# Standard Drawing Index

City of Columbus, Ohio  
Department of Public Service  
Division of Design and Construction

Reference Index of Standard Construction Drawings  
[4000-4409]

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NOTES:

1. CONDUIT THAT IS DRILLED/DIRECTIONALLY BORED SHALL BE (725.052, EPEC-80-HDPE) OR 725.20 SCHEDULE 80. JACKED CONDUIT SHALL BE RIGID METAL CONDUIT (725.04).

2. THE CONTRACTOR WITH THE APPROVAL OF THE ENGINEER OR AT THE DIRECTION OF THE PLANS OR THE ENGINEER SHALL POTHOLE THE PROPOSED JACKING/BORED AREA.

3. FOR TRAFFIC SIGNAL CONDUIT BANK AND CONDUIT SEE CITY OF COLUMBUS STANDARD DRAWING 4001.
*NOTE: "W" IS WIDTH OF CONDUIT.

**USE AS DIRECTED.

CONCRETE COVER VARIES. SEE STD DWG 4001.

CONCRETE - CLASS C
- MEDIUM SET**
- FAST SET**

BEND CONDUIT AND SPACER USING GALVANIZED WIRE

3" MIN.

TRENCH SECTION
CONCRETE ENCASED CONDUIT

10'-0" STANDARD CONDUIT

2'-6" MAX.

5'-0" INTERVALS

2'-6" MAX.

BOTTOM OF TRENCH

SPACER

COUPLING

SIDE ELEVATION
CONCRETE ENCASED CONDUIT

ROADWAY
CONDUIT
STANDARDS
**ENCASED CONDUIT**

**TRAFFIC SIGNAL CONDUIT BANK STANDARDS**

*TRENCH DEPTH MAY VARY PER PLAN DETAILS*

**NOTE:**

SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.
CONDUIT BANK

TOP OF FINISHED SURFACE

18" TRENCH MAX.
17" MIN.

(1)-1.5” CONDUIT W/TRACING WIRE

13” MIN.

36”*

CONDUIT WRAPPED W/GALVANIZED WIRE EVERY FIVE FEET

8.5”

CONCRETE ENCASEMENT

5” SPACER SEPARATION ALONG CONDUIT RUN

TWO 2” & ONE 1.5” CONDUIT BANK
WITH 3” CONCRETE ENCASEMENT
(4-3/8” CENTER-CENTER CONDUIT SEPARATION)

TOP OF FINISHED SURFACE

18” TRENCH MAX.
36”*

17” MIN.

(1)-1.5” CONDUIT W/TRACING WIRE

15” MIN.

9.5”

CONCRETE ENCASEMENT

5” SPACER SEPARATION ALONG CONDUIT RUN

TWO 3” & ONE 1.5” CONDUIT BANK
WITH 3” CONCRETE ENCASEMENT
(5-1/2” CENTER-CENTER CONDUIT SEPARATION)

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

NOTE:
SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.
**CONDUIT BANK**

**TRAFFIC SIGNAL CONDUIT BANK STANDARDS**

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

**NOTE:**

SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.
FIVE 2" & ONE 1.5" CONDUIT BANK
3" CONCRETE ENCASEMENT - TYPE 1
(4-3/8" CENTER-CENTER CONDUIT SEPARATION)

FIVE 2" & ONE 1.5" CONDUIT BANK
3" CONCRETE ENCASEMENT - TYPE 2
(4-3/8" CENTER-CENTER CONDUIT SEPARATION)

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

NOTE:
SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.
CONDUIT BANK

TRAFFIC SIGNAL CONDUIT BANK STANDARDS

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4001

8/01/2015

CITY ENGINEER

SHT 5 OF 9

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

NOTE:
SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.

(LOOKING UP STATION)
FOUR 3", TWO 2" & ONE 1.5" CONDUIT BANK
3" CONCRETE ENCASEMENT - TYPE 1
(5-1/2" CENTER-CENTER CONDUIT SEPARATION)

(LOOKING UP STATION)
FOUR 3", TWO 2" & ONE 1.5" CONDUIT BANK
3" CONCRETE ENCASEMENT - TYPE 2
(5-1/2" CENTER-CENTER CONDUIT SEPARATION)
CONDUIT BANK

TRAFFIC SIGNAL CONDUIT BANK STANDARDS

NOTES:

ARRANGEMENT OF MULTICELL CONDUIT SHALL BE DETERMINED BY DESIGN.

SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.

* TRENCH DEPTH MAY VARY PER PLAN DETAILS
**CONDUIT BANK**

**TRAFFIC SIGNAL CONDUIT BANK STANDARDS**

NOTES:

ARRANGEMENT OF MULTICELL CONDUIT SHALL BE DETERMINED BY DESIGN.

SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4001

8/01/2015

CITY ENGINEER

SHT 7 OF 9
CONDUIT BANK

TOP OF FINISHED SURFACE

24" TRENCH MAX.

17" MIN.

23.5" MIN.

36" *

5' SPACER SEPARATION ALONG CONDUIT RUN

CONDUIT WRAPPED W/GLAZVANIZED WIRE EVERY FIVE FEET

(1)-1.5" CONDUIT W/TRACING WIRE

CONCRETE ENCASEMENT

SIX 4" & ONE 1.5" CONDUIT BANK
3" CONCRETE ENCASEMENT
(6-1/2" CENTER-CENTER CONDUIT SEPARATION)

* TRENCH DEPTH MAY VARY PER PLAN DETAILS

NOTES:

ARRANGEMENT OF MULTICELL CONDUIT SHALL BE DETERMINED BY DESIGN.

SMALLER DIAMETER CONDUITS MAY NEED WRAPPED SEPARATELY.
INTERCONNECT / TRAFFIC SIGNAL CONDUIT AND TRAFFIC SIGNAL POWER CONDUIT
WITH 3" CONCRETE ENCASEMMENT
MINIMUM DUCT BANK SEPARATION

* TRENCH DEPTH MAY VARY PER PLAN DETAILS
CONDUIT PARALLEL TO GUARDRAIL

CONDUIT GUARDRAIL PROTECTION

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

NOTES:

1. CONDUIT PLACED PARALLEL TO GUARDRAIL AND WITH AN OFFSET BETWEEN 5' AND 8' SHALL BE ENCASED. CONDUIT MAY NOT BE PLACED CLOSER THAN 5' WHEN PARALLEL TO GUARDRAIL.

2. CONDUIT ENCASEMENT SHALL EXTEND A MINIMUM OF 10' PAST THE LAST GUARD RAIL POST.
CONDUIT CROSSING GUARDRAIL

GUARDRAIL POST (TYP.)

FINISH GRADE

3" CONCRETE ENCASEMENT

CONDUIT W/ 3" ENCASEMENT

10' (MIN.)

TOP VIEW

SECTION A-A

X = POST SPACING AS DEFINED BY THE OHIO DEPARTMENT OF TRANSPORTATION STANDARD CONSTRUCTION DRAWING MGS 2.1

CONDUIT GUARDRAIL PROTECTION

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4002

5/01/2014

SHT 2 OF 2
NOTES:

1. AFTER THE CONDUITS HAVE BEEN INSTALLED, ANY OPENING IN THE PULL BOX WALL SHALL BE COMPLETELY FILLED WITH MORTAR OR CONCRETE AND FINISHED FLUSH WITH THE INSIDE PULL BOX WALL. (NO VOIDS)

2. PULL BOX DRAINS IN ACCORDANCE WITH CMSC 603 SHALL BE INSTALLED WHEN SPECIFIED, OR AS DIRECTED BY THE ENGINEER.

3. CONTRACTOR TO VERIFY ROADWAY UNDERDRAIN IS BELOW THE PULL BOX AGGREGATE BEFORE INSTALLING DRAIN.
3/4" DIA. NC THREADED LIFT INSERT OR PRESTRESSED CABLE LIFTING LOOP (4" TO 5" LOOP)

USE CLIP WHEN FRAME QUADRANT AREA IS IN DIRT.

FRAME EDGE

CENTER CASTING ON PULL BOX

KNOCKOUT AREA 12" x 12" (OD DIM.) TYPICAL 4 SIDES

35" O.D.

ANCHOR & CLIP AS REQUIRED

8 EACH, #4 REBAR 26" LONG, GRADE 60 SPACED EACH SIDE OF THE KNOCKOUT (VERTICALLY CENTERED)

TOP VIEW OF CONCRETE PULL BOX

3/4" DIA. LIFT INSERT 5" BELOW TOP OF CONCRETE

MASTIC

11" NOM

ASTM A-185 WELDED WIRE FABRIC (6X6, W2.9 x W2.9)

MASTIC

30" LIFTING LOOP

12" OD

12" OF #57 COMPACTED AGGREGATE

REMOVE WIRE MESH IN KNOCKOUT AREA CENTER DUCTS IN KNOCKOUT

4" HEAVY DUTY FRAME WITH SOLID LID WITH WORD "TRAFFIC" IN LID & PICK HOLE. (MEETS ASTM A48 CLASS 35B SPECS)

3/8"x4" (NOM.) SSLT WEDGE ANCHOR, WASHER AND NUT WITH CLIP. FIELD DRILL ANCHOR HOLE IN CONCRETE PULL BOX. ANGLE WEDGE ANCHOR TO MISS THE WELDED WIRE FABRIC.
2" RAISED LETTERS
FLUSH W/TOP SURFACE

4" HEAVY DUTY FRAME WITH SOLID LID WITH
WORD "TRAFFIC" IN LID & PICK HOLE.
(MEETS ASTM A48 CLASS 35B SPECS)

1 1/2"
3 1/2"
2 1/2"
1"

CASTING INSTALLATION: USE
THIS SIDE UP WHEN CASTING
IS FULLY OR PARTIALLY
ENCASED IN ASPHALT OR
CONCRETE.

FRAME AND COVER DETAIL

4" 1 1/2"
26 1/4"
25 1/4"
1/2"
23 1/2"
25 3/8"
29 1/2"
5/8"

1/2" STAINLESS STEEL
(UNC) GROUND BOLT
FIELD DRILL AND TAP
27/64" HOLE

BONDING WIRE

GROUND BOLT INSTALLATION DETAIL

NON-INSULATED ONE
HOLE TIN PLATED
COPPER COMPRESSION
TERMINAL, UL LISTED
AND APPROVED FOR #4
AWG COPPER WIRE

PULL BOX
27"

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4021

5/01/2014

CITY ENGINEER
SHT 2 OF 3
NOTES:

ONE COAT OF WATER REPELLENT SEALER (SEE CITY OF COLUMBUS QUALIFIED PRODUCTS LIST) SHALL BE APPLIED TO THE INSIDE & OUTSIDE OF THE PULL BOX.

CONCRETE SHALL HAVE AIR ENTRAPMENT OF 6% ± 2% AND SHALL HAVE 4500 PSI STRENGTH AT 28 DAYS.

LID RING LOAD TRANSFER IS TO BE DISTRIBUTED BY USE OF A PREFORMED MASTIC JOINT MATERIAL.

CUT OFF CONDUITS SO THEY EXTEND NO MORE THAN THREE INCHES BEYOND THE INSIDE PULL BOX WALL AND PROVIDE BUSHINGS.

WHENEVER POSSIBLE, CONDUITS SHOULD ENTER THE PULL BOX VIA A KNOCKOUT. WHEN APPROVED BY THE DIVISION OF DESIGN AND CONSTRUCTION PERSONNEL, CONDUITS MAY ENTER THE PULL BOX THROUGH ITS WALL ONLY IF THE OPENING IS SAWN OR CORE DRILLED.

THE WEDGE ANCHOR ASSEMBLY SHALL BE OMITTED WHENEVER THE ENTIRE AREA ABOVE THE KNOCKOUT (1/4 OF THE CASTING) IS EITHER ENCASED IN CONCRETE OR ASPHALT. THE ENCASEMENT SHALL BE CENTERED AROUND THE KNOCKOUT.

ENLARGING THE KNOCKOUT AREA IF REQUIRED SHALL BE DONE BY SAW CUTTING THE CONCRETE. NO OTHER METHOD IS ALLOWED. CONTRACTOR SHALL REPLACE THE CONCRETE HOUSING IF DAMAGED AT HIS EXPENSE.

AFTER THE CONDUITS HAVE BEEN INSTALLED, ANY OPENING IN THE PULL BOX WALL SHALL BE TOTALLY FILLED WITH MORTAR OR CONCRETE AND FINISHED FLUSH WITH THE INSIDE PULL BOX WALL. (NO VoidS)

PULL BOX BEARING CAPACITY TO EXCEED 40,000 POUNDS.

ANY CONDUIT THAT EXITS A PULL BOX, AND DIRECTLY ENTERS ANY ELECTRONIC CABINET, SHALL BE DUCT SEALED IN THE PULL BOX.

THE CONTRACTOR SHALL INSTALL NON-ORGANIC FIBERGLASS PULL TAPE WITH A MINIMUM 1800 FT./LBS TENSION STRENGTH IN CONDUIT TO FACILITATE CABLE PLACEMENT.

ALL UNUSED CONDUITS SHALL BE CAPPED AND THE CAPS SECURED TO THE CONDUITS WITH TAPE.
**TOP VIEW OF CONCRETE PULL BOX**

- **3/4" DIA. LIFT INSERT**
- **5" BELOW TOP OF CONCRETE**
- **MASTIC**
- **12" NOM**
- **32" OD**
- **0.5"x5.5" (NOM.) SSLT WEDGE ANCHOR, WASHER AND NUT WITH CLIP. FIELD DRILL ANCHOR HOLE IN CONCRETE PULL BOX.**
- **LIFTING LOOP**
- **ASTM A-185 WELDED WIRE FABRIC (6X6, W2.9 x W2.9)**
- **REMOVE WIRE MESH IN KNOCKOUT AREA**
- **CENTER DUCTS IN KNOCKOUT**

**SECTION X-X PULL BOX WITH FRAME AND LID**

- **12" OF #57 COMPACTED AGGREGATE**

**THE CLIP SHALL BE MADE FROM A36 METAL, HD GALV (ASTM A123) AND IN THE SHAPE SHOWN.**

**CLIP PROFILE (NOM. VALUES)**

- **1" TO 1.25"**
- **0.7"**
- **0.6"**
- **1.5"**
- **0.25"**
- **3.8"**
- **2.6"**
- **1.25"**

**PULL BOX**

**32"**

**CITY OF COLUMBUS, OHIO**
**DEPARTMENT OF PUBLIC SERVICE**
**DIVISION OF DESIGN AND CONSTRUCTION**
**STD DWG 4022**

5/01/2014
SHT 1 OF 3
4" HEAVY DUTY FRAME WITH SOLID LID WITH WORD "TRAFFIC" IN LID & PICK HOLE.
(MEETS ASTM A48 CLASS 35B SPECS)

2" RAISED LETTERS FLUSH W/TOP SURFACE

(1) OPEN PICK HOLE
OPEN PICK HOLE
(EXTRA MATERIAL UNDERNEATH IS SQUARED OFF)

3 1/2"
1"
1 1/2"

34 1/4"
34 5/8"
34 5/8"
35 5/8"
4"
1 1/2"
1/2"
32 1/2"
38 1/2"

FRAME AND COVER DETAIL

GROUNDBOLT INSTALLATION DETAIL

NON-INSULATED ONE HOLE
TIN PLATED COPPER
COMPRESSION TERMINAL,
UL LISTED AND APPROVED
FOR #4 AWG COPPER WIRE

1/2" STAINLESS STEEL
(UNC) GROUND BOLT
FIELD DRILL AND TAP
27/64" HOLE
BONDING WIRE

PULL BOX
32"

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4022

5/01/2014

CITY ENGINEER

SHT 2 OF 3
NOTES:

ONE COAT OF WATER REPELLENT SEALER (SEE CITY OF COLUMBUS QUALIFIED PRODUCTS LIST) SHALL BE APPLIED TO THE INSIDE AND OUTSIDE OF THE PULL BOX.

CONCRETE SHALL HAVE AIR ENTRAPMENT OF 6% ± 2% AND SHALL HAVE 4500 PSI STRENGTH AT 28 DAYS. CONCRETE MATERIALS SHALL MEET ODOT SPECIFICATIONS. STANDARD PLACEMENT FOR WIRE MESH & REBAR SHALL BE USED.

LID RING LOAD TRANSFER IS TO BE DISTRIBUTED BY USE OF A PREFORMED MASTIC JOINT MATERIAL.

CUT OFF CONDUITS SO THEY EXTEND NO MORE THAN THREE INCHES BEYOND THE INSIDE PULL BOX WALL AND PROVIDE BUSHINGS.

WHENEVER POSSIBLE, CONDUITS SHOULD ENTER THE PULL BOX VIA A KNOCKOUT. WHEN APPROVED BY THE DIVISION OF DESIGN AND CONSTRUCTION PERSONNEL, CONDUITS MAY ENTER THE PULL BOX THROUGH ITS WALL ONLY IF THE OPENING IS SAWN OR CORE DRILLED.

THE WEDGE ANCHOR ASSEMBLY SHALL BE OMITTED WHENEVER THE ENTIRE AREA ABOVE THE KNOCKOUT (1/4 OF THE CASTING) IS EITHER ENCASED IN CONCRETE OR ASPHALT. THE ENCASEMENT SHALL BE CENTERED AROUND THE KNOCKOUT.

AFTER THE CONDUITS HAVE BEEN INSTALLED, ANY OPENING IN THE PULL BOX WALL SHALL BE TOTALLY FILLED WITH MORTAR OR CONCRETE AND FINISHED FLUSH WITH THE INSIDE PULL BOX WALL. (NO VOIDS)

PULL BOX BEARING CAPACITY TO EXCEED 40,000 POUNDS.

ENLARGING THE KNOCKOUT AREA IF REQUIRED SHALL BE DONE BY SAW CUTTING THE CONCRETE. NO OTHER METHOD IS ALLOWED. CONTRACTOR SHALL REPLACE THE CONCRETE HOUSING IF DAMAGED AT HIS EXPENSE.

ANY CONDUIT THAT EXITS A PULL BOX, CONTAINS CABLE AND DIRECTLY ENTERS ANY ELECTRONIC CABINET, SHALL BE DUCT SEALED IN THE PULL BOX.

THE CONTRACTOR SHALL INSTALL NON-ORGANIC FIBERGLASS PULL TAPE WITH A MINIMUM 1800 FT./LBS TENSION STRENGTH IN CONDUIT TO FACILITATE CABLE PLACEMENT.

ALL UNUSED CONDUITS SHALL BE CAPPED AND THE CAPS SECURED TO THE CONDUITS WITH TAPE.
PULL BOX TOP SECTION DETAIL

3 - #5 DIAGONAL, BOTH SIDES (TIE BELOW), 1.5" CLR.

34" DIA OPENING

3 - #5 DIAGONAL, BOTH SIDES (TIE BELOW), 1.5" CLR.

GROUND BOLT

10''

14''

PULL BOX TOP SECTION DETAIL

#4 BARS VERTICAL (TYP. OF 8)

#57 COMPACTED AGGREGATE

CLIP WITH ANCHOR (TYP. OF 4, AS NEEDED)

1 SHEET 3 x 8 W3 x W2 STEEL MESH

2.5" DIA DRAIN HOLE

14"W x 18"H KNOCKOUT 18" UP F.O.B. (TYP. OF 4)

LIFTERS (TYP.)

4" HEAVY DUTY FRAME WITH SOLID LID WITH WORD "TRAFFIC" IN LID & PICK HOLE (MEETS ASTM A48 CLASS 35B SPECS)

0.5" x 5.5" (NOM.) SSLT WEDGE ANCHOR, WASHER AND NUT WITH CLIP. FIELD DRILL ANCHOR HOLE IN CONCRETE PULL BOX.

MASTIC

1 SHEET 3 x 8 W3 x W2 STEEL MESH

REMOVE WIRE MESH IN KNOCKOUT AREA

#5 @ 9" O.C., E.W.

6.5"

56" 60"

MASTIC

48" ID

58" OD

70" DIA.

#57 COMPACTED AGGREGATE

SECTION X-X
PULL BOX WITH FRAME AND LID

TYPE 1

THE CLIP SHALL BE MADE FROM A36 METAL, HD GALV (ASTM A123) AND IN THE SHAPE SHOWN.

CLIP PROFILE
(NOM. VALUES)

0.7"

1"

0.6" 1.25"

0.25"

0.25"

3.8"

2.6"

1.25"

CLIP PROFILE
(NOM. VALUES)

0.7"

1"

0.6" 1.25"

0.25"

0.25"

3.8"

2.6"

1.25"

PULL BOX 48"

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4023

5/01/2014

SHT 1 OF 4

CITY ENGINEER

Zahraa
3 - #5 DIAGONAL, BOTH SIDES (TIE BELOW), 1.5" CLR.

34" DIA OPENING

GROUND BOLT

PULL BOX TOP SECTION DETAIL

THE CLIP SHALL BE MADE FROM A36 METAL, HD GALV (ASTM A123) AND IN THE SHAPE SHOWN.

CLIP PROFILE (NOM. VALUES)

4" HEAVY DUTY FRAME WITH SOLID LID WITH WORD "TRAFFIC" IN LID & PICK HOLE (MEETS ASTM A48 CLASS 35B SPECS)

0.5" x 5.5" (NOM.) SSLT WEDGE ANCHOR, WASHER AND NUT WITH CLIP, FIELD DRILL ANCHOR HOLE IN CONCRETE PULL BOX.

SECTION X-X
PULL BOX WITH FRAME AND LID

TYPE 2*

*USE WHEN PLACING PULL BOX OVER EXISTING CONDUITS

Mastic 4"
4" HEAVY DUTY FRAME WITH SOLID LID WITH WORD "TRAFFIC" IN LID & PICK HOLE. (MEETS ASTM A48 CLASS 35B SPECS)

2" RAISED LETTERS FLUSH W/TOP SURFACE

(1) OPEN PICK HOLE OPEN PICK HOLE (EXTRA MATERIAL UNDERNEATH IS SQUARED OFF)

1 1/2"

3 1/2"

1"

TRAFFIC

FRAME AND COVER DETAIL

4" 1 1/2"

35 5/8"

34 5/8"

34 1/4"

1/2"

32 1/2"

34 5/8"

38 1/2"

GROUND BOLT

1/2" STAINLESS STEEL (UNC) GROUND BOLT FIELD DRILL AND TAP 27/64" HOLE

BONDING WIRE

GROUND BOLT INSTALLATION DETAIL

NON-INSULATED ONE HOLE TIN PLATED COPPER COMPRESSION TERMINAL, UL LISTED AND APPROVED FOR #4 AWG COPPER WIRE

PULL BOX 48"

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4023

5/01/2014

SHT 3 OF 4
NOTES:

ONE COAT OF WATER REPELLENT SEALER (SEE CITY OF COLUMBUS QUALIFIED PRODUCTS LIST) SHALL BE APPLIED TO THE INSIDE AND OUTSIDE OF THE PULL BOX.

CONCRETE SHALL HAVE AIR ENTRAPMENT OF 6% ± 2% AND SHALL HAVE 4500 PSI STRENGTH AT 28 DAYS. CONCRETE MATERIALS SHALL MEET ODOT SPECIFICATIONS.

LID RING LOAD TRANSFER IS TO BE DISTRIBUTED BY USE OF A PREFORMED MASTIC JOINT MATERIAL.

CUT OFF CONDUITS SO THEY EXTEND NO MORE THAN THREE INCHES BEYOND THE PULL BOX WALL AND PROVIDE BUSHINGS WHENEVER POSSIBLE, CONDUITS SHOULD ENTER THE PULL BOX VIA A KNOCKOUT. WHEN APPROVED BY THE DIVISION OF DESIGN AND CONSTRUCTION PERSONNEL, CONDUITS MAY ENTER THE PULL BOX THROUGH ITS WALL ONLY IF THE OPENING IS SAWN OR CORE DRILLED.

THE WEDGE ANCHOR ASSEMBLY SHALL BE OMITTED WHENEVER THE ENTIRE AREA ABOVE THE KNOCKOUT (1/4 OF THE CASTING) IS ENCASED IN EITHER CONCRETE OR ASPHALT. THE ENCASMENT SHALL BE CENTERED AROUND THE KNOCKOUT.

AFTER THE CONDUITS HAVE BEEN INSTALLED, ANY OPENING IN THE PULL BOX WALL SHALL BE TOTALLY FILLED WITH MORTAR OR CONCRETE AND FINISHED FLUSH WITH THE INSIDE PULL BOX WALL (NO VOIDS).

PULL BOX BEARING CAPACITY TO EXCEED 40,000 POUNDS.

ENLARGING THE KNOCKOUT AREA, IF REQUIRED, SHALL BE DONE BY SAW CUTTING THE CONCRETE. NO OTHER METHOD IS ALLOWED. THE CONTRACTOR SHALL REPLACE THE CONCRETE HOUSING, IF DAMAGED, AT THEIR EXPENSE.

ANY CONDUIT THAT EXITS A PULL BOX, CONTAINS CABLE AND DIRECTLY ENTERS ANY ELECTRONICS CABINET, SHALL BE DUCT-SEALED IN THE PULL BOX.

THE CONTRACTOR SHALL INSTALL NON-ORGANIC FIBERGLASS PULL TAPE WITH A MINIMUM 1800 FT./LBS TENSION STRENGTH IN CONDUIT TO FACILITATE CABLE PLACEMENT.

ALL UNUSED CONDUITS SHALL BE CAPPED AND THE CAPS SECURED TO THE CONDUITS WITH TAPE.

STANDARD PLACEMENT FOR WIRE MESH AND REBAR SHALL BE USED.
LOOP PULL BOX INSTALLED OVER INTERCONNECT CONDUIT BANK
NOTES:

1. CONDUIT ENTRY AT BASE OF POLE SHOWN IN ANCHOR BASE AND EMBEDDED APPLICATIONS SHALL ONLY BE PERMITTED IF SPECIFIED IN THE CONSTRUCTION PLANS.

2. SEE MESSENGER WIRE DETAILS ON CITY OF COLUMBUS STANDARD DRAWINGS 4330 AND 4331.

3. THESE ARE NOT APPLICABLE FOR POWER SERVICE. SEE CITY OF COLUMBUS STANDARD DRAWING 4052 FOR DETAILS.

4. EXISTING POLE ONLY WITH PRIOR APPROVAL FOR RETRO FIT APPLICATIONS.
ANCOHOR BOLT PATTERN
ANCOHOR BOLT PROJECTS 2.75" ABOVE BASE

(4) 3/4" x 40'-8 NC GALV STEEL ANCHOR BOLTS, ASTM A576, 50k PSI MINIMUM YIELD, TOP 10" GALV PER ASTM A153, "L" SHAPED (4"L)
(4) 8 NC GALV STEEL HEX NUTS
(4) GALV STEEL LOCKWASHERS

PLATE PEDESTAL BASE

5' PEDESTAL HEIGHT

PUSHBUTTON

42" PUSHBUTTON MOUNTING HEIGHT

13 3/4"

NOTES:

1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. THE POLE SHAFT SHALL BE 46.75" WITH A DIAMETER OF 4" NPT (4.5" OD, SCH 40), & SHALL BE THREADED FOR INSERTION INTO THE BASE.

3. THE 5 FT. STRUCTURE HEIGHT ENCOMPASSES THE BASE HEIGHT PLUS THE INSERTED POLE SHAFT HEIGHT.

4. THE PUSHBUTTON STRUCTURE SHALL BE ALL ALUMINUM.

5. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4163.

6. FOR PUSHBUTTON SIGN DETAILS, SEE CITY OF COLUMBUS STANDARD DRAWING 4230.
10.7' PEDESTAL PEDESTRIAN SIGNAL HEAD MOUNTING

ANCHOR BOLT PROJECTS 2.75" ABOVE BASE
(4) 3/4" x 40'-8 NC GALV STEEL
ANCHOR BOLTS, ASTM A576, 50K PSI MINIMUM YIELD, TOP 10" GALV PER ASTM A153, "L" SHAPED (4"L)
(4) 8 NC GALV STEEL HEX NUTS
(4) GALV STEEL LOCKWASHERS

ANKOR BOLT PATTERN

POLE CAP ALLOY
43, 1/4" 20 NC SS HEX HEAD SCREWS

'C' OR 'J' HOOK

4.5" OD

PED SIGNAL UNITS
CLAMSHELL MOUNTED
(1.4 SQ FT, 25 LBS EACH)

TAPERED ALUM TUBE
(ALLOY 6063-T6, 0.188" WALL)

9' SHAFT

8' TAPERED SECTION

(SEE NOTE 10)

GALV STL CONNECTING HARDWARE
(4) 1"-8 NC x 3.75" HEX HEAD BOLTS
(4) 1"-8 NC HEX NUTS
(4) 1" LOCKWASHERS
(4) 1" FLATWASHERS

6061-T6 ALUM ALLOY 13.13"
COSMETIC PLATE WHEN REQUIRED
BASE FLANGE ALLOY 356-T6
WITH BOLT COVERS & SS 1/4"
20 NC HEX HD SCREWS

(SEE NOTE 4)

(SEE NOTE 6)

42" PUSHBUTTON MOUNTING HEIGHT

12" STRAIGHT SECTION

20"

8"

7" OD

10.25" SQ.

14.5°
1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. PEDESTAL SUPPORTS SHALL BE DESIGNED FOR 90 MPH WINDS, APPROPRIATE GUST FACTOR AND LOADING AS PER PLAN.

3. 4 ANCHOR BOLTS SHALL BE INCLUDED WITH NUTS, LOCK WASHERS AND EIGHT (8) SHIMS.

4. A 20" TRANSFORMER BASE (ALSO KNOWN AS T-BASE) AND ALL CONNECTING HARDWARE SHALL BE FURNISHED WITH EACH PEDESTAL. FOR TRANSFORMER BASE DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4105.

5. THE PEDESTAL SHALL BE FURNISHED AND INSTALLED WITH A POLE SHAFT THAT HAS A COMBINED TAPERED-Straight CROSS-SECTIONAL DESIGN AND A ONE-PIECE CONSTRUCTION WITH NO LONGITUDINAL OR CIRCUMFERENTIAL WELDS EXCEPT FOR THE WELD NEEDED TO ATTACH THE POLE BASE. THE POLE SHAFT SHALL HAVE A ROUND CROSS-SECTIONAL DESIGN.


8. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4163.

9. THE PEDESTRIAN SIGNAL HEAD HOUSING AND CLAM SHELL MOUNTING BRACKETS SHALL BE BLACK MATCHING FEDERAL STANDARD 595B, COLOR # 27038.

10. FOR PEDESTRIAN PUSHBUTTON SIGN DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4230.
12.7' PEDESTAL VEHICULAR SIGNAL HEAD MOUNTING

ANCHOR BOLT PROJECTS 2.75" ABOVE BASE
(4) 3/4" x 40'-8 NC GALV STEEL ANCHOR BOLTS, ASTM A576, 50k PSI MINIMUM YIELD, TOP 10" GALV PER ASTM A153, "L" SHAPED (4"L)
(4) 8 NC GALV STEEL HEX NUTS
(4) GALV STEEL LOCKWASHERS

ANCHOR BOLT PATTERN

GALV STL CONNECTING HARDWARE
(4) 1"-8 NC x 3.75" HEX HEAD BOLTS
(4) 1"-8 NC HEX NUTS
(4) 1" LOCKWASHERS
(4) 1" FLATWASHERS

6061-T6 ALUM ALLOY 13.13" COSMETIC PLATE WHEN REQUIRED BASE FLANGE ALLOY 356-T6 WITH BOLT COVERS & SS 1/4" 20 NC HEX HD SCREWS

POLE CAP ALLOY 43, 1/4" 20 NC SS HEX HEAD SCREWS

11' SHAFT
10' TAPERED SECTION
42" PUSHBUTTON MOUNTING HEIGHT
12" STRAIGHT SECTION
7" OD

(SEE NOTE 9)
(SEE NOTE 4)
(SEE NOTE 6)
(SEE NOTE 8)

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4102
5/01/2014
SHT 1 OF 2
1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. PEDESTAL SUPPORTS SHALL BE DESIGNED FOR 90 MPH WINDS, APPROPRIATE GUST FACTOR AND LOADING AS PER PLAN.

3. 4 ANCHOR BOLTS SHALL BE INCLUDED WITH NUTS, LOCK WASHERS AND EIGHT (8) SHIMS.

4. A 20" TRANSFORMER BASE (ALSO KNOWN AS T-BASE) AND ALL CONNECTING HARDWARE SHALL BE FURNISHED WITH EACH PEDESTAL. FOR TRANSFORMER BASE DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4105.

5. THE PEDESTAL SHALL BE FURNISHED AND INSTALLED WITH A POLE SHAFT THAT HAS A COMBINED TAPERED-Straight CROSs-SECTIONAL DESIGN AND A ONE-PIECE CONSTRUCTION WITH NO LONGITUDINAL OR CIRCUMFERENTIAL WELDS EXCEPT FOR THE WELD NECESSARY TO ATTACH THE POLE BASE. THE POLE SHAFT SHALL HAVE A ROUND CROSs-SECTIONAL DESIGN.


8. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4163.

9. FOR PEDESTRIAN PUSHBUTTON SIGN DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4230.
NOTES:

1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLAN.

2. PEDESTAL SUPPORTS SHALL BE DESIGNED FOR 90 MPH WINDS, APPROPRIATE GUST FACTOR AND LOADING AS PER PLAN.

3. 4 ANCHOR BOLTS SHALL BE INCLUDED WITH NUTS, LOCK WASHERS AND EIGHT (8) SHIMS.

4. A 20" TRANSFORMER BASE (ALSO KNOWN AS T-BASE) AND ALL CONNECTING HARDWARE SHALL BE FURNISHED WITH EACH PEDESTAL. FOR TRANSFORMER BASE DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4109.

5. THE PEDESTAL SHALL BE FURNISHED AND INSTALLED WITH A POLE SHAFT THAT HAS A COMBINED TAPERED-Straight CROSS-SECTIONAL DESIGN AND A ONE-PIECE CONSTRUCTION WITH NO LONGITUDINAL OR CIRCUMFERENTIAL WELDS EXCEPT FOR THE WELD NEEDED TO ATTACH THE POLE BASE. THE POLE SHAFT SHALL HAVE A ROUND CROSS-SECTIONAL DESIGN.


8. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4163.

9. FOR PEDESTRIAN PUSHBUTTON SIGN DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4230.
21' PEDESTAL & VEHICULAR SIGNAL HEAD MOUNTING

ANCHOR BOLT PROJECTS 2.75' ABOVE BASE
(4) 3/4" x 40"-8 NC GALV STEEL
ANCHOR BOLTS, ASTM A576, 50k PSI MINIMUM YIELD, TOP 10" GALV PER ASTM A153, "L" SHAPED (4"L)
(4) 8 NC GALV STEEL HEX NUTS
(4) GALV STEEL LOCKWASHERS

ANCHOR BOLT PATTERN

GALV STL CONNECTING HARDWARE
(4) 1"-8 NC x 3.75" HEX HEAD BOLTS
(4) 1"-8 NC HEX NUTS
(4) 1" LOCKWASHERS
(4) 1" FLATWASHERS

6061-T6 ALUM ALLOY 13.13" COSMETIC PLATE WHEN REQUIRED
BASE FLANGE ALLOY 356-T6
WITH BOLT COVERS & SS 1/4"
20 NC HEX HD SCREWS

(SEE NOTE 4)

(TAPERED ALUM TUBE
(ALLOY 6063-T6, 0.25" WALL)

(SEE NOTE 9)

42" PUSHBUTTON MOUNTING HEIGHT

19'-4" SHAFT

16'-6"

20"

POLE CAP ALLOY
43, 1/4" 20 NC SS
HEX HEAD SCREWS

4.5" OD
(MIN)

'C' OR 'J' HOOK

(SEE NOTE 6)

8" OD

B.C. 14.5" 10.25" SQ.

(SEE NOTE 8)
NOTES:

1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. PEDESTAL SUPPORTS SHALL BE DESIGNED FOR 90 MPH WINDS, APPROPRIATE GUST FACTOR AND LOADING AS PER PLAN.

3. 4 ANCHOR BOLTS SHALL BE INCLUDED WITH NUTS, LOCK WASHERS AND EIGHT (8) SHIMS.

4. A 20” TRANSFORMER BASE (ALSO KNOWN AS T-BASE) AND ALL CONNECTING HARDWARE SHALL BE FURNISHED WITH EACH PEDESTAL. FOR TRANSFORMER BASE DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4105.

5. THE PEDESTAL SHALL BE FURNISHED AND INSTALLED WITH A POLE SHAFT THAT HAS A TAPERED CROSS-SECTIONAL DESIGN AND A ONE-PIECE CONSTRUCTION WITH NO LONGITUDINAL OR CIRCUMFERENTIAL WELDS EXCEPT FOR THE WELD NEEDED TO ATTACH THE POLE BASE. THE POLE SHAFT SHALL HAVE A ROUND CROSS-SECTIONAL DESIGN.


8. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4163.

9. FOR PEDESTRIAN PUSHBUTTON SIGN DETAILS SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4230.
TRANSFORMER BASE

NOTES:

A 13.75" SQUARE BOTTOM SECTION CAN BE WELDED TO THE TRANSFORMER BASE TO PROVIDE A 13" TO 15" BOLT CIRCLE.

TRANSFORMER BASE SHALL BE SUPPLIED WITH A TOP OR RIGHT SIDE HINGED DOOR, SCREW AND 1/2" THICK x 2.5'/2.75" OD GALVANIZED WASHERS.

CONNECTING HARDWARE TO ATTACH SHAFT BASE TO TRANSFORMER BASE SHALL BE SUPPLIED.

TRANSFORMER BASE SHALL ACCEPT 3/4" OR 1" DIAMETER ANCHOR BOLTS.

TRANSFORMER BASE SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4163.

ALUMINUM TRANSFORMER BASE

<table>
<thead>
<tr>
<th>SHAFT SIZE</th>
<th>BASE HEIGHT</th>
<th>TOP SQUARE</th>
<th>BOTTOM SQUARE</th>
<th>TOP BOLT CIRCLE</th>
<th>BOTTOM BOLT CIRCLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7&quot; &amp; 8&quot;</td>
<td>20&quot;</td>
<td>13.13&quot;</td>
<td>15.38&quot;</td>
<td>11&quot;-13&quot;</td>
<td>14.5&quot;</td>
</tr>
</tbody>
</table>

BASE SUPPLIED WITH (8) STEEL WASHERS, 1/2" THICK X 2.5'/2.75" DIA. (WASHERS MECHANICALLY GALVANIZED PER ASTM B454)

STAINLESS STL. PIANO HINGE CENTERED ON DOOR. (USE AS TEMPLATE FOR DRILLING 3/16" DIA. HOLES IN DOOR AND BASE FOR POP RIVETS.)
4.52" I.D. CAST ALUMINUM POLE TOP CAP

4 1/2" DIA. (AT TOP)

PEDESTAL SUPPORT FABRICATED FROM 6063-T4 ALUMINUM TUBE (PEDESTAL ASSEMBLY IS HEAT TREATED TO T6 CONDITION AFTER WELDING)

8'-3 3/4"

10'-8" OVERALL POLE HEIGHT

6.00" DIA. POLE

DECORATIVE BASE (SEE "BASE PLATE DETAIL " & "BASE DETAIL ")

2'-4 1/4"

SECTION A-A
NOTES:

1. PEDESTAL SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. PEDESTAL SUPPORTS SHALL BE DESIGNED FOR 90 MPH WINDS, APPROPRIATE GUST FACTOR AND LOADING AS PER PLAN.

3. FOUR ANCHOR BOLTS SHALL BE INCLUDED WITH NUTS, LOCK WASHERS AND EIGHT (8) SHIMS.


5. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4163.
INSTALL TRAFFIC FLOW MONITOR CABLE IN TOP ARM BRACKET

TAPERED ALUMINUM TUBE (6" O.D.)
.156" WALL ALLOY 6063-T6
OVERALL LENGTH UPPER MEMBER 29'-9 11/16"
OVERALL LENGTH LOWER MEMBER 28'-11"

2\" SCH. 40
PIPE X 8"
6" HORIZONTAL EXTENSION

(SEE NOTE 11)
REMOVABLE END CAPS
2 @ 180°
7'-0"
RISE

28'-0"
26'-6" TAPERED

2\" STRUT
(TYP.)
1'-3"
1'-2 5/16"""""""""""""

1\" X 6 1/2"
SECTION

1/8\" DIA
WEEP HOLE

CAST ALUM. POLE BANDS FITTED TO POLE OD
WITH 1/2\"-13NC STAINLESS STEEL HARDWARE

WARNING: TIGHTEN BRACKET CLAMPS SECURELY TO
PREVENT BRACKET ROTATION & CABLE SHEARING.

TOP CLAMP LOCATION IS ONE (1) FOOT BELOW TOP
OF POLE. CLAMP "10" SHALL BE DESIGNED TO FIT
THE "OD" OF THE SIGNAL POLE. VERIFICATION OF
POLE "OD" MUST BE MADE BEFORE THE CLAMPS
ARE MANUFACTURED.

VIDEO DETECTOR (BANDED
OR CLAMP MOUNTED)
DRILL A 5/8\" HOLE IN THE
BOTTOM ARM END CAP
JUST LARGE ENOUGH TO
PLACE THE VIDEO DETECTOR
CABLE THROUGH IT.
SEE NOTE F OF CONDUIT
ELL SPECIFICATIONS
ON SHEET 3 OF 3.

(2) 1/2\"-13NC x 2-1/2\" LONG HEX HD
BOLTS WITH HEX NUTS & LOCKWASHERS
(STAINLESS STEEL)
3/4\" CABLE HOLE
THROUGH CLAMP

(2) 1/2\"-13NC x 2-1/2\" LONG HEX HD
BOLTS WITH HEX NUTS & LOCKWASHERS
(STAINLESS STEEL)
3/4\" CLAMP GAP

VIEW A-A
VERIFY UPPER & LOWER
ID DIMENSIONS

30'-0" BRACKET ARM

VIDEO DETECTOR /
TRAFFIC FLOW MONITOR
BRACKET ARM

EFFECTIVE PROJECTED AREA
TRAFFIC FLOW CAMERA - 1 SQ. FT
VIDEO DETECTOR - 0.75 SQ FT
WEIGHT IN POUNDS
TRAFFIC FLOW CAMERA - 20
VIDEO DETECTOR - 8
SAFETY FACTOR > 1.6

LOADING FACTORS

HORIZONTAL SLIPFITTER

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SHT 1 OF 3
INSTALL TRAFFIC FLOW MONITOR CABLE IN TOP ARM BRACKET

TAPE ALUM. TUBE (.5" O.D.)
.125" WALL, ALLOY 5053-T6
BLANK LENGTH, UPPER 25'-9" BLANK LENGTH, LOWER 23'-9"

2'-9" TAPERED

2'-9"

3'-X-8.1/2" SECTION (TYP.)

1'-10"

1'-10"

2'-6"

(4) 3/8" STIFFENERS

ALUMINUM VERTICAL STRUTS (TYP.)

21'-3" TAPERED

21'-3"

23'-2"

1/8" DIA WEEP HOLE

CAST ALUM. POLE BANDS FITTED TO POLE OD
WITH 1/2"-13NC STAINLESS STEEL HARDWARE

WARNING: TIGHTEN BRACKET CLAMPS SECURELY TO PREVENT BRACKET ROTATION & CABLE SHEARING.

TOP CLAMP LOCATION IS ONE (1) FOOT BELOW TOP OF POLE. CLAMP ID SHALL BE DESIGNED TO FIT THE "OD" OF THE SIGNAL POLE. VERIFICATION OF POLE "OD" MUST BE MADE BEFORE THE CLAMPS ARE MANUFACTURED.

VIDEO DETECTOR (BANDED OR CLAMP MOUNTED)

DRILL A 5/8" HOLE IN THE BOTTOM ARM END CAP JUST LARGE ENOUGH TO PLACE THE VIDEO DETECTOR CABLE THROUGH IT. SEE NOTE F OF CONDUIT F.I.T. SPECIFICATIONS ON SHEET 3 OF 3.

VIEW A-A

VERIFY UPPER & LOWER ID DIMENSIONS

25'-0" BRACKET ARM

VIDEO DETECTOR / TRAFFIC FLOW MONITOR BRACKET ARM

EFFECTIVE PROJECTED AREA
TRAFFIC FLOW CAMERA - 1 SQ FT
VIDEO DETECTOR - .075 SQ FT

WEIGHT IN POUNDS
TRAFFIC FLOW CAMERA - 20
VIDEO DETECTOR - 8

SAFETY FACTOR > 1.6

LOADING FACTORS

2" SCH. 40 PIPE ALLOY 6063-T6

1/2" OF NPT THREADS ON THE OUTSIDE OF THE EXTENSION

SPIN LD. TO ACCEPT 2" PIPE

HORIZONTAL SLIPFITTER

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CITY ENGINEER

ZAHMAN

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SHT 2 OF 3
INSTALL THE TRAFFIC FLOW MONITOR CABLE IN THE TOP ARM BRACKET. INSTALL THE VIDEO DETECTOR CABLE IN THE BOTTOM ARM BRACKET.

THREADED OUTSIDE END OF BRACKET ARM PIPE (1.2" OF STD NPT THREADS)

VIDEO DETECTOR - BANDED OR CLAMP MOUNTED

(SEE NOTE 11)

BRACKET ARM

SEAL THE CABLE ENTRY OPENING IN END CAP. (SEE NOTE F)

VIDEO CABLE - W/ DRIP LOOP

THREADED LOCKNUT

ALL MOUNTING HARDWARE COLOR COATED TO MATCH BRACKET ARM COLOR.

LIGHT WEIGHT ALUMINUM LL OR LR CONDUIT ELL OUTLET BODY

2" TO 1.5" NPT HEX STEEL PIPE REDUCER

TRAFFIC FLOW MONITOR

NOTEs:

1. BRACKET ARMS SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO THE ROAD CENTERLINE AS PER PLAN.

2. ALL CABLES SHALL BE RUN INSIDE A BRACKET TUBE. ENTRY HOLES INTO THE SIGNAL POLE SHALL BE FIELD DRILLED.

3. BRACKET ARM, VIDEO DETECTOR OR & TRAFFIC FLOW MONITOR DOME SHALL BE COLOR COATED AS PER PLAN.

4. HEAT TREAT AFTER WELDING.

5. BRACKET ARMS SHALL BE COATED IN ACCORDANCE WITH THE PLANS TO MATCH THE SIGNAL SUPPORT OR STAIN POLE STRUCTURE.

6. A TRUSS-STYLE DESIGN SHALL BE USED AND SHALL BE CAPABLE OF SUPPORTING A LUMINAIRE WEIGHING 75 POUNDS AND HAVING AN EFFECTIVE PROJECTED AREA OF 1.6 SQUARE FEET AND OR CAMERA (VIDEO DETECTOR OR TRAFFIC FLOW MONITOR).

7. BRACKET ARMS SHALL BE DESIGNED FOR A 90 MPH WIND/loading WITH APPROPRIATE GUST FACTOR.

8. THE CLAMP MOUNTED ARM SHALL COME WITH BOTH CLAMPS AND MOUNTING HARDWARE.

9. BRACKET ARMS SHALL BE DESIGNED TO FIT A MAST ARM POLE SHAFT THAT HAS A NOMINAL TAPER OF 0.14 INCH PER FOOT AND A BOTTOM-OF-POLE OUTSIDE DIAMETER AS PER PLAN.

10. DETAILS AND DIMENSIONS ILLUSTRATED ON THESE DRAWINGS ILLUSTRATE AN ALUMINUM TRUSS. ALL STRUCTURAL COMPONENTS REMAIN THE RESPONSIBILITY OF THE MANUFACTURER.

11. FOR MECHANICAL DAMPENING DEVICE SEE STANDARD DRAWING 4122.

NOTES AND CONDUIT ELL SPECS

VIDEO DETECTOR / TRAFFIC FLOW MONITOR BRACKET ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
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STD DWG 4110

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CITY ENGINEER

SHT 3 OF 3
POLE CAP ALLOY 43, 1/4" 20 NC SS HEX HEAD SCREWS

1.25" DIA WIRE HOLE IN SHAFT WITH 1" ID RUBBER GROMMET

CAMERA CABLE FROM DOME INSIDE UPPER BRACKET ARM TO CAMERA CABINET

(SEE NOTE 5)

TRAFFIC SIGNAL POLE SEE STANDARD DRAWING 4170

POLE FOUNDATION & WORK PAD
SURFACES ARE TO BE FLUSH WITH EACH OTHER.
WHEN WORK PAD IS ADJACENT TO SIDEWALK, THEN PAD AND SIDEWALK SURFACES ARE TO BE FLUSH.

NOTES:

1. STRAIN POLE SUPPORTS SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

2. FOR FOUNDATION DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4160.

3. WHEN A GROUND MOUNTED CABINET IS USED, CONDUITS SHALL ENTER THROUGH THE FOUNDATION AND THE WORK PAD SHALL BE LOCATED ADJACENT TO THE GROUND MOUNTED CABINET.

4. RETAINING WALL WILL BE NEEDED IF ELEVATIONS AROUND WORKPAD IS GREATER THAN 3.1.

5. FOR BRACKET ARM DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4110.

TRAFFIC FLOW MONITOR

CITY OF COLUMBUS, OHIO
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DIVISION OF DESIGN AND CONSTRUCTION

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CITY ENGINEER

5/01/2014
SHT 1 OF 1
MECHANICAL DAMPENING DEVICE (SEE NOTE 15)

MECHANICAL DAMPENING DEVICE (SEE NOTE 16)

BRACKET ARM WHEN REQUIRED (SEE NOTE 6)

ARM LENGTH

VARIES (OVERLAP WHEN REQUIRED)

(SEE NOTE 5)

1/2" MIN. STAINLESS OR GALV. STEEL HEX HEAD THROUGH BOLT

1 3/8" DIA. HOLE IN MASTARM, WITH 1 in GROMMET OR BUSHING (TYPICAL) APPLICABLE TO ALL SIGNAL HEADS

RISE: 3" MIN., 12 in MAX., AFTER ERECTION OF SIGNALS (DESIGNS 4-12); RISE: 3" MIN., 30" MAX. AFTER ERECTION OF SIGNALS (DESIGN 14)

POLE SHALL BE VERTICAL WITH MAX. OFFSET OF 5/3 ALONG CENTERLINE

HAND HOLE (3"x6")

1'6" (TYP.)

POLE HEIGHT

POLE HEIGHT

HANDHOLE (4"x6")

HANDHOLE (5"x8")

STANDARD
CITY OF COLUMBUS
MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4120

5/01/2014
SHT 1 OF 10
### TABLE 1 - PART A - POLE DIMENSIONS

<table>
<thead>
<tr>
<th>DESIGN NO.</th>
<th>MAXIMUM DESIGN AREA SQ FT (NOTE A)</th>
<th>DESIGN DISTANCE FROM L FT</th>
<th>POLE TYPE</th>
<th>WALL THICK</th>
<th>SIZE</th>
<th>WALL THICK</th>
<th>SIZE</th>
<th>TWO PIECE ARM TYPE</th>
<th>WALL THICK</th>
<th>SIZE</th>
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<td>.239</td>
<td>13x9.78x23'</td>
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<td>10.32x5.00x38'</td>
<td>ROUND</td>
<td>.299</td>
<td>11x8.62x17' +</td>
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<tr>
<td>12</td>
<td>42</td>
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<td>.299</td>
<td>14x10.78x23'</td>
<td>.299</td>
<td>16x8.80x30' +</td>
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<td>.299</td>
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<td>14</td>
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<td>.299</td>
<td>17x13.78x23'</td>
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<td>C15</td>
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<td>C16 DOUBLE ARM</td>
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**ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.**

### TABLE 1 - PART B - POLE DIMENSIONS

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<tr>
<th>DESIGN NO.</th>
<th>ARM ATTACHMENT</th>
<th>ANCHOR BASE</th>
<th>ANCHOR BOLT</th>
<th>PLATE SKIRT</th>
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<td>B</td>
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<td>C15</td>
<td>24</td>
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<td>C16 DOUBLE ARM</td>
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<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>

**ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.**

**THESE DESIGNS USE FULL PENETRATION WELDS AT THE ARM AND BASE PLATE CONNECTIONS.**

**NOTES:**

A. MAXIMUM DESIGN AREA IS BASED ON 90 MPH DESIGN WIND SPEED WITH A PRESSURE OF 25 PSF.

B. DIMENSION LOCATIONS ARE ILLUSTRATED ON SHEETS 3 & 4.
BASE CONNECTION

STANDARD
CITY OF COLUMBUS
MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
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CITY ENGINEER

SHT 3 OF 10
ARM ATTACHMENT (TYP.)
DESIGN 4, 12, 13 & 14

BOLT DIA. G, WASHER (S) (SEE NOTE 15)

"J" HOOK
GUSSET PLATES (THICKNESS = P) [SEE NOTE 17]

POLE P

2 1/2" DIA. HOLE
REMOVE SHARP EDGES

HANDHOLE
(4"x6")

SEE NOTE 15
OPENING FOR GALVANIZING

BOLT HOLE DIA., (SEE NOTE 1)

2 1/2" DIA. WIRING HOLE
IN POLE PLATE
CENTERED OVER 3" DIA.
HOLE IN POLE (DEBurr
HOLE)

4"x6" HANDHOLE
OPPOSITE MAST ARM

GALV. DRAIN
OPENINGS

(4) HEX HD CONNECTION
BOLTS (SIZE PER CHART)
EACH WITH (1) FLAT
WASHER (INCLUDED
WITH ARM) (SEE NOTE 15)

ARM ATTACHMENT (TYP.)
DESIGN C15

ARM ATTACHMENTS
STANDARD
CITY OF COLUMBUS
MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

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SHT 5 OF 10
2.5" dia. wiring hole in pole plate centered over 3" dia. hole in pole (debur hole)

See weld detail on sheet 3

4"x6" handhole between mast arms

(P) thk gussets top, bottom & sides

3/8"

(3) hex hd connection bolts (size per chart) each with (1) flat washer (included with arms)

Arm attachment (typ.)
Design C16

Arm attachments/DTI washer placement

Standard
City of Columbus
MAST ARM

DTI washer placement
For designs 13, 14, C15 & C16
(see note 15)

Pole plate
Arm plate
DTI washer
F436 flat washer
Connection nut

City of Columbus, Ohio
Department of Public Service
Division of Design and Construction

5/01/2014
SHT 6 OF 10

City Engineer
POLE EXTENSION FOR BRACKET ARM

POLE CAP, 3 SET SCREWS MINIMUM
THRU BOLT STYLE

"J" HOOK
3"x5" HANDHOLE

EXTENDED SIGNAL SUPPORT POLE

4"x6" HANDHOLE
"J" HOOK

POLE EXTENSION
STANDARD
CITY OF COLUMBUS
MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

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3"x5" HANDHOLE

VIDEO BRACKET ARM

CABLE SUPPORT "J" OR "C" HOOK

EXTENDED POLE SHAFT

HANDHOLE 3"x5"

VIDEO BRACKET ARM

HANDHOLE 4"x6"

4"x6" HANDHOLE

CURVED COVER PLATE

ALLEN WRENCH SOCKET OR PHILLIP TYPE OF MACHINE SCREW

STEEL LOCKING BRACKET W/RUST INHIBITING COATING

FLUSH HANDHOLE

NO. 12 STAINLESS STEEL SINGLE JACK CHAIN SECURED WITH 0.19" X 0.50" POP RIVETS

5"x8" HANDHOLE

12 GA. H.R.M.S. COVER SECURED WITH 0.25" x 0.50" STAINLESS STEEL CAP SCREWS

LOWER HANDHOLE

5" MIN

A

8" MIN

0.50" TAPPED HOLE IN THE RIM FOR A GROUND WIRE LUG BOLT

POLE TUBE WALL

SECTION A-A

COVER MOUNTING CLIP

LESS THAN 7 GA. = .19
7 GA. THRU 3 GA. = .25

STANDARD CITY OF COLUMBUS MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4120

5/01/2014
SHT 8 OF 10
1. ARM PLATE HOLE DIAMETER SHALL BE BOLT DIAMETER PLUS 1/8" POLE PLATE TAPPED HOLE SHALL HAVE THREADS WITH 75% (MIN.) FULL PROFILE HEIGHT. THREADS MAY BE RETAPPED AFTER GALVANIZING. (SEE SHEET 5.)

2. FOR SIGN MOUNTING DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4251 AND 4252.

3. FOR FOUNDATION DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.

4. THE ARM ATTACHMENT PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. THE POLE ATTACHMENT TO THE BASE PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. (SEE SHEET 3 AND 5.)

5. FOR SIGNAL ATTACHMENT DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.

6. FOR BRACKET ARM DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWINGS 4110.

7. A MINIMUM OF ONE BOLT THREAD SHALL REMAIN ABOVE THE ANCHOR NUT. (SEE SHEET 3.)

8. ALL UNUSED COUPLINGS SHALL BE PROVIDED WITH A REMOVABLE GALVANIZED CAST IRON PLUG.

9. FOR POLE AND BASE PLATE DIMENSIONS, SEE TABLES 1A AND 1B. (SEE SHEET 2.)

10. WHEN FREE SWINGING VEHICULAR SIGNAL HEADS ARE PERMITTED, THE WIRE ENTRANCE PART OF THE SIGNAL HEAD MAY BE ORIENTED IN ANY DIRECTION TO KEEP THE CABLE DRIP LOOP FROM RUBBING ON THE SIGNAL HEAD. THE SIGNAL HEAD SHALL HANG LEVEL AND PLUMB. (SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.)

11. FOR DETAILS AND LOCATION OF HAND HOLES, SEE FLUSH HAND HOLE AND OPTIONAL HAND HOLE DETAILS. (SEE SHEET 8.)

12. THE DESIGN LOADS WERE CALCULATED AS THE EQUIVALENT AMOUNT OF SIGNAL AREA THAT COULD BE CARRIED AT THE END OF THE ARM.

13. THE DESIGN LOADS WERE DEVELOPED WITHOUT APPLYING GALLOPING FATIGUE LOADS. ALSO, THE STRESS REQUIREMENTS OF NOTE B, TABLE 11-2 IN THE AASHTO CODE WERE NOT APPLIED.

14. THESE STRUCTURES SHOULD BE INSPECTED FOR EXCESSIVE WIND INDUCED DEFLECTION IN THE VERTICAL DIRECTION. IF FOUND, A DAMPING DEVICE SHOULD BE PLACED ON THE ARM.

15. MAST ARM CONNECTION BOLTS SHALL BE ASTM A325 FOR DIAMETERS 1.50" AND SMALLER. BOLTS LARGER THAN DIAMETER 1.50" SHALL BE ASTM A449. DESIGNS 4 THROUGH 12 SHALL USE ASTM F436 FLAT WASHERS. DESIGN 13 AND C16 SHALL USE ASTM F959 DTI WASHERS. DESIGN 14 AND C15 SHALL USE ASTM F2437 TYPE 2 GRADE 5 DTI WASHERS. IF NECESSARY, I.D. OF DTI WASHERS SHALL BE GROUND OR REAMED TO FIT PROPERLY OVER ATTACHMENT BOLTS. PROVIDE PROPER DTI FEELER GAUGE TO ENGINEER. AN F436 WASHER SHALL BE USED DIRECTLY UNDER THE HEAD OF THE BOLT WITH ALL DTI WASHERS. ASSURE THAT THE FLAT WASHER DOES NOT SPIN DURING BOLT TIGHTENING WITH DTI WASHER. (SEE SHEET 5 AND 6.)

16. AN APPROVED DAMPING DEVICE SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE END OF THE ARM. INSTALL IF DIRECTED BY THE PLANS OR THE ENGINEER. FLAT PLATE DAMPERS SHALL ONLY BE USED FOR NEW CONSTRUCTION IF DIRECTED BY THE PLANS OR THE ENGINEER. (SEE SHEET 1.) (SEE STD DWG 4122 FOR VIBRATION MITIGATION DEVICE.)

17. RING-STIFFENED WRAP-AROUND HORIZONTAL PLATES ARE PERMITTED AS AN ALTERNATIVE TO THE HORIZONTAL PLATES SHOWN. (SEE SHEETS 5.)

18. PRODUCT SHOP DRAWINGS FOR ALL ITEMS SHALL BE SUBMITTED FOR APPROVAL TO THE CITY OF COLUMBUS.

19. THE STRUCTURAL INTEGRITY OF ALL PRODUCTS SHALL TAKE PRECEDENCE OVER STATED DESIGN DIMENSIONS IF THESE DIMENSIONS IN THE OPINION OF THE MANUFACTURER NEED TO BE INCREASED FOR THAT MANUFACTURER'S PRODUCT TO MEET THE REQUIRED DESIGN LOADING REQUIREMENTS. THE MANUFACTURER SHALL SUBMIT DESIGN CHANGES TO THE CITY OF COLUMBUS FOR REVIEW AND APPROVAL. THE STATED DIMENSIONS ARE SHOWN TO ALLOW FLEXIBILITY IN FUTURE PART REPLACEMENTS AND TO CREATE A STANDARD FOR THE INTERCHANGEABILITY OF PARTS WITHIN THE CITY OF COLUMBUS.

20. ALL PRE-DRILLED HOLES FOR ALL BID ITEMS SHALL BE DEBURRED AND FREE OF ALL SHARP EDGES. ALL OUTSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE ROLLED OR GROUND SMOOTH. ALL INSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE VOID OF SHARP EDGES.

21. NO FOUNDATION BOLT PATTERN CHANGE SHALL BE ALLOWED FOR THE POLE SHAFT BASE PLATE. THE POLE BASE PLATE MUST FIT THE GIVEN FOUNDATION BOLT PATTERN AS SHOWN ON CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.

STANDARD CITY OF COLUMBUS MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

CITY ENGINEER

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22. SIGNAL SUPPORTS SHALL BE HOT DIPPED GALVANIZED AND COATED IN ACCORDANCE WITH THE PLANS.

23. SUPPORTS SHALL HAVE 1, 2, OR 3 HOLE HOLES, AS PER PLAN DESIGN, EACH COMPLETE WITH A COVER, A RECTANGULAR OR ELLIPTICAL REINFORCED FRAME, AND A STAINLESS STEEL FASTENER FOR THE COVER. THE FASTENER SHALL BE FLUSH WITH THE HOLE SURFACE. THE HOLE HOLES SHALL BE LOCATED 180 DEGREES FROM THE MAST ARM UNLESS SPECIFIED OTHERWISE. (SEE SHEET 8.)

A.) THE HOLE HOLE NEAR THE VIDEO BRACKET ARM SHALL HAVE A MINIMUM INSIDE OPENING OF 3” X 5” AND BE SIMILAR IN DESIGN TO THE BOTTOM HOLE HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.

B.) THE HOLE HOLE NEAR THE ARM ATTACHMENT SHALL HAVE A MINIMUM INSIDE OPENING OF 4” X 6” AND BE SIMILAR IN DESIGN TO THE BOTTOM HOLE HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.

C.) THE BOTTOM HOLE HOLE SHALL HAVE A MINIMUM INSIDE OPENING OF 5” X 8”. A GROUNDING PROVISION CAPABLE OF ACCEPTING 4 - #4 AWG COPPER GROUNDING WIRES SHALL BE PROVIDED AND SHALL BE ATTACHED TO THE FRAME.

24. SUPPORT SHALL HAVE A REMOVABLE POLE CAP ATTACHED EITHER BY A MINIMUM OF 3 STAINLESS STEEL SET SCREWS OR BY A STAINLESS STEEL THROUGH BOLT. (SEE SHEET 7.)

25. SUPPORTS SHALL HAVE A STEEL POLE BASE PLATE/ANCHOR BOLT-NUT COVER (1/4" THICK SQUARE PLATE, TWO PIECE CONSTRUCTION, GALVANIZED TO ASTM A123 THEN COATED) THAT SKIRTS THE BOLTS, NUTS AND BASE PLATE. ALL SCREW HOLES SHALL BE PRE-DRILLED AND STAINLESS STEEL FASTENERS SHALL BE USED. (SEE SHEET 4.)

26. SUPPORTS SHALL HAVE 1, 2, OR 3 WELDED CABLE SUPPORT HOOPS (‘J’ OR ‘C’ HOOKS) LOCATED ON THE INSIDE OF THE POLE AND G50 DEGREES FROM THE MAST ARM. (SEE SHEET 7.)

27. THE ARM SHALL MAINTAIN A CIRCULAR CROSS-SECTION (CONSTANT CROSS-SECTIONAL RADIUS).


29. THE ARM SHALL NOT HAVE PRE-DRILLED HOLES FOR SIGNAL HEAD CABLE ENTRY. THE CONTRACTOR SHALL FIELD DRILL THESE HOLES.

### TABLE 1 - PART A - POLE DIMENSIONS

<table>
<thead>
<tr>
<th>DESIGN NO.</th>
<th>MAXIMUM DESIGN AREA SQ FT (NOTE A)</th>
<th>DESIGN DISTANCE FROM CL FT</th>
<th>POLE TYPE</th>
<th>WALL THICK</th>
<th>SIZE</th>
<th>ARM WALL THICK</th>
<th>SIZE</th>
<th>TWO PIECE ARM TYPE</th>
<th>WALL THICK</th>
<th>SIZE</th>
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<tbody>
<tr>
<td>4</td>
<td>42</td>
<td>37.5</td>
<td>16-FLUTES</td>
<td>.250</td>
<td>13.00x8.94x29'</td>
<td>.250</td>
<td>10.50x5.18x38'</td>
<td>ROUND</td>
<td>.250</td>
<td>11.50x7.72x27' +</td>
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<td>12</td>
<td>42</td>
<td>47.5</td>
<td>16-FLUTES</td>
<td>.250</td>
<td>14.50x10.44x29'</td>
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<td>ROUND</td>
<td>.179</td>
<td>8.33x3.47x34'</td>
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<td>59.5</td>
<td>16-FLUTES</td>
<td>.250</td>
<td>16.00x11.94x29'</td>
<td>.179</td>
<td>8.33x3.47x34'</td>
<td>ROUND</td>
<td>.179</td>
<td>12.75x8.41x31' +</td>
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<td>38</td>
<td>69.5</td>
<td>16-FLUTES</td>
<td>.313</td>
<td>15.50x11.44x29'</td>
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<td>9.05x3.31x41'</td>
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<td>14.25x8.65x40' +</td>
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<td>78.5</td>
<td>16-FLUTES</td>
<td>.313</td>
<td>18.00x13.94x29'</td>
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**ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.**

### TABLE 1 - PART B - POLE DIMENSIONS

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<th>DESIGN NO.</th>
<th>ARM ATTACHMENT</th>
<th>ANCHOR BASE</th>
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<td>BOLT CIRCLE  S  J  K  T  R  H  DIA  L</td>
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<tr>
<td>C15</td>
<td>25 27 25 20 20 2 2 2 16</td>
<td>24 24 17 8 2 2 2.38 2 90</td>
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<tr>
<td>C16 (DOUBLE ARM)</td>
<td>21 23 21 17 17 2 1.5 1.5 13</td>
<td>22 23 15.56 6 2 3.5 2.38 2 90</td>
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** ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.**

**THESE DESIGNS USE FULL PENETRATION WELDS AT THE ARM AND BASE PLATE CONNECTIONS.**

**NOTES:**

A. MAXIMUM DESIGN AREA IS BASED ON 90 MPH DESIGN WIND SPEED WITH A PRESSURE OF 25 PSF.

B. DIMENSION LOCATIONS ARE ILLUSTRATED ON SHEETS 3 & 5.
NOTES:

THE HANDHOLE IN DECORATIVE BASE SHALL BE ALIGNED WITH THE HANDHOLE IN THE SUPPORT POLE.

DECORATIVE BASE MATERIAL SHALL BE AS SPECIFIED PER PLAN.
(G)-STUD DIA. (4)-STUDS EACH WITH (2)-HEX NUTS & (2) FLAT WASHERS (SEE NOTE 1 AND 30)

TOP VIEW

(2)-1/2" 13NC x 3 1/2" LG HEX HD CAP SCREWS (FIELD DRILL 5/8" DIA. HOLES IN POLE) 3/16" DIA. HOLE THRU PIPE & BOLT FOR 1/8" x 1 1/2" COTTER PINS

PLATE THICKNESS 3/8" (SEE NOTE 4)

SECTION VIEW

1/2" SCH 80 PIPE x 3/4" LG WELDED TO CLAMP

SEE WELD DETAIL BELOW

ARM FLANGE WELD DETAIL

MAST ARM CLAMP CONNECTION

DECORATIVE CITY OF COLUMBUS MAST ARM

CITY OF COLUMBUS, OHIO DEPARTMENT OF PUBLIC SERVICE DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4121

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CITY ENGINEER

Nassar Zahran
DECORATIVE CITY OF COLUMBUS MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

Handhole Frame Details:

- 3" x 5" Handhole near Bracket Arm Frame Detail
- 4" x 6" Handhole near Mast Arm Frame Detail
- 4" x 8" Bottom Handhole Frame Detail

Materials and Instructions:

- 11 GA cover with 1/4"-20NC S.S. machine screw & S.S. chain
- Grounding provision nut retainer C24774 welded to handhole frame with 1/2"-13NC S.S. sq nut & 3/4" LG S.S. hex bolt

Bar size angles on frame for cover attachment.

5/01/2014

CITY ENGINEER

SHT 6 OF 9
TOP OF POLE DETAIL
(FOR POLES WITH LUMINAIRE ONLY)

LUMINAIRE BRACKET ARM NOT SHOWN FOR CLARITY. SEE MIS-183 FOR ADDITIONAL DETAILS.

DTI WASHER PLACEMENT
(FOR DESIGNS 13, 14, C15 & C16)
(SEE NOTE 30)

POLE TENON / DTI WASHER PLACEMENT

DECORATIVE
CITY OF COLUMBUS
MAST ARM
NOTES:

1. ARM PLATE HOLE DIAMETER SHALL BE BOLT DIAMETER PLUS 1/8". (SEE SHEET 1)
2. FOR SIGN MOUNTING DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4251 AND 4252.
3. FOR FOUNDATION DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.
4. THE ARM ATTACHMENT PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. THE POLE ATTACHMENT TO THE BASE PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. (SEE SHEETS 3 AND 5.)
5. FOR SIGNAL ATTACHMENT DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.
6. FOR BRACKET ARM DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWINGS 4110.
7. A MINIMUM OF ONE BOLT THREAD SHALL REMAIN ABOVE THE ANCHOR NUT. (SEE SHEET 3.)
8. ALL UNUSED COUPLINGS SHALL BE PROVIDED WITH A REMOVABLE GALVANIZED CAST IRON PLUG.
9. FOR POLE AND BASE PLATE DIMENSIONS, SEE TABLES 1A AND 1B. (SEE SHEET 2.)
10. WHEN FREE SWINGING VEHICULAR SIGNAL HEADS ARE PERMITTED, THE WIRE ENTRANCE PART OF THE SIGNAL HEAD MAY BE ORIENTED IN ANY DIRECTION TO KEEP THE CABLE DRIP LOOP FROM RUBBING ON THE SIGNAL HEAD. THE SIGNAL HEAD SHALL HANG LEVEL AND PLUMB. (SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.)
11. FOR DETAILS AND LOCATION OF HAND HOLES, SEE FLUSH HAND HOLE AND OPTIONAL HAND HOLE DETAILS. (SEE SHEETS 1 AND 6.)
12. THE DESIGN LOADS WERE CALCULATED AS THE EQUIVALENT AMOUNT OF SIGNAL AREA THAT COULD BE CARRIED AT THE END OF THE ARM.
13. THE DESIGN LOADS WERE DEVELOPED WITHOUT APPLYING GALLOPING FATIGUE LOADS. ALSO, THE STRESS REQUIREMENTS OF NOTE B, TABLE 11-2 IN THE AASHTO CODE WERE NOT APPLIED.
14. THESE STRUCTURES SHOULD BE INSPECTED FOR EXCESSIVE WIND INDUCED DEFLECTION IN THE VERTICAL DIRECTION. IF FOUND, A DAMPING DEVICE SHOULD BE PLACED ON THE ARM.
15. AN APPROVED DAMPING DEVICE SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE END OF THE ARM. INSTALL IF DIRECTED BY THE PLANS OR THE ENGINEER. FLAT PLATE DAMPERS SHALL ONLY BE USED FOR NEW CONSTRUCTION IF DIRECTED BY THE PLANS OR THE ENGINEER. (SEE SHEET 1.)
16. A TENON SHALL BE PROVIDED TO ACCOMMODATE THE LUMINAIRE BRACKET ARM. (SEE SHEET 7.)
17. PRODUCT SHOP DRAWINGS FOR ALL ITEMS SHALL BE SUBMITTED FOR APPROVAL TO THE CITY OF COLUMBUS.
18. THE STRUCTURAL INTEGRITY OF ALL PRODUCTS SHALL TAKE PRECEDENCE OVER STATED DESIGN DIMENSIONS IF THESE DIMENSIONS IN THE OPINION OF THE MANUFACTURER NEED TO BE INCREASED FOR THAT MANUFACTURER'S PRODUCT TO MEET THE REQUIRED DESIGN LOADING REQUIREMENTS. THE MANUFACTURER SHALL SUBMIT DESIGN CHANGES TO THE CITY OF COLUMBUS FOR REVIEW AND APPROVAL. THE STATED DIMENSIONS ARE SHOWN TO ALLOW FLEXIBILITY IN FUTURE PART REPLACEMENTS AND TO CREATE A STANDARD FOR THE INTERCHANGEABILITY OF PARTS WITHIN THE CITY OF COLUMBUS.
19. ALL PRE-DRILLED HOLES FOR ALL BID ITEMS SHALL BE DEBURRED AND FREE OF ALL SHARP EDGES. ALL OUTSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE ROLLED OR GROUND SMOOTH. ALL INSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE VOID OF SHARP EDGES.
20. NO FOUNDATION BOLT PATTERN CHANGE SHALL BE ALLOWED FOR THE POLE SHAFT BASE PLATE. THE POLE BASE PLATE MUST FIT THE GIVEN FOUNDATION BOLT PATTERN AS SHOWN ON CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.

DECORATIVE
CITY OF COLUMBUS
MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4121

5/01/2014
SHT 8 OF 9

Nasser Zabaneh
CITY ENGINEER
21. SIGNAL SUPPORTS SHALL BE HOT DIPPED GALVANIZED AND COATED IN ACCORDANCE WITH THE PLANS.

22. SUPPORTS SHALL HAVE 1, 2, OR 3 HAND HOLES, AS PER PLAN DESIGN, EACH COMPLETE WITH A COVER, A RECTANGULAR OR ELLIPTICAL REINFORCED FRAME, AND A STAINLESS STEEL FASTENER FOR THE COVER. THE FASTENER SHALL BE FLUSH WITH THE HAND HOLE SURFACE. THE HAND HOLES SHALL BE LOCATED 180 DEGREES FROM THE MAST ARM UNLESS SPECIFIED OTHERWISE. (SEE SHEET 6.)

   A.) THE HAND HOLE NEAR THE VIDEO BRACKET ARM SHALL HAVE A MINIMUM INSIDE OPENING OF 3" X 5" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.

   B.) THE HAND HOLE NEAR THE ARM ATTACHMENT SHALL HAVE A MINIMUM INSIDE OPENING OF 4" X 6" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.

   C.) THE BOTTOM HAND HOLE SHALL HAVE A MINIMUM INSIDE OPENING OF 4" X 8". A GROUNDING PROVISION CAPABLE OF ACCEPTING 4 - #4 AWG COPPER GROUNDING WIRES SHALL BE PROVIDED AND SHALL BE ATTACHED TO THE FRAME.

23. THE VERTICAL POLE SHAFT SHALL HAVE 16 SHARP FLUTES.

24. THE DECORATIVE BASE SHALL BE AS DETAILED ON SHEET 4.

25. SUPPORTS SHALL HAVE 1, 2 OR 3 WELDED CABLE SUPPORT HOOKS ('J' OR 'C' HOOKS) LOCATED ON THE INSIDE OF THE POLE AND 90 DEGREES FROM THE MAST ARM.

26. THE ARM SHALL MAINTAIN A CIRCULAR CROSS-SECTION (CONSTANT CROSS-SECTIONAL RADIUS).


28. THE ARM SHALL NOT HAVE PRE-DRILLED HOLES FOR SIGNAL HEAD CABLE ENTRY. THE CONTRACTOR SHALL FIELD DRILL THESE HOLES.


30. MAST ARM CONNECTION BOLTS SHALL BE ASTM A325 FOR DIAMETERS 1.50" AND SMALLER. BOLTS LARGER THAN DIAMETER 1.50" SHALL BE ASTM A449. DESIGNS 4 THROUGH 12 SHALL USE ASTM F436 FLAT WASHERS. DESIGN 13 AND C16 SHALL USE ASTM F959 DTI WASHERS. DESIGN 14 AND C15 SHALL USE ASTM F2437 TYPE 2 GRADE 5 DTI WASHERS. IF NECESSARY, I.D. OF DTI WASHERS SHALL BE GROUND OR REAMED TO FIT PROPERLY OVER ATTACHMENT BOLTS. PROVIDE PROPER DTI FEELER GAUGE TO ENGINEER. AN F436 WASHER SHALL BE USED DIRECTLY UNDER THE HEAD OF THE BOLT WITH ALL DTI WASHERS. ASSURE THAT THE FLAT WASHER DOES NOT SPIN DURING BOLT TIGHTENING WITH DTI WASHER. (SEE SHEETS 5 AND 7.)
MECHANICAL DAMPENING DEVICE

NOTE:
NON-STAINLESS STEEL ITEMS SHALL BE COATED TO MATCH BRACKET / MAST ARM.
ANCHOR BOLTS

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

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ANCHOR BOLTS
### CITY OF COLUMBUS 4210 & 4121 TYPE SUPPORTS

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### NOTES:

1. USE 1/2" PREFORMED JOINT FILLER AS PER 705.03 BETWEEN FOUNDATIONS AND ADJACENT PAVED AREAS.

2. A SPECIAL FOUNDATION DESIGN WILL BE REQUIRED WHEN COHESIVE SOIL WITH UNDRAINED SHEAR STRENGTH OF LESS THAN 2000 LB/FT² OR GRANULAR SOIL WITH AN ANGLE OF INTERNAL FRICTION LESS THAN 30° AND A WET DENSITY LESS THAN 120 LB/FT³ IS ENCOUNTERED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN THESE CONDITIONS ARE IDENTIFIED.

3. PROVIDE ALL ANCHOR BOLTS WITH STANDARD STEEL HEX NUTS, LEVELING NUTS, AND PLAIN WASHERS. THE NUTS SHALL BE CAPABLE OF DEVELOPING THE FULL STRENGTH OF THE ANCHOR BOLTS.


5. THE SIZE, NUMBER (MINIMUM OF 2) AND ORIENTATION OF CONDUIT ELLS SHALL BE SHOWN IN THE PLAN. EXCEPT THAT A 3/4" SCHEDULE 40 PVC CONDUIT SHALL BE INSTALLED IN EACH FOUNDATION. UNUSED CONDUIT ELLS SHALL BE CAPPED.

6. CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4170 TYPE SUPPORTS DESIGNS 13 AND 14, AND 4120 AND 4121 TYPE SUPPORTS DESIGNS C15 AND C16 SHALL USE 6 NO. 8 REBARS.

7. THE ANCHOR BASE POLE FOUNDATION SIDES SHALL BE ORIENTATED PARALLEL TO THE SIDEWALK OR BACK-OF-CURB OR EDGE-OF-PAVEMENT.

8. THE TOP OF THE FOUNDATION SHALL BE SET BASED ON THE FOLLOWING GUIDELINES:

   **FOUNDATION LOCATED ENTIRELY IN WALK OR CONCRETE AREA**
   TOP OF FOUNDATION SHALL BE AS PER 4161.

   **FOUNDATION LOCATED BEHIND CURB ASSOCIATED WITH CURB RAMP**
   TOP OF FOUNDATION SHALL BE FLUSH WITH TOP OF CURB AT BACK OF RAMP FOR A PARALLEL RAMP.

   **FOUNDATION LOCATED ADJACENT TO WALK OR CONCRETE AREA**
   TOP OF FOUNDATION SHALL BE FLUSH WITH WALK OR CONCRETE AREA FOR A PERPENDICULAR RAMP.

---

**SIGNAL SUPPORT/ STRAIN POLE FOUNDATIONS**

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4160

CITY ENGINEER

5/01/2014
SHT 3 OF 3
LEVEL & SLOPE THE SUBGRADE AS SHOWN. COMPACT THE SUBGRADE AROUND THE FOUNDATION. THOROUGHLY CLEAN THE CONCRETE FOUNDATION SURFACE SO THE WALK CONCRETE WILL BOND.

NOTE:

WHEN POURING WALK, EMBED 1/2" THICK EXPANSION JOINT FILLER (CMSC 608.03C AND 705.03). FORM A 3'x3' SQUARE (STRAIN POLE AND MAST ARM POLE FOUNDATION) OR 2'x2' SQUARE (PEDESTAL POLE FOUNDATION) AND CENTER THE JOINT FILLER AROUND THE FOUNDATION AS DIRECTED BY THE ENGINEER. ORIENT THE EXPANSION JOINTS PARALLEL TO OTHER GEOMETRIC LINES.
NOTES:

1. WHEN POURING THE CONCRETE WALK BASE, EMBED 1/2" THICK EXPANSION JOINT FILLER (608.03C AND 705.03). FORM A 3’X3’ SQUARE (STRAIN POLE AND MAST ARM POLE FOUNDATION) OR 2’X2’ SQUARE (PEDESTAL POLE FOUNDATION) AND CENTER THE JOINT FILLER AROUND THE FOUNDATION AS DIRECTED BY THE ENGINEER. ORIENTATE THE FILLER SQUARE PARALLEL TO OTHER GEOMETRIC LINES.

2. REBAR CAGE NOT SHOWN FOR CLARITY.


4. LEVEL & SLOPE THE SUBGRADE AS SHOWN. COMPACT THE SUBGRADE AROUND THE FOUNDATION. TROUGHERLY CLEAN THE CONCRETE FOUNDATION SURFACE SO THE CONCRETE WALK BASE WILL BOND.

5. LEAVE THE FOUNDATION CONCRETE DOWN 8”. POUR THE CONCRETE WALK BASE OVER THE LOWERED FOUNDATION.

6. PAVER AND SETTING BED DIMENSIONS SHALL BE PER CITY OF COLUMBUS STANDARD DRAWING 2301 OR PER PLAN.
SURFACE MUST BE LEVEL & CLEAN

EDGE CORNER WITH 1/2" SIDEWALK EDGER (TYPICAL ALL SIDES)

GROUND WIRE

CUT CONDUITS OFF WITHIN 2" ABOVE SURFACE. METAL CONDUITS SHALL HAVE BUSHINGS AND BE CENTERED IN FOUNDATION.

ANCHOR BOLTS & CONDUITS ARE INCIDENTAL TO THIS ITEM.

CONTROLLER WORK PAD SEE DETAIL ON SHEET 2

ANCHOR BOLTS CAN BE ENCASED IN CONCRETE OR MIN. 8" STUD ANCHOR BOLTS CAN BE INSTALLED BY FIELD DRILLING.

CONDUITS PER PLAN, 2' RADIUS

PERMANENTLY EMBLEM A VISIBLE MARKER IN THE CONCRETE ON TOP OF THE BASE 5" FROM THE EDGE & OVER THE EXITING 1/2" PVC CONDUIT.

GROUND RODS ARE 1"x10' AND SPACED 6' APART. DO NOT ENCASE END OF ROD IN CONCRETE.

NOTE:
USE EXPANSION MATERIAL BETWEEN THE BASE CONCRETE & OTHER CONCRETE AREAS.
## Controller Cabinet and Foundation Dimensions

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<th>M36 Cabinet (in.)</th>
<th>P44 Cabinet (in.)</th>
<th>P-UPS Cabinet (#1) (in.)</th>
<th>P-UPS Cabinet (#2) (in.)</th>
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### UPS Cabinet Foundation / Work Pad Type 1

- **Cw**: Cabinet Width
- **Co**: Cabinet Depth
- **Fw1**: Foundation Width 1
- **Fw2**: Foundation Width 2
- **WPw1**: Work Pad Width 1
- **WPw2**: Work Pad Width 2
- **WPw3**: Work Pad Width 3
- **UPS #1**: UPS Cabinet #1
- **SIGNAL CABINET #1**: Signal Cabinet
- **DOOR**: Door
- **DOOR HINGE**: Door Hinge
- **CONCRETE PAD**: Concrete Pad

### UPS Cabinet Foundation / Work Pad Type 2

- **Cw**: Cabinet Width
- **Co**: Cabinet Depth
- **Fw1**: Foundation Width 1
- **Fw2**: Foundation Width 2
- **WPw1**: Work Pad Width 1
- **WPw2**: Work Pad Width 2
- **UPS #2**: UPS Cabinet #2
- **SIGNAL CABINET #2**: Signal Cabinet
- **DOOR**: Door
- **DOOR HINGE**: Door Hinge
- **CONCRETE PAD**: Concrete Pad

### Standard Cabinet Foundation / Work Pad

- **Cw**: Cabinet Width
- **Co**: Cabinet Depth
- **Fw1**: Foundation Width 1
- **Fw2**: Foundation Width 2
- **WPw1**: Work Pad Width 1
- **WPw2**: Work Pad Width 2
- **M36 / P44 SIGNAL CABINET**: M36 / P44 Signal Cabinet
- **DOOR**: Door
- **DOOR HINGE**: Door Hinge
- **CONCRETE WORK PAD OR SIDEWALK**: Concrete Work Pad or Sidewalk

### Note:

Build-up/stabilization of surrounding area may be required by engineer and is incidental to the installation. This applies to all sloped area installations.

---

**Traffic Signal Controller Cabinet Foundation**

City of Columbus, Ohio
Department of Public Service
Division of Design and Construction

STD DWG 4162

City Engineer

5/01/2014

SHT 2 OF 2
NOTES:

1. 1/2" PREFORMED JOINT FILLER AS PER 608.03C SHALL BE USED BETWEEN FOUNDATIONS AND ADJACENT PAVED AREAS.

2. THE SIZE, NUMBER (MINIMUM OF 2) AND ORIENTATION OF CONDUIT ELLS SHALL BE AS SHOWN IN THE PLAN, EXCEPT THAT A 3/4" SCHEDULE 40 PVC CONDUIT SHALL BE INSTALLED IN EACH FOUNDATION. UNUSED CONDUIT ELLS SHALL BE CAPPED.

3. THE SIZE, NUMBER AND LOCATION OF ANCHOR BOLTS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER’S RECOMMENDATIONS.

4. ALL PEDESTALS SHALL BE PROVIDED WITH A METHOD OF SECURELY ATTACHING A 4 AWG INSULATED COPPER GROUNDING CONDUCTOR TO THE PEDESTAL OR ANCHOR BOLT. NO CABLES OR CONNECTIONS SHALL BE EXTERNAL TO THE PEDESTAL.

5. THE PEDESTAL BASE SHALL SET ON THE FOUNDATION TOP WITHOUT GROUTING, PREFORMED FILLERS OR LEVELING NUTS UNDER THE BASE. STAINLESS STEEL SHIMS MAY BE USED UNDER THE BASE FOR LEVELING THE INSTALLATION.

6. THE FOUNDATION AREA OF CONTACT WITH THE PEDESTAL BASE SHALL BE LEVEL. IF ADJACENT PAVED AREAS SLOPE, THE REMAINDER OF THE FOUNDATION TOP SHALL BE BEVELED TO MEET THE ADJACENT ELEVATIONS.

7. THE TOP OF THE FOUNDATION SHALL BE SET BASED ON THE FOLLOWING GUIDELINES:

   FOUNDATION LOCATED ENTIRELY IN WALK OR CONCRETE AREA
   TOP OF FOUNDATION SHALL BE FLUSH WITH WALK OR CONCRETE SURFACE.

   FOUNDATION LOCATED BEHIND CURB ASSOCIATED WITH CURB RAMP
   TOP OF FOUNDATION SHALL BE FLUSH WITH TOP OF CURB AT BACK OF RAMP.

   FOUNDATION LOCATED ADJACENT TO WALK OR CONCRETE AREA
   TOP OF FOUNDATION SHALL BE FLUSH WITH WALK OR CONCRETE AREA.

   FOUNDATION LOCATED ADJACENT TO WALK OR CONCRETE WITH STEEP GRADE CHANGE
POLE DETAILS

POLE CAP
3 SET SCREWS
(MIN.)

J HOOK
(SEE NOTE 7)

SPAN WIRE
CLAMP
(SEE NOTE 2)

SEE SHEET
4 OF 5

1/4" x 2" BAR
TYPICAL

(SEE
NOTE 4)

ANCHOR BOLTS
WITH STD. STEEL
HEX NUTS AND
PLAIN WASHERS
(SEE NOTE 5)

1/4" MIN.
STRAIN POLE

BASE PLATE

BOLT CIRCLE

H (DIA.)

S F S

NO. 12 STAINLESS STEEL SINGLE JACK CHAIN SECURED WITH 0.19" X 0.50" POP RIVETS

UPPER HANDHOLE MINIMUM SIZE IS 4" x 6"

LOWER HANDHOLE

0.50" TAPPED HOLE IN THE RIM FOR A GROUND WIRE LUG BOLT

HARDWARE

12 GA. H.R.M.S. COVER SECURED WITH 0.25" x 0.50" STAINLESS STEEL CAP SCREWS

POLE TUBE WALL

LESS THAN 7 GA. = .19
7 GA. THRU 3 GA. = .25

COVER MOUNTING CLIP

SECTION A-A

STANDARD DRAWING

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

4170

5/01/2014

SHT 3 OF 8
SPAN WIRE CLAMP

3/16" STRANDED STAINLESS STEEL CLAMP

1/4" THICK CLEVIS

1-3/8" DIA. HOLE FOR 1" SCH 80 PIPE X 2-1/4" LONG

1/4" HEX NUT AND LOCK WASHER

5/8" DIA. U-BOLT

3/16" DIA. HOLES FOR 5/32" x 2" S.S. COTTER PINS

CONNECTION POINTS SHALL BE WELDED

SPAN WIRE CLAMP

STRAIN POLE

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4170

5/01/2014

CITY ENGINEER

SHT 4 OF 8
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<td>32</td>
<td>-</td>
<td>900</td>
<td>23</td>
<td>0.563</td>
<td>22</td>
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</tbody>
</table>

**NOTES:**

A. TAPERED TUBE SHALL BE STEEL WITH A MINIMUM OF 55,000 PSI YIELD STRESS AFTER GALVANIZING.

B. DESIGN 5 SHALL BE ASTM A595M STEEL WITH A MINIMUM OF 55,000 PSI YIELD STRENGTH AFTER GALVANIZING. DESIGNS 6 THRU 14 SHALL BE ASTM A572M GRADE 65 STEEL WITH A MINIMUM OF 65,000 PSI YIELD STRENGTH AFTER GALVANIZING.

C. DESIGN 13 AND 14 STRAIN POLES ARE AASHTO 1994 COMPLIANT.
NOTES:

1. SIGNAL CABLE ENTRANCE SHALL BE A 2" MINIMUM BLIND HALF COUPLING PROVIDED IN EACH POLE ON CORNERS WITHOUT CABINET. MINIMUM OF 3" BLIND HALF COUPLING ON CORNER WITH CABINET OR AS SPECIFIED ON THE PLANS.

2. SPAN WIRE CLAMP SHALL BE GALVANIZED STEEL, CAPABLE OF RESISTING A LOAD OF 12,500 POUNDS MINIMUM WITHOUT PERMANENT DISTORTION.

3. FOR FOUNDATION DETAILS, INCLUDING ANCHOR BOLT DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.

4. THE BASE PLATE SHALL BE WELDED TO TWO PLY POLES WITH AWS PREQUALIFIED WELDS IN CONFORMANCE WITH 730.04.

5. A MINIMUM OF ONE FULL BOLT THREAD SHALL REMAIN ABOVE THE ANCHOR NUT.

6. ALL UNUSED COUPLINGS SHALL BE PROVIDED WITH A REMOVABLE GALVANIZED CAST IRON PLUG.

7. PROVIDE 1 OR 2 WELDED CABLE SUPPORT HOOKS ('J' OR 'C' HOOKS) LOCATED ON THE INSIDE OF THE POLE.

8. STRAIN POLES SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

9. PROVIDE 1, 2 OR 3 HANDHOLES, AS PER PLAN DESIGN, EACH COMPLETE WITH A COVER, A RECTANGULAR OR ELLIPTICAL REINFORCED FRAME, AND A STAINLESS STEEL FASTENER FOR THE COVER. THE FASTENER SHALL BE FLUSH WITH THE HANDHOLE SURFACE. THE HANDHOLES SHALL BE LOCATED 180 DEGREES FROM THE RESULTANT FORCE UNLESS SPECIFIED OTHERWISE.
   A.) THE HAND HOLE NEAR THE VIDEO BRACKET ARM SHALL HAVE A MINIMUM INSIDE OPENING OF 3" X 5" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.
   B.) THE HAND HOLE NEAR THE SPAN WIRE ATTACHMENT POINT SHALL HAVE A MINIMUM INSIDE OPENING OF 4" X 6" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.
   C.) THE BOTTOM HAND HOLE SHALL HAVE A MINIMUM INSIDE OPENING OF 5" X 8". A GROUNDING PROVISION CAPABLE OF ACCEPTING 4 - #4 AWG COPPER GROUNDING WIRES SHALL BE PROVIDED AND SHALL BE ATTACHED TO THE FRAME.

10. PROVIDE A REMOVABLE POLE CAP ATTACHED EITHER BY A MINIMUM OF 3 STAINLESS STEEL SET SCREWS OR BY A STAINLESS STEEL THROUGH BOLT.

11. FOR BRACKET ARM DETAILS SEE CITY OF COLUMBUS STANDARD DRAWING 4110.
POLE MOUNTING STANDARD

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STANDARD
4200

8/01/2015
SHT 1 OF 2
NOTES:

1. SIGNAL HEAD CONDUIT BRACKETS AND CONDUIT FITTINGS SHALL BE GALVANIZED AND PAINTED (EXCEPT POLE CLAMPS OR BANDS) TO MATCH THE POLE.

2. THE SIGNAL HEAD BRACKET ARMS SHALL BE ATTACHED TO STEEL POLES BY HUB PLATES ATTACHED TO THE POLE WITH 3/4" WIDE STAINLESS STEEL BANDS (TWO BANDS PER HUB PLATE).

   A. HOLES FOR WIRE ACCESS SHALL BE FIELD DRILLED.

   FIELD INSTALLATION OF THE WIRING HOLES FOR SIGNAL HEADS AND PUSHPUSHTTONS WILL BE PERMITTED PROVIDED THAT THE HOLES ARE DRILLED OR HOLE SAWN. NO TORCH CUTTING OR FIELD WELDING WILL BE PERMITTED. CUT SURFACES SHALL BE FILED SMOOTH AND COVERED WITH TWO COATS OF ZINC RICH PAINT. GROMMETS OR WIRING GUIDES SHALL BE INSTALLED IN THE HOLES.

3. VERTICAL SPACING BETWEEN BRACKET FITTINGS SHALL BE DETERMINED BY THE CONTRACTOR, AND SHALL BE THE DIMENSION FROM CENTERLINE TO CENTERLINE OF THE BRACKET ARMS NECESSARY TO ACCOMMODATE THE VERTICAL HEIGHT OF THE SIGNAL HEAD PLUS NOT MORE THAN 10".

4. OUTER JACKET OF THE PEDESTRIAN SIGNAL CABLE SHALL EXTEND INTO THE SIGNAL HOUSING

5. THE PEDESTRIAN SIGNAL HEAD HOUSING AND CLAM SHELL MOUNTING BRACKETS SHALL BE BLACK MATCHING FEDERAL STANDARD 595B, COLOR # 27038.

6. CLEARANCE DISTANCES PROVIDED IN THE OHIO DEPARTMENT OF TRANSPORTATION'S LOCATION AND DESIGN MANUAL, VOLUME 1 OR A MINIMUM OF 2', WHICH EVER IS GREATER, SHALL BE MAINTAINED.

7. PLACEMENT OF PEDESTRIAN PUSHPUSHTTONS SIGN SHALL BE PER CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4230.
RIGID SIGNAL HEAD MOUNTING FOR
MAST ARMS

OVERHEAD SIGNAL
ATTACHMENTS -
MAST ARM

UPPER ARM - ALUMINUM ALLOY
CASTING ALLOWING POSITIVE
POSITIONING OF THE SIGNAL
HEAD WITHOUT MISALIGNMENT.

SIGNAL HEAD
ATTACHMENT
HARDWARE KIT

STAINLESS V-BOLTS
(5/16"-18)

CABLE CLAMP
LOOP

HIGH TENSILE ALUMINUM
ALLOY FULLY ADJUSTABLE
TWO PIECE CLAMP WITH
VERTICAL ADJUSTMENT
OPTION

1.5" DIA. GUSSETED TUBE

SIGNAL HEAD
ATTACHMENT
HARDWARE KIT

CABLE ENTRY INTO SIGNAL
HEAD SHALL BE FROM THE
LOWER ARM.

LOWER ARM - ALUMINUM
ALLOY CASTING ALLOWING
POSITIVE POSITIONING OF THE
SIGNAL HEAD WITHOUT
MISALIGNMENT.
RIGID SIGNAL HEAD MOUNTING FOR MAST ARMS

OVERHEAD SIGNAL ATTACHMENTS - MAST ARM
FREE SWINGING SIGNAL HEAD MOUNTING FOR MAST ARMS

OVERHEAD SIGNAL ATTACHMENTS - MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4201

8/1/2015
CITY ENGINEER

SHT 3 OF 4
GENERAL

ALL SIGNAL HEAD ASSEMBLIES SHALL BE INSTALLED IN A PLUMB POSITION AND PERPENDICULAR TO THE APPROACH LANE.

ALL SIGNAL HEADS SHALL BE INSTALLED WITH THEIR LOWEST PART (INCLUDING BACKBRACING AND BACKPLATES) WITH A CLEARANCE ABOVE PAVEMENT ELEVATION AT THE HIGHEST POINT OF THE ROADWAY OF 16.5' MINIMUM, 19' MAXIMUM. HOWEVER, 17' IS THE PREFERRED HEIGHT. IT IS INTENDED THAT THIS CLEARANCE BE OBTAINED BY ATTACHMENT HEIGHTS, ARM RISE, AND OTHER FACTORS DURING THE INSTALLATION. IF THE INSTALLATION CANNOT BE ADJUSTED TO THE PROPER CLEARANCE, THE CONTRACTOR SHALL ADVISE THE CITY OF ALL SIGNALS WHICH WILL POTENTIALLY NOT BE IN COMPLIANCE WITH THIS RANGE PRIOR TO INSTALLATION.

SIGNAL HEAD ROTATION SHALL BE PREVENTED BY THE USE OF SERRATED RINGS, SET SCREWS OR OTHER POSITIVE LOCKING DEVICES INCORPORATED IN THE SIGNAL HOUSING AND AT CRITICAL LOCATIONS IN THE SUPPORTING HARDWARE.

SIGNAL HEAD MOUNTING BRACKETS AND FITTINGS SHALL BE COATED TO MATCH THE MAST ARM. ATTACHMENT HARDWARE SHALL BE COATED IN ACCORDANCE WITH THE PLANS.

RIGID SIGNAL HEAD MOUNTING FOR MAST ARMS:

THE MAST ARM CLAMP SHALL HAVE A MINIMUM STRENGTH AT YIELD TO SUPPORT A 200 POUND LOAD WITH 90 MPH WIND.

FOR A 3-SECTION SIGNAL, SIGNAL CABLE SHALL ENTER THE GREEN SECTION SIGNAL HEAD. FOR A 5-SECTION HEAD, ENTER HOUSING THROUGH GREEN BALL SECTION AND ROUTE CABLE THROUGH RED SECTION TO ACCESS THE TURN ARROW SECTION.

TERMINAL BLOCK SHALL BE LOCATED IN GREEN SECTION FOR RIGID MOUNTED SIGNAL HEADS.

CABLE CLAMPS SHALL BE STAINLESS STEEL CABLE ONLY. CABLE CLAMPS TO BE PROVIDED WITH APPROPRIATE LENGTH. ANY ADDITIONAL CABLE WILL BE SECURELY COILED IN PLACE AND NOT CUT.

FREE SWINGING SIGNAL HEAD MOUNTING FOR MAST ARMS:

THE CLEVIS SHALL HAVE A NOMINAL 11/16" DIAMETER HOLE WHICH WILL ACCEPT A 5/8" DIAMETER X 2" LONG STAINLESS STEEL CLEVIS PIN.

A 1" LONG X 1/8" DIAMETER STAINLESS STEEL COTTER PIN SHALL BE FURNISHED WITH EACH CLAMP.

THE HANGER SHALL HAVE A MINIMUM STRENGTH AT YIELD TO SUPPORT A 1000-POUND LOAD.

A 90 DEGREE CLEVIS HANGER THAT HAS A STAINLESS STEEL BUSHING AND IS CONNECTED TO A WIRE ENTRANCE HEAD SHALL BE USED.

SIGNAL CABLE SHALL ENTER THE RED SECTION.

TERMINAL BLOCK SHALL BE LOCATED IN RED SECTION.
3-SECTION SIGNAL HEAD SUSPENSION

EXTENDER: OVERLAP AT LEAST 3" AND FASTEN WITH AT LEAST 2 BOLTS AT 2 in. SPACING (SEE NOTE 6)

STRAIN-RELIEF SPRING (SEE DETAIL B2)

BACKPLATE (SEE NOTE 18)

CLAMP ASSEMBLY, 3/4" SLOT

MESSENGER WIRE

SINGLE-HOLE EXTENDER CONNECTOR HANGER, 3/4" (SEE NOTE 1)

ADJUSTABLE-DROP TRI-STUD WIRE ENTRANCE (SEE NOTE 4)

6 in DRIP LOOP (TYP.)

TRI-STUD BREAKAWAY CLAMP (DETAIL A)

BREAKAWAY CLAMP, FULL WIDTH, FIXED SIDE FULLY FLAT

BREAKAWAY CLAMP, FULL WIDTH, FIXED SIDE FULLY FLAT

1-5/8" MIN.

TETHER WIRE: 1/4" 7-STRAND

COMPRESSION SPRING (SEE NOTE 9)

ROUNDED EDGES

ROUNDED EDGES

DIRECTION OF VEHICLE TRAVEL UNDER SIGNAL

DETIAL A: BREAKAWAY TETHER ANCHOR (TYPICAL, SEE NOTE 6)

OVERHEAD SIGNAL ATTACHMENTS - SPAN WIRE
TETHER WIRE

CROSS-BRACES:
MIN. 0.125" THICK
2" WIDTH
GALVANIZED STEEL
(MAY BE FIELD DRILLED)

SPREADER BARS

CROSS-BRACES:
MIN. 0.125" THICK
2" WIDTH
GALVANIZED STEEL
(MAY BE FIELD DRILLED)

DETAIL B2:
DOUBLE SPREADER BARS
AND CROSS-BRACING ON
SKEWED SPANS
(BOTTOM VIEW)

OVERHEAD SIGNAL
ATTACHMENTS -
SPAN WIRE

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STANDARD DRAWING
4202

5/01/2014
SHT 4 OF 7
OVERHEAD SIGNAL ATTACHMENTS - SPAN WIRE

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4202
5/01/2014
SHT 5 OF 7
NOTES:

1. ADJUST HANGER AND SPAN WIRE CLAMP TO ELIMINATE ALL PLAY BETWEEN HANGER AND CLAMP BY USING SHIM WASHERS AS NECESSARY. CAST 3/4” ALUMINUM MATCHING CLAMPS AND HANGERS WITH A TIGHT INITIAL FIT SHALL BE USED.

2. ALL SIGNAL HEAD ASSEMBLIES SHALL BE INSTALLED IN A PLUMB POSITION AND PERPENDICULAR TO THE APPROACH LANE.

3. ALL SIGNAL HEADS SHALL BE INSTALLED WITH THEIR LOWEST PART (INCLUDING TETHER ATTACHMENT HARDWARE AND BACKPLATES) WITH A CLEARANCE ABOVE THE ROADWAY PAVEMENT AT ALL POINTS OF 16.5’ MINIMUM, 19’ MAXIMUM. HOWEVER 17’ IS PREFERRED HEIGHT. TO OBTAIN 17’ IT IS INTENDED THAT THIS CLEARANCE BE OBTAINED WITHOUT THE USE OF BOTTOM EXTENDERS, BUT RATHER BY THE CAREFUL SELECTION OF FOUNDATION HEIGHTS, ATTACHMENT HEIGHTS, SPAN WIRE SAG, AND OTHER FACTORS DURING THE INSTALLATION. IF THE INSTALLATION CANNOT BE ADJUSTED TO THE PROPER CLEARANCE THE CONTRACTOR SHALL ADVISE THE CITY OF ALL SIGNALS WHICH EXCEED THE MAXIMUM.

4. SIGNAL HEAD ROTATION SHALL BE PREVENTED BY THE USE OF SERRATED RINGS AND TRI-STUDS OR OTHER POSITIVE LOCKING DEVICES INCORPORATED IN THE SIGNAL HOUSING AND AT CRITICAL LOCATIONS IN THE SUPPORTING HARDWARE. ONLY SINGLE-PIECE TRI-STUD ENTRANCE PORTS SHALL BE USED, NOT INSERTS.

5. ALL CONDUCTORS SHALL HAVE ADEQUATE CLEARANCE BETWEEN HANGERS, THIMBLES, BULLRINGS, ETC. IN ORDER TO AVOID DAMAGE FROM RUBBING.

6. FOR ALL TETHERED INSTALLATIONS, BREAKAWAY TETHER ANCHOR(S) SHALL BE INSTALLED IN BOTTOM BRACKET. BOTTOM TETHER ANCHOR EXTENDER SHALL BE USED ONLY IF THERE IS INTERFERENCE BETWEEN BACKPLATE AND TETHER WIRE. SIGNAL HEIGHT ADJUSTMENT SHALL BE MADE BY TOP-MOUNTED EXTENDERS ONLY. BREAKAWAY CLAMP SHALL BE FULL WIDTH WITH ROUNDED EDGES. CLAMP SHOULD COMPRESS TETHER WIRE ONLY AGAINST A FLAT SURFACE (DETAIL A).

7. BACKUP TIE SHALL BE 1/4", 7-STRAND WIRE IDENTICAL TO TETHER WIRE. THREE CAST WIRE ROPE CLIPS ON EACH SIDE SHALL BE USED WITH 18" OVELAP AND SPACING AS SHOWN. TIE SHALL HANG NO LOWER THAN 17", ABOVE PAVEMENT, AND MUST NOT RUB AGAINST THE BREAKAWAY CLAMP. TIES UNDER 3-SECTION HEADS ARE RECOMMENDED IN WINDY AREAS; SHALL BE INSTALLED IF SPECIFIED IN PLANS, OR IF DIRECTED BY THE CITY. SPACING OF CLIPS MAY BE ADJUSTED TO ACCOMODATE ADJACENT HEADS. CLOSELY SPACED ADJACENT HEADS MAY SHARE A SINGLE BACKUP TIE AND WIRE ROPE CLIPS; THERE SHALL BE A MINIMUM OF THREE WIRE ROPE CLIPS BETWEEN HEADS.

8. MULTI-WAY HEADS WITH BACKPLATES SHALL NOT BE USED ON TETHERED SPANS. EXISTING MULTI-WAY HEADS SHALL BE SEPARATED AS DIRECTED BY THE CITY. REWIRE AS NECESSARY TO SEPARATE THE HEADS PER THE PROPER ALIGNMENT.

9. COMPRESSION SPRING, 0.375” OD, 0.054” WIRE DIAMETER, 10-12 COILS PER INCH, STAINLESS STEEL 6” MINIMUM LENGTH.

OVERHEAD SIGNAL ATTACHMENTS - SPAN WIRE

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4202
5/01/2014
SHT 6 OF 7

CITY ENGINEER

[Signature]

[Signature]
10. S-HOOK IS MATCHED TO THE STRAIN POLE DESIGN NUMBER (SEE TABLE 1). S-HOOK AND TURNBUCKLE ARE REQUIRED ONLY AT ONE END OF SIMPLE SPANS, ALL ENDS OF COMPLEX SPANS. S-HOOK SHALL BE CLOSED AT POLE END. IF S-HOOK BEGINS TO YIELD DURING INSTALLATION, IT SHALL BE REMOVED AND REPLACED. THE WIRE TENSION SHALL BE ADJUSTED TO MINIMIZE MOVEMENT OF SIGNAL HEADS IN HIGH WINDS. TYPICAL TENSION IS 600 TO 800 LBS.

<table>
<thead>
<tr>
<th>Strain Pole Design No.</th>
<th>Galvanized Mild Steel</th>
<th>S-Hook Wire Diameter (Inches)</th>
<th>S-hook yield point (+10%/-20%) (Pounds)</th>
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</thead>
<tbody>
<tr>
<td>5 - 14</td>
<td>1/2</td>
<td></td>
<td>3300</td>
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</table>

11. LOCK WIRE SHALL BE STAINLESS STEEL, 1/8" SOFT TEMPER, WOUND TO PREVENT TURNING OF THE TURNBUCKLE BODY. FINISHED SPAN SHALL HAVE AT LEAST 2" OF SPACE FOR TURNBUCKLE ADJUSTMENT. TURNBUCKLE SHALL NOT BE OVERTIGHTENED. USE 8-INCH HAND TOOLS, MAXIMUM.

12. IF SIGNAL ORIENTATION IS NOT PERPENDICULAR TO SPAN AND TETHER WIRE, THEN USE AN ANCHOR EXTENSION. CLAMP ASSEMBLY MUST BE ATTACHED TO THE FLAT SIDE OF THE EXTENDER BAR.

13. INSTALL SAFETY TIE AT EACH TURNBUCKLE. THIS WIRE SHALL BE 1"X19", 1/8" STAINLESS STEEL. TIE SHOULD BE SLACK, BUT NOT SO SLACK AS TO CONTACT POLE. USE 3 CLIPS PER END AT 3-1/4" SPACING.

14. TETHER WIRE SHALL BE 7-STRAND ASTM A475 HS OR EHS GRADE 1/4" ON ALL SPANS, INSTALL TETHER HORIZONTALLY. MAINTAIN PREFERRED CLEARANCE OF 17" OVER ROADWAY.

15. SPAN WIRE CLAMP AS PER CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4170 REQUIRED FOR TETHER WIRE ATTACHMENT OR APPROVED EQUAL RATED AT 3000 LBS. OR HIGHER. ALTERNATE ATTACHMENT METHOD SHALL NOT BE PERMITTED.

16. SAFETY TIE ANCHOR HEIGHT ABOVE TETHER IS ADJUSTED IN THE FIELD BEFORE S-HOOK IS INSTALLED. DIMENSION X (SAFETY TIE HEIGHT) SHALL BE ADJUSTED SO THAT THE MINIMUM VERTICAL CLEARANCE OF THE SAGGING TETHER WIRE ABOVE THE PAVEMENT WITHOUT THE S-HOOK INSTALLED IS AT LEAST 14'. MINIMUM DISTANCE BETWEEN THE SAFETY TIE CLAMP AND TETHER CLAMP SHALL BE 1.5" AND CONTAIN ENOUGH SLACK FOR HEAD TO SWAY IN HIGH WINDS. SAFETY TIE ANCHOR MAY BE ANY GALVANIZED OR STAINLESS STEEL POLE CLAMP ASSEMBLY RATED AT 3000 POUNDS OR HIGHER.

17. ON SPANS WITH BULLRINGS, A TIE SHALL BE PROVIDED BETWEEN MESSENGER AND TETHER BULLRINGS IF A 14" CLEARANCE CANNOT BE MAINTAINED AFTER S-HOOK OPENING. THIS VERTICAL TIE SHALL BE 1"X19", 1/16" STAINLESS STEEL. TIE SHALL BE SLIGHTLY SLACK, TIED BACK USING CAST WIRE ROPE CLIPS AS SHOWN. WIRE ROPE CLIPS SHALL NOT BE OVER-TIGHTENED.

18. FOR BACKPLATES SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4205.
BACKPLATE LOUVER CONFIGURATION  
(SEE NOTE BELOW)

NOTE:

ALL BACKPLATES SHALL HAVE LOUVERS AND 2" FLUORESCENT YELLOW REFLECTIVE BORDER. BORDER SHALL NOT BE APPLIED OVER LOUVERS. LOUVERS SHOULD BE ORIENTED TO SCOOP AIR FROM THE FRONT SIDE AND ORIENTED WITH THE OPENINGS FACING ALTERNATE DIRECTIONS BY GROUPS, AS SHOWN. LOUVER OPEN AREA SHALL BE AT LEAST 8 PERCENT OF THE TOTAL BACKPLATE AREA. 5-SECTION BACKPLATES SHALL HAVE NOTCHED TOP CORNERS, AS SHOWN.
FOR PUSHBUTTON LOCATED AT THE SIDE OF A LANDING AREA

FOR PUSHBUTTON LOCATED AT THE SIDE OF A LANDING AREA

FOR PUSHBUTTON LOCATED AT THE BACK OF A LANDING AREA

NOTE:

THE BOTTOM OF THE PUSHBUTTON SIGN SHALL BE MOUNTED JUST ABOVE THE TOP OF THE PUSHBUTTON.

Pedestrian Signal Heads Present

PUSHBUTTON & SIGN INSTALLATION DETAIL

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4230

8/01/2015

SHT 1 OF 2
FOR PUSHBUTTON LOCATED AT THE SIDE OF A LANDING AREA

POLE OR PEDESTAL

SIGN R10-3A 9"x15"

DIRECTION OF RAMP

PUSH BUTTON TO CROSS STREET WAIT FOR GREEN

R10-4A-9 (L) 9"x15"

FOR PUSHBUTTON LOCATED AT THE SIDE OF A LANDING AREA

POLE OR PEDESTAL

SIGN R10-3A 9"x15"

DIRECTION OF RAMP

PUSH BUTTON TO CROSS STREET WAIT FOR GREEN

R10-4A-9 (R) 9"x15"

FOR PUSHBUTTON LOCATED AT THE BACK OF A LANDING AREA

POLE OR PEDESTAL

SIGN CM-R10-3A 9"x15"

PUSH BUTTON TO CROSS "NAME OF STREET" WAIT FOR GREEN

CM-R10-4A-9 9"x15"

* Actual Street Name To Be Used

NOTE:

THE BOTTOM OF THE PUSHBUTTON SIGN SHALL BE MOUNTED JUST ABOVE THE TOP OF THE PUSHBUTTON.

Pedestrian Signal Heads Not Present

PUSHBUTTON & SIGN INSTALLATION DETAIL

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4230

8/01/2015

CITY ENGINEER

SHT 2 OF 2
### Type 2

**Sign Hanger Assembly Span Wire**

**Design Details**

- **Span Wire Clamp**
- **1-1/4" x 1/4" Galv. Steel Bar Stock (Bend and Twist Bar to Proper Configuration)**
- **No. 2 U-Channel Drive Post**
- **Drill or Punch for 5/16" Bolts, Washers and Nuts (2 Per Bar)**
- **Bolt, 3 Locations Min.**
- **Bear Plate See Detail**
- **4" to 6"**
- **10"**
- **2 Sign Hangers Required Per Sign As Shown**

**Material Specifications**

- **5" x 4" x 0.100" Aluminum or 0.06" Galv. Steel**
- **3/8" (10 mm) R**

**Installation Instructions**

- **Deburr All Edges (Typ.)**
- **3/8" Dia. Hole**
- **2"**
- **4"**

---

**City of Columbus, Ohio**

**Department of Public Service**

**Division of Design and Construction**

**STD DWG 4250**

**5/01/2014**

**City Engineer**

**SHT 2 OF 2**
NOTES:

ALL MOUNTING HARDWARE SHALL BE COATED TO MATCH SUPPORT STRUCTURE.

STAINLESS STEEL CABLE SHALL BE NEATLY COILED AFTER FINAL TENSIONING AND SECURELY PLACED WITHOUT CUTTING.
FREE SWINGING SIGN HANGER
1/4" x 2" GALV. STEEL BAR
DRILL OR PUNCH FOR 5/16" BOLTS, WASHERS AND NUTS (2 PER BAR)
NO.3 U-CHANNEL DRIVE POST
BEARING PLATE

SIDE VIEW

FREE SWINGING SIGN HANGER
5/8" HEX BOLT WITH WASHERS, CASTLE NUT AND COTTER KEY.

STAINLESS STEEL CABLE CLAMP

TWIST IN 3"

VARIES

VARS

2 SIGN HANGERS REQUIRED PER SIGN AS SHOWN

AS REQUIRED

BOLT, 3 LOCATIONS MIN.

BEARING PLATE

10" MIN

10" MIN

REAR VIEW

NOTES:
ALL MOUNTING HARDWARE SHALL BE COATED TO MATCH SUPPORT STRUCTURE.
STAINLESS STEEL CABLE CLAMP SHALL NOT BE PAINTED.

SIGN HANGER ASSEMBLY MAST ARM FREE SWINGING

5/01/2014

SHT 1 OF 1
NOTES:

1. USE A MINIMUM OF 2 BRACKETS (LOCATED 6" FROM TOP AND BOTTOM OF SIGN) PER INSTALLATION WITH MAXIMUM SPACING OF 3'.

2. ALL MOUNTING HARDWARE SHALL BE COATED TO MATCH SUPPORT STRUCTURE.

3. STAINLESS STEEL BANDING SHALL NOT BE PAINTED.
VEHICULAR DETECTOR

NOTES:

ONLY ONE SET OF LOOP WIRES SHALL BE RUN IN A SAW SLOT.

ALL ADJACENT SAW SLOTS SHALL HAVE A MINIMUM DISTANCE OF 1 FT BETWEEN THEM. NO SAW SLOT SHALL BE LOCATED WITHIN 1 FT OF A LONGITUDINAL OR TRANSVERSE JOINT IN P.C.C. PAVEMENTS IF THE SLOT IS PARALLEL TO THE JOINT.

DETECTOR LOOPS SHALL EACH BE ON A SEPARATE DETECTOR UNIT CHANNEL.

ALL CONDUIT FROM THE LOOP DETECTOR TO THE PULL BOX SHALL BE 125.04.

MULTIPLE LOOP DETECTOR INSTALLATION DETAIL
RECTANGULAR DETECTOR LOOP DETAILS

WIDTH AS SPECIFIED IN PLAN

LENGTH SPECIFIED IN PLAN

SAW CUT LAYOUT

SEE DETAIL A ON SHEET 6 OF 7

SEE CONDUIT DRILLED HOLE DETAIL ON SHEET 5 OF 7.

WINDING PATTERN
SEE TABLE FOR NUMBER OF TURNS

<table>
<thead>
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<th>LOOP TYPE</th>
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<tr>
<td>PRESENCE DETECTION LOOPS</td>
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<tr>
<td>ADVANCED DETECTION LOOPS (6&quot;x6&quot;)</td>
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VEHICULAR DETECTOR STANDARDS

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG 4300
5/01/2014
SHT 2 OF 7
BICYCLE LOOP CONSTRUCTION

<table>
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<th>LOOP TYPE</th>
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<tr>
<td>PRESENCE DETECTION LOOPS</td>
<td>3-3-3-3</td>
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</table>

VEHICULAR DETECTOR STANDARDS
NO TRENCHING OR UNDERCUTTING CLOSER THAN 2' FROM THE EDGE OF PAVEMENT. BACKFILL TRENCH UNDER BERM WITH THE LOW STRENGTH MORTAR.

NOTES:

THE DRILLED HOLE SHALL BE LOCATED AS SHOWN ABOVE AND WITHIN THE FULL DEPTH PAVEMENT. IT SHALL NOT BE DRILLED OR CUT THROUGH THE PAVED BERM, CURB OR CURB AND GUTTER SECTION.

IN AREAS OF POOR PAVEMENT CONDITION, THE SAW SLOT DEPTH SHALL BE INCREASED TO INSURE ADEQUATE WIRE EMBEDMENT. ALL FIELD ADJUSTMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

IF AN EXISTING PAVED BERM IS 4.5" THICK OR MORE, THE LOOP WIRE MAY BE INSTALLED IN A SAW SLOT CUT ACROSS THE BERM. WHEN PAVED BERM ARE LESS THAN 4.5" THICK, THE CONDUIT RACEWAY SHALL BE INSTALLED AS SHOWN.

**TYPICAL DRILLED HOLE LOCATIONS FOR 1" CONDUIT**
JOINT CROSSING DETAIL
IN PORTLAND CEMENT CONCRETE
PAVEMENTS

CUT OUT PAVEMENT AND JOINT
MATERIAL TO DEPTH OF SAWCUT
APPROXIMATELY 3" SQUARE OR 3" DIAMETER.
LAY WIRES IN "S" SHAPE.
FILL WITH ELASTIC JOINT
MATERIAL OR ASPHALT.

1 1/4" DIAMETER (MIN.) HOLE
DRILLED TO DEPTH OF SAW SLOT.

DETAIL A

VEHICULAR DETECTOR STANDARDS

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

STD DWG
4300

5/01/2014
SHT 6 OF 7
NOTES:

LOOP DETECTOR WIRE TO LEAD-IN CABLE SPLICES WITHIN THE ENCAPSULATED SPLICE ENCLOSURE SHALL BE SOLDERED.

IF A PULLBOX IS NOT SPECIFIED IN THE PLANS, THE WATERPROOF SPLICE ENCLOSURE SHALL BE LOCATED IN THE FIRST ENTERED POLE OR PEDESTAL, EXCEPT IF THE CONTROLLER CABINET IS MOUNTED ON THAT POLE OR PEDESTAL, IN WHICH CASE THE LOOP WIRES SHALL BE ROUTED DIRECTLY INTO THE CABINET.

THE ENCLOSURE SHALL NOT CONTAIN VISIBLE AIR BUBBLES (VOIDS) GREATER THAN 1/4 IN (16 MM)

LOOP SLOT DEPTH SHALL BE 4 IN.

LOOP DETECTOR WIRE IN TUBING SHALL BE AS SPECIFIED IN CMSC TABLE 732.19-1

LOOP DETECTOR SEALANT SHALL BE PER THE CITY OF COLUMBUS PRE-QUALIFIED PRODUCT LIST.

SAW SLOTS SHALL BE THOROUGHLY CLEANED AND DRIED PRIOR TO INSTALLATION OF SEALANT.
NOTES:

BICYCLE DETECTOR MARKINGS SHALL:
- Be used when a bicycle needs to actuate a traffic signal phase in order to proceed through an intersection.
- Not be used for right turn only lanes, when right turn on red is permitted.
- Not be used for second vehicle detection.
- Be accompanied by a R10-22 bicycle detector sign.

PLACEMENT GUIDELINES:
- Locate near the stop line.
- Locate to avoid conflicts with other markings.
- Locate in the right-most through lane and right-most left turn lane.
- Locate on the left side of an induction loop, except for the left lane of one-way streets.
- Locate on the right side of an inductive loop for the left lane of one-way streets.

INDUCTIVE LOOP DETECTOR APPLICATION

BIKE DETECTOR MARKINGS

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

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4301

5/01/2014

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BICYCLE DETECTOR MARKINGS SHALL:
- BE USED WHEN A BICYCLE NEEDS TO ACTUATE A TRAFFIC SIGNAL PHASE IN ORDER TO PROCEED THROUGH AN INTERSECTION.
- NOT BE USED FOR RIGHT TURN ONLY LANES, WHEN RIGHT TURN ON RED IS PERMITTED.
- NOT BE USED FOR SECOND VEHICLE DETECTION.
- BE ACCOMPANIED BY A R10-22 BICYCLE DETECTOR SIGN.

PLACEMENT GUIDELINES:
- LOCATE NEAR THE STOP LINE.
- LOCATE TO AVOID CONFLICTS WITH OTHER MARKINGS.
- LOCATE IN THE RIGHT-MOST THROUGH LANE AND RIGHT-MOST LEFT TURN LANE.
- LOCATE IN THE HORIZONTAL CENTER OF A VIDEO DETECTION ZONE.
LOOP DETECTOR LEAD-IN ATTACHMENT DETAILS

WOOD POLE SIDE VIEW

WOOD POLE FRONT VIEW

4 AWG INSULATED BONDING JUMPER

FOR PAINTED POLES DRILL AND TAP FOR A 1/2" GROUNDING BOLT WITH TWO WASHERS

3-BOLT CLAMP, OR PREFORMED DEAD END MAY BE USED

THIMBLE (SEE NOTE 1 ON SHEET 2)

WEATHERHEAD

STEEL POLE

CONTINUATION OF POLE (SEE NOTE 5)

CABLE TO CONTROLLER BY CONDUIT RISER OR BY WEATHERHEAD TO THE INSIDE OF POLE

LOOP DETECTOR LEAD-IN CABLE TO CONTROLLER OR CONTINUED ON SPAN

1' MAX

1' MAX

4 AWG INSULATED GROUNDING CONDUCTOR

GROUND CLAMP, TYPE FOR BARE MESSENGER WIRE

STAPLE TO POLE AT 5' INTERVALS. COVER WITH WIRE MOLDING OR PLACE THE WIRE IN 1/2" SCH. 80 PVC FROM THE GROUND LINE TO 10' ABOVE THE GROUND LINE.

MESSER WIRE DETAILS

SEE NOTE 1 ON SHEET 2.
NOTES:

1. MESSENGER WIRE POLE ATTACHMENT SHALL BE BY A POLE CLAMP ON STEEL POLES AND BE A 5/8" THRU-BOLT (OR THIMBLE-EYE BOLT) WITH WASHERS ON WOOD POLES.

2. THE LOOP DETECTOR LEAD-IN CABLE SHALL HAVE A SAG BETWEEN 3% AND 5% OR MATCH EXISTING UTILITY LINES.

3. THE POWER SERVICE MESSENGER WIRE SHALL BE GROUNDED AT THE FIRST AND LAST POLES IN A CABLE RUN AND AT INTERVALS NOT TO EXCEED 1200 FEET. WHEN ATTACHED TO WOOD POLES, THE MESSENGER WIRE SHALL BE GROUNDED BY BONDING TO AN EXISTING GROUND ROD. THE MESSENGER WIRE SHALL BE BONDED TO GROUNDED STEEL POLES BY USE OF A 1/2" BOLT, DRILLED AND TAPPED INTO THE POLE.

4. THE MINIMUM 3-BOLT CLAMP SHALL BE 6 INCH LONG WITH 1/2" DIAMETER BOLTS. PREFORMED GUY GRIPS SHALL NOT BE USED TO ATTACH THE MESSENGER WIRE TO THE SIGNAL POLES. THEIR USE IS LIMITED TO BULLRING ATTACHMENTS.

5. FOR CONTINUATION OF POLE SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4050.
"WHEN X" IS NOT EQUAL TO 180° OR AT A TERMINUS POINT A DOWN GUY IS REQUIRED.

NOTES:

1. FOR ANGLES OF 166° THROUGH 180° USE ATTACHMENT DETAILS SHOWN ON CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4330. MESSENER WIRE POLE ATTACHMENT SHALL BE BY A POLE CLAMP ON STEEL POLES AND BY A 5/8 INCH THRU-BOLT OR THIMBLEYE BOLT WITH 2″ SQUARE WASHERS ON WOOD POLES.

2. POWER SERVICE MESSENER WIRE SHALL BE ELECTRICALLY GROUNDED AT THE FIRST AND LAST POLES IN A CABLE RUN AND AT INTERVALS NOT TO EXCEED 1200 FEET.

3. WHEN ATTACHED TO WOOD POLES, THE MESSENER WIRE SHALL BE GROUNDED BY BONDING TO EXISTING SIGNAL GROUND WIRE OR CONNECTION TO A GROUND ROD. THE MESSENER WIRE SHALL BE BONDED TO GROUNDED STEEL POLES BY USE OF A 1/2″ BOLT, DRILLED AND TAPPED INTO THE POLE.

4. LOOP DETECTOR LEAD-IN CABLE SHALL HAVE A SAG TO MATCH THE EXISTING UTILITY LINES OR WHEN NO EXISTING LINES A SAG OF 3% TO 5%.

5. GROUNDING OF POLES SHALL BE AS SHOWN ON CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4330.
MAINLINE PROTECTED ONLY LEFT TURN PHASE, LEADING LEFT TURN ONLY CIRCUIT

1. RELAY SHOWN IN A DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. PLACE A PERMANENT LABEL ON THE PLATE READING "EBLT Ø CUTOUT RELAY"

EBLT PROTECTED ONLY PHASE

1. RELAY SHOWN IN A DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. PLACE A PERMANENT LABEL ON THE PLATE READING "EBLT Ø CUTOUT RELAY"

NBLT PROTECTED ONLY PHASE

1. RELAY SHOWN IN A DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. PLACE A PERMANENT LABEL ON THE PLATE READING "NBLT Ø CUTOUT RELAY"

WBLT PROTECTED ONLY PHASE

1. RELAY SHOWN IN A DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. PLACE A PERMANENT LABEL ON THE PLATE READING "WBLT Ø CUTOUT RELAY"

SBLT PROTECTED ONLY PHASE

1. RELAY SHOWN IN A DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. PLACE A PERMANENT LABEL ON THE PLATE READING "SBLT Ø CUTOUT RELAY"

LEFT TURN TRAP PREVENTION CUT-OUT RELAY

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City Engineer: Zahn
K1
KRPA-11DG-24
WITH 5x852 BASE
Provides delay
Inhibit to
EBLT during
Ø3 and Ø8 GREEN.

Ø3 GREEN CONTROLLER
Ø6 GREEN CONTROLLER
(DC OUTPUT)

K2
KRPA-11DG-24
WITH 5x852 BASE
Provides delay
Inhibit to
WBLT during
Ø4 and Ø7 GREEN.

Ø4 GREEN CONTROLLER
Ø7 GREEN CONTROLLER
(DC OUTPUT)

1. RELAY SHOWN IN DE-ENERGIZED STATE.
2. MOUNT RELAY BASE ON AN ALUMINUM PANEL THAT IS TO BE MOUNTED ON THE LEFT CABINET SIDE WALL.
3. RELAY PANEL LABEL SHALL READ ‘Ø3 & Ø7 L/T DELAY INHIBIT RELAY’.
4. ISOLATE ALL 115VAC TERMINAL CONNECTIONS TO ELIMINATE FEEDBACK.

Ø3/Ø7 LEFT TURN INHIBIT DELAY RELAY
USE FOR E/W SIDE STREETS

DELAY OVERRIDE RELAY LOGIC FOR SHELF MOUNTED DETECTOR UNITS

INHIBIT DELAY RELAY

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

INHIBIT DELAY RELAY

CITY ENGINEER

STD DWG 4333
5/01/2014
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