THE REQUIREMENTS OF A MODIFIED ASTM A36 (WITH 50 KSI YIELD STRENGTH), OR ASTM A577 GRADE 55.

8. WASHERS INSTALLED WITH ANCHOR BOLTS OF ANY TYPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F674 AND SHALL HAVE THE SAME FINISH OR COATING AS THE BOLT AND NUT.

FOUNDATION SCHEDULE

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GENERAL NOTES

1. DESIGN OF FOUNDATIONS IS BASED ON TRAFFIC SIGNAL POLE CONFIGURATIONS PROVIDED BY VALCHI INDUSTRIES, INC. DRAWING NO. 0010 FOR THE CITY & COUNTY OF DENVER AND PUBLIC SERVICE OF COLORADO, REFER TO CITY & COUNTY OF DENVER TRAFFIC STANDARD DRAWING FOR ANY ADDITIONAL TRAFFIC POLE INFORMATION.

2. DESIGN CONSIDERATIONS ARE BASED ON THE USE OF MATERIALS AND METHODS OF CONSTRUCTION FOR THE SHAVER COMPOUNDS AND FOR THE INSTALLATION OF TRAFFIC SIGNAL POLE CASSETTES.

3. AN ULTIMATE WIND VELOCITY OF 120 MPH HAS BEEN USED FOR THE DESIGNS HEREIN.

4. ALL FOUNDATIONS ON THIS SHEET ARE SINGLE MAST ARM POLES EXCEPT AS NOTED.

5. THE DESIGNS HEREBY ASSUME THAT SIGNALS ARE INSTALLED WITHIN THE ROADWAY CURB WITH THE FOLLOWING SOIL CONDITIONS:

- SOIL DENSITY = 110 lb/cu.ft.
- SOIL SLOPE = 1:6 FOR MEDIUM SOIL OR 1:5 FOR SOILS WHICH ARE NOT MEDIUM SOIL.
- SF = 1.25 FOR TORSIONAL RESISTANCE AND 3.0 FOR FLEXURAL RESISTANCE.

6. ALL FOUNDATIONS ON THIS SHEET ARE SINGLE MAST ARM POLES EXCEPT AS NOTED.

7. CASSETTES SHALL BE PLACED AGAINST UNDISTURBED EARTH.

8. CASSETTES SHALL BE CONSTRUCTED WITH AN ENTRAINED COARSE 82 CONCRETE IN ACCORDANCE WITH SECTION 503 OF THE STANDARD SPECIFICATIONS. REINFORCING STEEL SHALL BE GRADE 60.

9. CASSETTE CONCRETE SHALL REACH THE SEVEN DAY PRECAST STRENGTH PRIOR TO INSTALLING THE SIGNAL STRUCTURE.

10. FOUNDATION TO BE PROVIDED WITH 2 CONCRETE STUB BOLTS (2-3T)

11. BASE PLATE, NUTS AND NUT COVER TO BE FURNISHED BY MANUFACTURER. ANCHOR BOLTS TO BE FURNISHED BY THE CONTRACTOR AND ARE INCLUDED IN THE COST OF THE FOUNDATION.

12. FOUNDATION SHALL BE PAIRED WITH THE FEET OF THE ROLLING MILL. USE OF THE SHAPER FOR CONCRETE CASSETTE SHALL BE ALLOWED ONLY BY APPROVAL OF THE CDOT TRAFFIC ENGINEER.

13. PLUMBING OF CASSETTES SHALL BE ACCOMPLISHED BY ADJUSTING NUTS AFTER LOADING MAST ARM.

14. EACH END OF CASSETTE TIES TO TERMINATE WITH A 15" HOPEAROUND A CONCRETE CURB.

15. DESIGN IS BASED ON A MAST ARM BASE CONCRETE CASSETTE IN THE MAST ARM OF THE CASSETTE. CASSETTES SHOULD NOT BE INSTALLED AT SITES WITH A SLOPE EXCEEDING 10 PERCENT.

16. LEVELING CONCRETE SHALL BE 4,000 PSI CLASS B ARM ENTRAINED CONCRETE.

17. FIELD STRESS OF REINFORCING STEEL SHALL BE MMS206 30,000 PSI.
October 18, 2019 – Signal Pole Foundation Anchor Bolts

SUBJECT: Modification to PWES-009.1 Transportation Design Signal, Sign and Marking Standards STD DWG 16.1.8

Denver Public Works has evaluated the anchor bolt size requirements for the Signal Pole Foundations used to support Signal Mast Arm Poles. After further evaluation, it has been determined that 2" diameter bolts are sufficient for mast arms up to 75 feet in length.

It is therefore determined that DPW's Public Works Standards, Details, Manuals, Plans and Studies for the Engineering Division (PWES-009.1), Transportation Design Signal, Sign and Marking Standards (Std. Dwg 16.1.8), Notes, Anchor Bolts, Note 1, enacted March 7, 2019, is hereby revised to state:

1. (4) 2.0” diameter anchor bolts per caisson with (2) 2.0” HEX and (2) 2.0” washers per bolt with threaded end galvanized to at least 12” from end.

This addendum shall take effect immediately.

Denver Public Works | City Traffic Engineer

Sincerely,

Emily Gloeckner, City Traffic Engineer

Copies:
Alex Kouprievitch, PM
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**Maximum Arm Length Combination for Dual Configuration are 40'-0" / 40'-0". Arm Lengths exceeding these will require a special pole design.**

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**Diagram Details**

- **Heavy Duty Stainless Steel Bands (by others)**
- **Mast Arm**
- **Heavy Duty Stainless Steel Bands**
- **Pole***
- **Hanger Tri Clamp**
- **Pole***
- **Hanger Tri Clamps**

**License Plate**

**Detail 15**

**Tri Mitigator**

---

[Computer File Information]

[Sheet Revisions]

[Department of Public Works]

[Table Data]

[Standard Drawing No.: 16.1.1]

[Sheet No.: 17 of 37]
NOTES:

1. All materials and construction shall conform to the requirements of the specifications.
2. Unstable soil or steep slope may require deeper foundations. See specifications. Cabinets shall not be located in drainage areas, unless they are elevated.
3. Conduit size shall be 2" Schedule 80 PVC.
4. Anchor bolts shall be galvanized, 16" x 16" x 4" complete with nuts and washers.
5. Conduit projects above foundation shall be 2" min. to 4" max. Conduits shall be capped.
6. 1" sleeve for ground rod, exact location per cabinet manufacturer's requirements.
7. In unpaved areas a raised RCC pad 36" x 4" x 4" shall be placed in front of the cabinet. The pad shall be set 2" below the foundation elevation and sloped away from the cabinet.
8. Confirm actual anchor bolt layout dimensions as shown on the table on this drawing prior to construction.
9. A meter pedestal shall be provided for electrical services for traffic signals when a separate service cabinet is specified. This cabinet can be used for other purposes as well. See plan.
10. Cabinets shall be offset a minimum of 6 ft. from any roadway and 5 ft. from controller cabinet, UPS cabinet, service pole or pad mounted transformer.
11. Preformed concrete base for the meter, pedestal shall be used only with the engineer's approval.
GENERAL NOTES

1. INSTALLATION DESIGN CONFORMS WITH ASPHALT "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORT FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS AND SHALL BE FABRICATED IN ACCORDANCE WITH"

A. STEEL PIPE, POST ANCHOR PLATES AND BREAK-AWAY PLATES SHALL CONFORM TO ASPHALT "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORT FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS AND SHALL BE FABRICATED IN ACCORDANCE WITH"

B. HIGH STRENGTH BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A490 AND SHALL BE GALVANIZED ORgalvanized PLATED.

C. HOLEs SHALL BE DRILLED AND CUTS SHALL BE PREPARED ON grim WHOLE,随意 SUPPLIES PROVIDE ALL EDGES ARE ROUNDED, METAL SHALL NOT PROJECT BEYOND THE FLARE OF THE PLATE FACE ON BREAK-AWAY PLATES

D. ALL WELDING IS TO BE CONTINUOUS AND IN ACCORDANCE WITH CURRENT AND SPECIFICATIONS. A "KEEPER PLATE" OF TIN (OR GALVANIZED SHEET METAL) FABRICATED TO MATCH BREAK-AWAY PLATE DIMENSIONS BUT WITH HOLES RATHER THAN SLOTS SHALL BE USED TO RESTRAIN BOLT LOOSENING DUE TO WIND VARIATION.

E. DRIVER FEEDBACK SIGN POLE SHALL BE MOUNTED ON THE CITY AND COUNTRY OF DENVER PUBLIC WORKS TRANSPORTATION OPERATIONS., Standard Pedestal pole shall be standard to pole pedestal pole and shall be the 4'' deep pole footing for 10'' pedestal pole (see detail 5 in sheet 16.1.2).

F. BOLTS, U-CLAMPS, NUTS AND METAL WASHERS SHALL BE GALVANIZED OR GALVANIZED PLATED.

2. DESIGN WIND VELOCITY = 90 MPH

3. AS DETERMINED AT EACH SPECIFIC SITE LOCATION, FOR POWER, OTHER SOLAR PANEL OR WIND-WIRE ELECTRICAL CONNECTION SHALL BE MADE.
WHEN FLASHING
RIGHT TURNS
AND
ONLY
BUSES

WHEN FLASHING
RIGHT TURNS
AND
ONLY
BUSES

INSTALLED TO MAST ARM WITH MINIMUM THREE STRUTS ATTACHED BY SADDLE BRACKETS BANDED TO ARM.

SEE INSERT FOR DETAIL

BUS LANE SIGN & SIGNAL FLASHER:
20 WATT ARM DESIGN NTS

BUS FLASHER SIGN & SIGNAL NOTES
1. INSTALL CABLE (2 CONDUCTOR #2 AWG) W/SA TO SIGNAL BOX, PN (BY COOD)
2. FLASHER WORK SHALL BE PERFORMED BY A QUALIFIED SIGNAL CONTRACTOR.
3. INSTALL NEW 12" YELLOW LED FLASHERS (2 EACH)
4. CONTACT TRAFFIC OPERATIONS AT 720-865-4000 FOR SIGN SPECIFICATIONS.
5. POLES SHALL BE FURNISHED AND INSTALLED BY XCEL ENERGY
6. DURING MOUNTING OF SIGN PANEL, NO TRAFFIC WILL BE ALLOWED IN THE AFFECTED LANE
7. LUMINARIE AND LUMINARIE ARM MAY BE PROVIDED AND INSTALLED BY XCEL ENERGY.
YIELD TO
PUSH BUTTON TO TURN ON WARNING LIGHTS

SOLAR PANEL — ENERGY SOURCE

RE-CALCULATE RADIUS NETWORK CONTROLLER (10 M x 10 M x 6 D)

30" X 30" W11-2 STD. YELLOW (Y) PEDESTRIAN CROSSING SIGN

SLOW DOWN 10 MPH
RANKING BAR CLEAR LENSES W/ AMBER LED LIGHTS

1/2" X 3/8" W15-7a SUPPLEMENTAL STD. YELLOW (Y) ARROW PLACARD

INSTALL PEDESTRIAN PUSHBUTTON AND INSTRUCTION SIGN

20-50 FT

STATE LAW

WITHIN CROSSWALK

会使

CONSTRUCT FOUNDATION ACCORDING TO DETAIL S STC 16:1.13.3

SEE DETAIL "A" FOR ROD CIRCLES

30 LBS. BUILDING PAPER GASKET (Typ.)

IPLE-SIDE MOUNTED FLUSH WITH SIDEWALK OR ISLAND

20-50 FT

SITE RZ DRAG TO TURN ON WARNING LIGHTS

36" X 36" P15-3 PEDESTRIAN CROSSING MARKER

SIDE VIEW

FRONT VIEW

30 MPH 440 FT

35 MPH 435 FT

40 MPH 430 FT

POSTED SPEED

SIGNED AND YIELD LINES AT UNSIGNALIZED MIDBLOCK CROSSWALKS

STATE LAW

DRAWN CIRCLE (PER)

ANCHOR BOLT X 2" X 4" NOOK (AS STC A-36 OR A-307)
**Typical Pull or Splice Box**

**Notes:**
1. All pull or splice boxes shall be traffic rated 20,000 PSI minimum.
2. Box dimensions shown are for 2 inch conduits maximum. For conduits larger than 2 inch, refer to N.E.C. Section 314.26a for box size requirements.

**Concrete (Class B) Support Ring**
- Not required when embedded in concrete sidewalk or other suitable concrete pad.

**Section A-A**
- PLAN VIEW
- DEEP GRAVEL BED
- 6" DEEP GRAVEL BED

**Cabinet Component List**
- (A) 30" W x 48" H x 12" D, NEMA 3R Rugged Enclosure with 6" legs anchored to the concrete foundation pad. The back of the cabinet shall be located 6" minimum from the edge of the concrete pad.
- (B) NEMA 1, 120A, 120/240v, 15-30amp load center, size panel schedule. Minimum spaces as required plus a minimum of two available spaces for future use. Install in cabinet with full-size ground, cover, and branch breakers as listed on the schedule.
- (C) Electrically hand lighting contractor furnished with 205-volt coils and number of poles required. Install inside cabinet.
- (D) NEMA 3R 120V photovoltaic control with 3-prong twist-lock receptacle base. Install the base inside the cabinet. The photovoltaic control shall be mounted on top of the cabinet and oriented northwest to minimize the sun's interference.
- (E) 20-AMP GFI MAINT. RECEPTACLE IN A 1-GANG BACK BOX WITH COVER. INSTALL INSIDE THE CABINET.
- (F) 125A, 120/240v, meter housing conformity to the utility provider's requirements.
- (G) NEMA 3R, 10A, 2-pole fused disconnect, UL listed for service equipment and pin fused as shown in one-line diagram with neutral and ground bars mounted on back side of enclosure.
- (H) 16" x 24" COPPER-CLASS DRIVEN GROUND ROOD WITH APPROVED GROUND ROD CLAMP.

**Lighting Control Center (Cabinet)**
- 24" (MIN.) AT 8" O.C. EACH WAY AT MID-DEPTH
- 1/2" CONCRETE SUPPORT RING
- 2" PVC
- CONCRETE SUPPORT RING
- 6" X 28" PULL BOX
- 12" (MIN.) AT 8" O.C. EACH WAY AT MID-DEPTH
- 2" PVC
- TWO 3" PVC

**Control Cabinet & Pull Box Detail**
- DEPARTMENT OF PUBLIC WORKS
- 101 WEST COLUAMNA AVE
- DENVER, CO 80202
- PHONE: (303) 893-3000
- FAX: (303) 893-4044
- Issued By:

**Standard Drawing No.**
- 16I.127

**Sheet No.**
- 37 of 37
TYPICAL CROSSWALK LAYOUT PROCEDURES

1. SETBACK SIDEWALK
   - Mark with chalk lines

2. SETBACK SIDEWALK ONE SIDE ATTACHED SIDEWALK OTHER SIDE
   - Align with curb
   - Center on sidewalk
   - Mark with chalk lines

3. ATTACHED SIDEWALK 5 TO 15' CORNER RADIUS
   - Mark with chalk lines
   - Align with curb
   - Line extended

4. ATTACHED SIDEWALK 20' TO 30' CORNER RADIUS
   - 5' from curb - line extended (typ.)
   - Mark with chalk lines

5. ATTACHED SIDEWALK WIDER THAN 10'
   - Mark with chalk lines

6. WELL-BLOCK CROSSWALK
   - Mark with chalk lines

7. INSTALL STOP LINE 6' IN ADVANCE OF AND PARALLEL TO THE NEAREST CROSSWALK LINE UNLESS OTHERWISE SHOWN
   - Drawn to be similar to adjacent street

NOTES:

1. CROSSWALK BAR DIMENSIONS
   - 12"

   USE 18" WIDTH FOR CROSSWALK BARS.

2. KEEP BARS PARALLEL TO LANE LINES EVEN IF THE CROSSWALK IS SHINED. (SEE EXAMPLE FAR LEFT)

3. ALL BARS IN EACH CROSSWALK MUST BE SAME WIDTH.

4. ADJUST TRANSPARENCY ALIGHTMENT IF NECESSARY TO ALIGN PROPERLY WITH PEDESTRIAN RAMPS. CROSSWALKS SHOULD CENTER ON PEDESTRIAN RAMPS WHEN POSSIBLE.

5. CROSSWALKS SHOULD NOT EXTEND PAST THE CURB LINE OF ADJACENT ROADS.
**TYPICAL PAVEMENT MARKING EXAMPLES**

**PAVEMENT MARKING LEGEND AND NOTES**

A. TRAFFIC LANE PAVEMENT MARKINGS

- **Epoxy Pavement Marking Material Shall Be Used.**
- **Unspecified Pavement Marking Material Shall Be Used.**

**ROCKET ROCKERY 2023**

- **Signal-Protected Turn Lane (Cable)**
- **Pavement Marking Material Shall Be Used for Turn Lanes.**
- **Unspecified Pavement Marking Material Shall Be Used.**

**FOR RIGHT TURN OR LEFT TURN DROP LANE**

- May be extended on posted speed limits.
- Design of turn lane.

**TURN LANE PAVEMENT MARKING PLACEMENT**

- **Based on length of turn pocket.**
- **Refer to turn lane table (see Fig. A).**
- **Based on length of turn pocket.**

**CROSSWALK MARKINGS - MATERIAL SHALL BE REFLECTED PRISMATIC**

- **White, 3/8" thick, with reflective strip.**
- **6" wide, 3" thick, with reflective strip.**
- **24" wide, 1/2" thick, with reflective strip.**

**NOTE:**

- **Any isolated pavement marking quantities shall include removal of any conflicting, previous, or decorative markings as necessary.**
- **All other provisions of City and County of Denver Standards and Specifications.**
- **State and Federal Standards for Road and Bridge Construction.**
- **State Department of Highways, State of Colorado, current edition.**

**NOTES:**

1. Recommended for CBD and at decorative crosswalk locations.
2. The spacing in Fig. A applies to left and right turn lanes.
3. When one (1) arrow is used, it shall be placed at the beginning of the full width turn lane. Otherwise, use Fig. A for arrow placement.
TYPICAL CENTRAL BUSINESS DISTRICT

PAVEMENT MARKING LEGEND AND NOTES

A. TRAFFIC LANE MARKINGS - MATERIAL SHALL BE EPOXY MARKING MATERIAL, UNLESS OTHERWISE SPECIFIED:
   - 2" SKIP WHITE LANE LINE, 10' LANE, 30' GAP
   - 4" SOLID WHITE RIGHT EDGE LINE OR TURN LANE LINE

B. CROSSTOPI MARKINGS - MATERIAL SHALL BE REFLECTORIZED PREFORMED THERMO-PLASTIC FULL WIDTH WITHOUT SEAMS, UNLESS OTHERWISE SPECIFIED:
   - 5" WHITE PARALLEL CROSSTOPI LINE
   - 4" WHITE STOP LINE ONLY WHEN SHOWN ON PLANS.

C. ANY FATAL PAINTING MARKINGS SHALL INCLUDE REMOVAL OF ANY CONFL UENT PREOXS OR DETOUR MARKINGS AS NEEDED.

D. ALL PAINTING TO BE MADE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" STATE DEPARTMENT OF HIGHWAYS, STATE OF COLORADO, CURRENT EDITION SHALL APPLY.

E. ALL PAINTINGS SHALL BE BY SPRAYING, SANDING OR WATER-BLASTING METHODS PROVIDED THAT THE PAINT SURFACE SHALL NOT BE MATERIally DAMAGED THE PAINTING MARKINGS SHALL NOT BE VISIBLE UNDER ANY CONDITIONS.

TURN LANE LINE SHOULDL INTERSECT THE LANE LINE WHICH WILL PROVIDE THE TURN LANE WITH TWO LANES, GOING AWAY FROM THE INTERSECTION, EXCEPT WHERE ONLY TWO THROUGH LAKES ARE AVAILABLE.
SPEED LIMIT 30

**NOTE:**
- All signs shall be fabricated from ASTM Type X, 40x20 Series skin facing sheeting material. All signs are 0.012 gauge, 800-175 or 800-400 aluminum alloy, treated with Alconine 1200 conversion coating. 3/8 inch diameter holes punched, centered on top and bottom, horizontal axis with standard 1/2 inch radius corners. All signage shall be accompanied with a hazard component system. Acrylic film that matches the warranty of the base reflective sheeting. Ink shall not be permitted for imaging.

**Roadside Sign Installation**
- Use with regulatory signs, warning signs, guide signs, neighborhood watch signs, other non-parking signs, and vehicle-parking signs.

**Details:**
1. **Detail 1:** Mounted in soil/vegetation.
2. **Detail 2:** Mounted at sidewalk/landscape.
3. **Detail 3:** Slope flowfill to drain.

**NOTE:**
- Posts should be installed to provide 4 feet of minimum clear width along existing sidewalk path for ADA compliance.

**Computer File Information**
- **Drawing File Name:** [Redacted]
- **Category:** [Redacted]
- **Scale:** [Redacted]

**Department of Public Works**
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**Standard Drawing No.** 18.2.5

**Sheet No:** 06 of 17
STANDARD SIGN PLACEMENT FOR STOP CONTROLLED INTERSECTIONS ALONG (EAST—WEST) ONE WAY STREETS

NOTES:
1. ONE WAY AND STREET NAME SIGNS SHOULD BE INSTALLED WITH BACK TO BACK SIGN PANELS.
   (STOP SIGNS ARE NOT REQUIRED TO BE BACK TO BACK — SEE SHEET 16.2.12)

STANDARD SIGN PLACEMENT FOR STOP CONTROLLED INTERSECTIONS ALONG (NORTH — SOUTH) ONE WAY STREETS
MOUNTING DETAIL FOR ADDING SIGNS TO EXISTING UTILITY POLES

PLAN VIEW

1/4" GALVANIZED STRAPING
STEEL, ALUMINUM
OR WOOD POLE

SIGN MOUNTING SAUCER BRACKET

SIGN

1/4" GALVANIZED STRAPING
CONNECT ENDS TOGETHER WITH THRU SHEETS OR 10-24 x 3/4" PAN HEAD SCREWS W/ 3/4" WASHERS AND NYLON LOCK NUTS (TYP 4 PLACES).

ATTACH SIGNS WITH 5/8" x 2 1/2" BOLTS AND NUTS (TYP 4 PLACES) USE POP RIVETS WHEN AVAILABLE TO REDUCE LIKELIHOOD OF SIGNS BEING STOLEN.

1 1/4" SQUARE TELESPOP INSERT (OR EQUAL) USE WHEN SIGNS ARE TO BE ADDED TO AN EXISTING POST.

6" INSERT INTO MAIN POST SECURED WITH THRU BOLT AND NUT (1 PLACE).

2" SQUARE TELESPOP MAIN POST (POST MAY BE EXTENDED TO INSTALL STREET NAME SIGNS).

TOP = NORTH-SOUTH (STREETS) (E-W BLOCK NUMBERS).

BOTTOM = EAST-WEST (AVENUES) (N-S BLOCK NUMBERS).

NOTE:
1. STREET NAME SIGN ASSEMBLIES TO BE PLACED ABOVE STOP SIGNS PER FOLLOWING CRITERIA:
   - 1 ASSEMBLY PER LOCAL/LOCAL INTERSECTION
   - 2 ASSEMBLIES PER ALL OTHER STOP CONTROLLED INTERSECTIONS (LOCAL/COLLECTOR, LOCAL/ARTERIALS, ETC.)
All text shall utilize standard Highway Gothic Font or approved equivalent. Letter sizes will vary depending on number of letters in street name. Note: stroke width of letters shown on this drawing is for illustrative purposes only and is not intended to represent correct stroke width for specified letter series or letter to letter spacing.

NOTES:
1. All sign plates shall be 0.08 inch thick aluminum with rounded corners (1/2 inch radius on outside corners, and 7/8 inch radius on inside corners). Sign plates are to be pre-drilled with 3/8 inch holes located in the center of the sign plate and .5 inches from the top and bottom edges (measured to center of hole).
2. All sign posts for installing street name signs shall be minimum 2.0 inch by 2.0 inch square steel posts with pre-drilled mounting holes.
3. All mounting bolts shall be zinc or cadmium plated.
4. All street name signs shall be mounted so as to have 7.0 feet minimum vertical clearance above sidewalk.
5. Street name signs may be installed above existing stop signs or one-way signs on utility pole with the condition that street name sign mounting height does not exceed 12.0 feet above grade.
6. All sign face sheeting material shall be reflectorized and applied to one side of sign blank only. Sheet material shall comply with F.H.A. standards established for A.S.M.E. Type 3 sheeting. A high-intensity sheeting with encapsulated lens (4-inch intensity grade). All manufacturers standards for surface preparation, sheeting adhesion, and edge sealing shall be met.
7. A minimum 10-year manufacturer's warranty for the retro-reflectivity and performance of the sign face sheeting materials shall be provided to the city traffic engineer.
8. The prefix 'E' and 'W' (for streets east and west of Broadway) and 'N' and 'S' (for streets north and south of Colfax Avenue) shall be used on all street name signs. The prefix shall be centered between the Denver "D" logo and the street name.
9. On numbered streets, the suffix following the number shall be lower case letters.

GROUND MOUNT STREET NAME SIGN DETAIL

DEPARTMENT OF PUBLIC WORKS

STANDARD DRAWING NO.

16-2.10

MOW.
Sheet No. 11 of 17
NOTES:
1. STREET NAME TEXT SHALL BE 2.75 POINT HIGHWAY "C" FONT.
2. ALL OTHER TEXT SHALL BE 2.75 POINT HIGHWAY "C" FONT.
BASE RAIL ARRAY

NOTES:
1. PREVENTED U'S MAY BE INSTALLED IN ONE BASE RAIL ARRAY.
2. THE BASE RAIL ARRAY DESCRIBED IN THIS DETAIL IS INTENDED FOR BELOW THE CURB BIKE CORRAL APPLICATIONS.

MOUNTING:
1. BASE RAIL ARRAY SHALL BE MOUNTED TO ASPHALT USING 4" X 6" ANCHOR BOLTS, SPACED EVENLY ALONG THE BASE PLATE AS NECESSARY TO SECURE.

LOCATION SPECIFIC GUIDELINES:
1. STREET CLASSIFICATION
   - ALLOWED ON CENTRAL BUSINESS DISTRICT DOWNTOWN STREETS.
   - ALLOWED ON COLLECTOR STREETS THAT ARE DESIGNATED BIKEWAYS.
   - ALLOWED ON LOCAL STREETS.
2. SIDEWALK WIDTH
   - ALLOWED BELOW THE CURB WHEN ADJACENT SIDEWALK IS LESS THAN 1.0 FEET WIDE OR THE INSTALLATION OF BIKE PARKING WOULD OBSTRUCT PEDESTRIAN TRAVEL (SIDEWALK WIDTH DEFINED AS BACK OF CURB TO ADJACENT BUILDING WALL).

SITE specific GUIDELINES:
1. RTD STOP (MEASURED FROM THE RTD SIGN FLAG)
   - 20 FEET AHEAD OF SIGN
   - 40 FEET BEHIND SIGN
2. VEHICLE ACCESS (CURB CUT, DRINKWAY, INTERSECTION, ALLEYWAY)
   - DO NOT INFRINGE RIGHT TRIANGLE
3. FIRE HYDRANT
   - 15 FEET FROM FIRE HYDRANT
4. HIGH INFRASTRUCTURE - 5 FEET FROM
   - POLICE/FIRE CALL BOX, EMERGENCY FACILITY, TRAFFIC CONTROL CABINETS, UTILITY BOX COVERS, MANHOLE COVERS, VALVE BOX COVERS
5. CURB LANE USES - DO NOT COMPLETE
   - INCLUDES LOADING ZONES, CAR SHARE, VALET, ADA, OTHER PERMITTED USES.

DEPARTMENT OF PUBLIC WORKS
BIKE RACK BASE RAIL INSTALLATION DATA
STANDARD DRAWING NO. 16.2.10
Sheet No. 17 of 17